BONE ARTEFACTS FROM HISTRIA

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Abstract: The paper presents the results of the analysis of recent data regarding an assemblage composed of 19 artefacts retrieved during the 2010 and 2012 archaeological excavations in the *Basilica extra muros* Sector of the ancient city of Histria (today Istria, Constanța County, Romania). The objects represent complete and used pieces (tools, adornments and a bone tube) as well as raw material (cattle metapodials and radius). The five artefacts discovered in 2010 represent (probably) raw material for anvil manufacturing (cattle metapodials, radius); another nine pieces discovered in 2012 were used as anvils for manufacturing the toothed iron sickles and were dated back to the IInd century AD. The assemblage also contains four bone hairpins and a bone tube (for preserving needles? or perhaps used as whistle?). In the past six decades, the bone (and antler) anvils have provoked numerous debates relating to their origin, diffusion and (especially) their function. Dated between the Vth century BC and the XVIIIth century AD, such items seem to be present in two large geographical areas covering the western basin of the Mediterranean Sea and the western and northwestern regions of the Black Sea. The methodology for their research involves the analysis of various parameters: information about the context of their discovery, type, state of preservation, raw material, dimensions, manufacture, traces of use, reshaping, and traces of re-use. The traces of manufacture and use were currently analysed using an optical microscope. Other than stressing the relative rarity of such finds, it is worth emphasising that the study of ancient bone (and antler) anvils from Romania benefits from the advantage of an extended and unitary research while bringing an important documentary contribution to the presence of these controversial artefacts in some central-eastern regions of Europe. The artefacts in question illustrate complex interconnections between traditions extending over a long period of time, ancient crafts and the agrarian economy at the contact between iron technology (iron smelting, manufacture of iron tools), bone and antler processing, the use/re-use of the artefacts that resulted, and the cultivation of cereals in Antiquity in the regions around the Black Sea.

Cuvinte-cheie: agricultură, ac de păr de os, seceră, industria osului, suport de os, tub de os, prelucrarea fierului, Histria.

Rezumat: Lucrarea prezintă rezultatele analizei datelor recente privind o categorie specială reprezentată de 19 piese, recuperate în campaniile arheologice 2010 și 2012 de la Histria, sectorul *Basilica extra muros*. Piesele reprezintă materie primă neprelucrată (patru metapodii și un radius de vită), piese finite și utilizate (suporturi pentru dințarea secerilor de fier – 9, ace de păr – 4 și un tub de os). Artefactele sunt datate în secolul al II-lea e.n. În ultimii 60 de ani suporturile pentru dințarea secerilor de fier au generat numeroase controverse, legate de originea, difuziunea și mai ales, rolul lor funcțional. Ele au fost descoperite în două mari arii geografice incluzând bazinul occidental al Mediteranei și zonele de vest și nord-vest ale Mării Negre și sunt datate între secolul al V-lea î.e.n. și sec. al XVIII-lea. Metodologia de studiu include analiza unor parametri variați precum datele relative la contextul descoperirii, tipul, starea de conservare, materia primă, dimensiunile, modul de fabricare, urmele de folosire, reamenajarea, urmele de reutilizare. Urmele de fabricare și utilizare au fost analizate sistematic cu ajutorul microscopiei optice. În afară de relativa raritate a acestor piese, putem menționa faptul că studiul suporturile antice de os (și corn de cerb) pentru dințarea secerilor de fier descoperite în România are avantajul unui demers extins și unitar, furnizând o importantă contribuție documentară asupra prezenței acestor controversate artefacte în regiunile central-estice ale Europei. Obiectele în discuție ilustrează interfața complexă a unor tradiții de lungă durată, vechi meșteșuguri și economie agrară la contactul între tehnologia reducerii și prelucrării fierului, procesarea osului și a cornului și utilizarea/reutilizarea artefactelor rezultate și cultivarea cerealelor în antichitate în regiunile din jurul Mării Negre. Studiul nicovalelor antice de os și corn din România și în primul rând cele descoperite la Histria oferă astfel o importantă contribuție la cunoașterea tehnologiei și economiei în Europa antică.

1. THE ARCHAEOLOGICAL CONTEXT

The archaeological research of the past decade (2001–2012) at Histria (Istria, Constanța County) – an ancient city located on the western coast of the Black Sea – was conducted by Alexandru Suceveanu

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and Mircea Victor Angelescu (from "Vasile Pârvan" Institute of Archaeology of the Romanian Academy, Bucharest)[1]. For the *Basilica extra muros* Sector the excavations were led by Alexandru Suceveanu and Viorica Rusu-Bolindeț (the National History Museum of Transylvania, Cluj-Napoca)[2], while for the *Basilica with Crypt-"Florescu"* Sector, the research was led by Irina Adriana Achim ("Vasile Pârvan" Institute of Archaeology of the Romanian Academy, Bucharest)[3].

The bone and antler industry so far resulted (and analysed) from both sectors is represented by 118 pieces: six in 2001, 28 in 2002, 13 in 2003, 31 in 2004, 20 in 2006, one in 2008, 10 in 2010 and 9 in 2012. They were tools (bone "anvils" used for serrated iron sickles, two bone pins with a proximal perforation which might have been used as needles), adornments (bone pins without a proximal perforation considered to be hairpins), bone bands probably used as elements of marquetry, a bone tube, a bone handle, blanks, various partly shaped raw materials, waste products, etc. Two pieces came from the *Basilica with Crypt ("Florescu")* Sector while the rest of 116 were discovered in the *Basilica extra muros* Sector[4].

The archaeological excavations conducted by Viorica Rusu-Bolindeț in the *Basilica extra muros* Sector in 2010 and 2012 brought to light another important assemblage of bone artefacts. They were found abandoned in secondary contexts and came from structures, pits and from the vicinity of some features used for reducing the iron ore, connected to the crafting area from Section I and dated to the Early Roman period (probably, 1st–7th decades of the IInd century AD)[5].

The finds from the *Basilica extra muros* Sector are part of the collections of the National History Museum of Transylvania (Cluj-Napoca), while the artefacts from the *Basilica with Crypt-"Florescu"* Sector are part of the collection of the "Vasile Pârvan" Institute of Archaeology in Bucharest.

Ten bone pieces were discovered during the 2010 excavation (figs. 1–11). Among them, five were long bones (metapodials, radius) probably selected as raw materials for tools used to make the serrated teeth of the iron sickles (in our previous papers we refered to them as "anvils", the same term used in the international literature), four bone hairpins and a bone tube[6]. During the 2012 excavations, nine pieces were discovered (figs 12–25), all anvils[7].

The typological structure of the assemblage comprises adornments and accessories (bone hairpins), tubes, technical pieces and raw materials.

All the above-mentioned types of artefacts made the subject of several papers published in the past years[8].

2. THE BONE ANVILS

The cattle long bones (metapodials, radius) were selected as raw material for the anvils used to make the serrated teeth of the iron sickles. In Romania the numerous anvils were discovered at Histria – the *Basilica extra muros* Sector. They present a very interest phenomenon and pose very complex and current issues regarding iron metallurgy, the role of workshops for manufacturing farming tools (among them sickles) and the processing of skeletal animal materials[9].

Here, we present data regarding a special category of bone and antler finds: the anvils. It is quite recently that they were first mentioned in the Romanian archaeological literature referring to the western shore of the Black Sea in the ancient fortress city of Histria, and they illustrate in a unique way some of the technologic and economic aspects of those times.

Among the discoveries of bone and antler artefacts at Histria special attention was drawn to the bone (and exceptionally) antler anvils. This group of artefacts holds an important documentary potential as it illustrates in a unique way economic activities seemingly very different and complex, but in fact interconnected (farming, agricultural

[1] Suceveanu 2002; 2003; 2004; 2005; 2006; 2007. For other results of archaeological research at Histria see: Suceveanu 2008; 2009; 2010; Angelescu 2011; 2012; 2013.

[2] Suceveanu *et alii* 2002; 2003a; 2004; Rusu-Bolindeț, Bădescu 2006; Rusu-Bolindeț *et alii* 2005; 2006; 2007; 2008; 2009; 2010; 2011.

[3] Suceveanu *et alii* 2003b; Achim *et alii* 2004; 2005; 2006; 2007; 2008; 2009; 2010; 2011.

[4] Beldiman 2013; Beldiman *et alii* 2007; 2008a; 2008b; 2009b; 2009c; 2010a; 2010c; 2011a; 2011b; 2011c; Beldiman, Sztancs 2007; 2009a; 2009b; 2009c; 2010a; 2010b; 2011.

[5] Rusu-Bolindeț, Bădescu 2006; Rusu-Bolindeț *et alii* 2007; 2008; 2009; 2010; 2011.

[6] Rusu-Bolindeț *et alii* 2011.

[7] Unpublished research report.

[8] Beldiman 2013; Beldiman *et alii* 2007; 2008a; 2008b; 2009a; 2009b; 2009c; 2010a; 2010b; 2010c; 2010d; 2011a; 2011b; 2011c; Beldiman, Sztancs 2007; 2009a; 2009b; 2009c; 2010a; 2010b; 2011.

[9] Beldiman *et alii* 2011a; Beldiman 2013 – with bibliography.

activities, iron crafting, bone and antler processing, woodcraft, etc.).

The systematic and detailed study of these materials began in 2007 with the analysis of artefacts from the *Basilica extra muros* Sector found in 2004. In 2008 the systematic study of the bone and antler industry discovered during the 2001–2003 excavations was finished. Other studies were related to artefacts discovered in 2006 in the *Basilica extra muros* Sector and to artefacts from the *Basilica with Crypt-"Florescu"* Sector[10].

The artefacts from the *Basilica with Crypt-"Florescu"* Sector were discovered also in secondary contexts, probably abandoned. They could not be securely dated because of former excavations carried out by Grigore Florescu. There is some evidence suggesting a *grosso modo* chronological dating during the II[nd] century AD[11]. Two pieces were analysed from this sector: one discovered in 2002 and another one found in 2008[12].

2.1. Bone anvil methodology analysis and typology

The methodology of analysis takes into account the recording and analysis of all essential data such as:

- artefact identification using a code (composed of the site code/the year of excavation, the sector code and a serial number – for example: HST/2001-BEM 3)
- the realisation of a catalogue (a dataset regarding the code of the artefact, discovery context, raw material, conservation status, subtype, description)
- dimensions (the total length/the preserved length; width/diameter of the edges and of the middle part; the length of the active part on each side; maximal/minimal width of active part on each side; dimensions are given in millimetres).

In this study, we used a systematic comprehensive data analysis including information resulted from microscopic (optical and digital) studies (zoom 4x – 40x; zoom 25x – 200x). Thus a database and a large collection of digital images were created, including more than 1000 macroscopical and microscopical pictures. It is the first database for bone and antler industry from Histria and it contains all the parameters taken into account in our studies over the years. The aim of the artefact analysis is to record all contextual, morphological, typological and technological data and to highlight the *chaîne opératoire* (manufacturing sequence) and use wear patterns. In this way, we should be able to reconstruct "the technological biography" of each artefact.

The artefacts that are generically called "anvils" were set in a special wooden installation, on a workbench and were used for the shaping of iron sickles (striking the serrated edges using the technique of indirect percussion with a triangular section chisel/*poinçon*). This operation is applied at the initial shaping of the sickle blades, but also when repairing the sickles[13].

The typological classification adopts conventional criteria reflecting the usage stage at the moment when the artefacts were abandoned. Taking into consideration the number of modified anatomical facets/sides of an anvil (thus becoming active/ smoothed parts), we conventionally distinguish the following subtypes: simple anvils (with one active side), double anvils (with two active sides), triple anvils (with three active sides), quadruple anvils (with four active sides), undetermined subtypes (fragments) and raw material. As we already mentioned, the subtypes reflect the stage of modification and use of the artefacts[14].

The typological structure of the entire collection consists of simple anvils, double anvils, triple anvils, quadruple anvils, indeterminate subtypes (fragments) and raw materials.

2.2. Manufacture and use of bone anvils

Generally, the raw materials used in different parts of Europe and North Africa for this kind of anvil varied. Most of them were skeletal elements from large domestic mammals (cattle, horse, camel, etc.): long bones (metapodials, tibias), mandibles, and the coxal bone. There are also special instances when segments of red deer antler beams and tines were used[15].

[10] Beldiman 2013; Beldiman *et alii* 2007; 2008a; 2008b; 2009a; 2009b; 2009c; 2010a; 2010b; 2010c; 2010d; 2011a; 2011b; 2011c; Beldiman, Sztancs 2007; 2009a; 2009b; 2009c; 2010a; 2010b; 2011.

[11] Achim *et alii* 2009.

[12] Beldiman *et alii* 2009b; 2009c; 2010a; 2010b.

[13] Aguirre *et alii* 2004.

[14] Beldiman *et alii* 2008b; 2010a.

[15] Briois *et alii* 1997; Esteban Nadal, Carbonell Roure 2004; Moreno-Garcia *et alii* 2005; 2007; Poplin 2007a; 2007b; Rodet-Belarbi *et alii* 2007 – with bibliography.

The finished anvils from the *Basilica extra muros* Sector were made only from cattle metapodials (metacarpal and metatarsal bones). Metapodials and, exceptionally, a radius segment were used as raw materials (discovered in 2010). Two exceptions in the *Basilica with Crypt-"Florescu"* Sector were an artefact made from a cattle metapodial and second from a red deer antler[16].

First, we took into consideration the analysis of different traces of manufacture and use, so that we can reconstruct the phases of the standard "manufacturing sequence" for the anvils on cattle metapodials: no débitage; façonnage/shaping in two stages for obtaining a flat and smooth surface (intensive chopping and abrasion/intense scraping using a metallic blade – possibly a knife?). This smooth surface was made on one, two, three or four anatomical facets of a bone.

Wear traces are quite uniform in terms of origin, morphology and dimensions. The aim of using such pieces (anvils) was to shape (sawing-toothed) the iron active part (blade) of the sickle or to reshape it. Eventually, the active parts/facets of the anvils were worn out and completely covered with small triangular dents/hollows, often representing situations when the smooth surfaces were reshaped including the broken fragments from the middle part of the sickle blade.

Wear traces were produced while the "teeth of the sickle" were shaped. The resulting dents were 2–3 mm long and were obtained by indirect striking of the cutting edge of the blade with a hammer with a narrow active part, using an iron chisel/poinçon (probably triangular in section). The rows obtained of *ca.* 5–10 dents each were parallel, divergent, convergent or even meeting.

Covering the entire surface of the anvil with rows of dents meant performing the following actions:

a) the preparation and usage of another active part of the anvil. There were cases when a single piece had four active parts corresponding to the four anatomical facets of the bone. Those were prepared and used successively;

b) the unique or double reshaping of the used surface by chopping, abrading or scraping using a metal tool, similar to the first shaping stage.

All these conclusions were based on the observations of microscopic traces preserved on the surfaces of the anvils.

[16] Beldiman *et alii* 2011a; 2011c; Beldiman 2013 – with bibliography.

Because of the renewed shaping of the anvils, the compact tissue of the metapodial got thinner and very often, the artefacts broke in the middle part. This breakage was due to the intense pressure applied during use. Thus, the artefact was abandoned or, if the preserved length was sufficient, reused/ reshaped.

We should refer also to the unique artefact HST/2002-BFL 6, the largest one until now (yoke? reused as anvil) which, so far, has no parallel in the archaeological literature consulted. Red deer antler artefacts were initially manufactured and used as anvils but are rarely published in Romanian archaeological literature (a piece made of a segment of an antler's beam at Durostorum)[17] or that from the Republic of Moldavia (a piece made of a segment of antler tine from Saharna Nouă)[18].

The "technological biographies" of the anvils are varied and generally imply several stages:

1. the preparation of the active part on an anatomical facet/side of the bone; 2. using and covering it entirely with dents/hollows; 3. reshaping the side; 4. reusing and covering it entirely with dents/hollows; 5. preparation of the active part on the second side; 6. using and covering it entirely with dents/hollows; 7. preparation of the active part on the third side; 8. using and covering it entirely with dents/hollows; 9. establishing the active part on the fourth side; 10. using and covering it entirely with dents/hollows; 11. reshaping of the side; 12. reusing; 13. discarding/abandonment.

There are situations when probably at least two active sides were prepared during the first stage of shaping but this hypothesis, though supported ethnographically, is difficult to argue for[19].

2.3. The artefacts from 2010 and 2012

The pieces discovered during the 2010 excavations at Histria (figs 1–5) are probable raw materials for manufacturing anvils. There are four cattle metapodials (two complete, two fragmentary) and a fragmentary cattle radius. Some of them preserve traces of skinning and butchering.

[17] Elefterescu 2009, 54, no. 488, pl. xxvii, 488; Beldiman *et alii* 2009, 118, fig. 4 (piece DRS 4); 2010d, fig. 4 (piece DRS 4).

[18] Arnăut 2007, 302, figs 1, 3.

[19] Esteban Nadal, Carbonell Roure 2004, 640–644; Moreno-Garcia *et alii* 2005, 623–624; Rodet-Belarbi *et alii* 2007, 160.

Nine artefacts were discovered during the 2012 excavations (figs 12–25). Eight of them were anvils made from cattle metapodials and there was also a fragmentary metapodial that probably was conserved in order to be used as raw material for an anvil. Three anvils were complete and five were fragmentary.

From the typological point of view we identified three simple anvils, four double anvils, one triple anvil. With one exception, all pieces were abandoned after a cycle of usage on each side. Some of them were reshaped, but remained unused. The piece HST/2012-BEM 2 was manufactured as a double anvil, but remained unused. It is a rare artefact thus greatly contributing to the information we have until now on the manufacturing sequences of bone anvils from cattle metapodials.

2.4. Analogies

Anvils made of cattle or horse metapodials, tibias, mandibles, coxal bones etc., as well as anvils made of red deer antler were discovered also on other Romanian sites: four at Ostrov-Durostorum (Constanța County)[20], 13 at Chitila (Ilfov County)[21]. They offer good analogies to the ones from Histria.

For other European regions and for the northern Africa, the archaeological literature mentions many such artefacts. On the present day territory of the Republic of Moldova and Ukraine such pieces are dated to the Greek, Hellenistic and Roman periods (Vth century BC–Vth century AD). They came from the Greek cities in the Black Sea Basin (Olbia, Neapolis, Thanagoria etc.), as well as from Scythian-Greek and Getic settlements[22]. Others were found in settlements in the western Mediterranean Basin (France, Spain, Portugal, Italy, Austria, Hungary and some countries from the northern Africa)[23] but were dated between the VIIth–XVIIIth centuries AD.

A growing interest was showed to the topic of bone anvils at the 5th and 7th Worked Bone Research Group (WBRG) meetings, with several archaeologists and archeozoologists paying more attention to this type of artefacts[24]. Consequently there is an increase in the list of publications dealing with this topic for Central and Western Europe, including southern Italy (a piece dated in the IInd century BC – Ist century AD) and Austria (a piece that seems to be medieval)[25].

Very recently were published some Hungarian Medieval pieces (Xth – XIIIth centuries AD). Thus, at Felgyő – "*Kettőshalmi dűlő*" are mentioned bone anvils made from cattle femurs found in an Avar context[26]. From the rural site of Cegléd – "*Fertály-földek II*" came 32 bone anvils made of horse and cattle long bones. Other artefacts were discovered in an assemblage of a blacksmith Vicus in Budapest, in an oven at the site of Hajdúnánás – "*Fürjhalom-dűlő*"[27] and at the manorial settlement of Baj – "*Öreg-Kovács-hegy*" (an anvil made of a cattle radius)[28]. They are also mentioned in the medieval village of Kolon, dated to the Árpádian period. Bone anvils made of cattle and horse long bones (radius, tibia, metapodials, humerus) were discovered in a pit where a smithy's debris had been discarded[29].

At the present moment, the area of diffusion of these artefacts (considered "enigmatic" for decades) seems to center around the Mediterranean Basin, with probable origins in the east Mediterranean and the northern Black Sea regions. The presence of bone anvils in Early Medieval Central Europe is still a problem to solve.

Over the years, specialists considered such artefacts as polishing tools used for finishing textiles, hides, stone or wood (for the items discovered in the northern part of the Black Sea or in some western European regions)[30]. There were instances when the dents/hollows made during the usage were interpreted as "an unknown type of Getic writing" (the case of the artefacts from Chitila)[31]. Recently,

[20] Elefterescu 2008; 2009; Beldiman *et alii* 2009; Beldiman, Sztancs 2009; 2009c; Beldiman *et alii* 2009; 2010d.

[21] Boroneanț 2003; 2005; Bălășescu *et alii* 2003; Beldiman *et alii* 2009; Beldiman, Sztancs 2009c.

[22] Arnăut 2007; Peters 1986; Semenov 1970 – with bibliography.

[23] Briois *et alii* 1997; Esteban Nadal, Carbonell Roure 2004; Moreno-Garcia *et alii* 2005; 2007; Poplin 2007a; 2007b; Rodet-Belarbi *et alii* 2007 – with bibliography.

[24] Poplin 2007a; 2007b; Moreno-Garcia *et alii* 2005.

[25] Gál 2010; Gál, Bartosiewicz 2012; Gőmőri, Szulovszky 2010; José Gonçalves *et alii* 2008.

[26] Kőrősi 2010, 112, figs 7–8.

[27] Gál *et alii* 2010, 117.

[28] Bartosiewicz 2010, 338, fig. 16; Gál *et alii* 2010, 117.

[29] Kvassay, Vörös 2010, 127.

[30] Semenov 1970; Peters 1986; Arnăut 2007; Beldiman *et alii* 2011a – with bibliography.

[31] Boroneanț 2005; Beldiman *et alii* 2011a – with bibliography.

"the riddle was solved": the functional role of those artefacts benefited from the observations of technological behaviour in the Iberian ethnography. Thus, with the help of experimental studies, the "manufacturing chain/sequence" of anvils and their use were established[32].

The wear traces preserved on these artefacts are identical or very similar to the ones observed on the items from Histria, caused by their use as anvils for shaping the sawing-toothed sickles.

2.5. Economic aspects

The bone and antler artefacts discovered in the *Basilica extra muros* Sector and the *Basilica with Crypt-"Florescu"* Sector are very important to complete the catalogue of finds with new site names from Central-Eastern Europe. Also, they are important in gathering precise data on craft activities during the IInd–IIIrd centuries AD. The "Histrian anvils" suggest the existence of some bone and antler workshops in the areas of the mentioned sectors, but at the same time, they assert the existence of iron processing workshops where sickles (tools very much used for harvesting cereals in many regions of the western Pontic coast) were produced and repaired.

The analysis of bone and antler anvils (relatively rare items but until recently lacking systematic studies in Romania) not only that touches on the unique and complex problem of ancient economy and technology in the region of the Lower Danube[33], but also outlines the connections between various activities (in our case, iron smelting and manufacturing of agrarian tools on one hand and bone and antler industry and harvesting techniques on the other).

The artefacts presented in this paper offer the opportunity to sum up some conclusions regarding the bone (and antler) industry at Histria. The study should be continued with further approaches on similar artefacts discovered in the earlier or more recent archaeological excavations carried out in other sectors of the site.

[32] Esteban Nadal, Carbonell Roure 2004, 640–644; Aguirre *et alii* 2004; Moreno-Garcia *et alii* 2005, 623–624; Rodet-Belarbi *et alii* 2007, 160; Beldiman *et alii* 2011a – with bibliography.

[33] For general aspects regarding the antique economy in the Dobrogea region see Suceveanu 1977; Suceveanu 1998.

3. THE BONE HAIRPINS

The bone hairpins represent an important typological category for the bone industry from Histria (IIIrd category: adornments: hairpins). Until now 45 pieces were studied, counting also those discovered in 2010[34].

The bone pins (*acus*/*spina crinalis* sau *acus*/*spina comatoria*) were very frequently used adornments during the Roman period. They were used in the *coiffure* or for fixing textile hair adornments (bonnets, ribbons, veils, hair nets). They were made of bone (of domestic animals such as cattle), ivory, metal (bronze, silver, gold) or glass. In the Roman Empire, where the "monumental *coiffure*" involving complex curls and buns was very frequent, the use of hairpins was indispensable. This stimulated the production of these artefacts with a diverse typology. They were numerous on the archaeological sites of the period (in towns, but also in camps, rural settlements or necropolises)[35].

Thus, bone hairpins were common on the Roman archaeological sites in Dacia and Moesia Inferior/Scythia Minor during the Ist to the IIIrd centuries. In Roman Dacia bone pins were found in cities (Apulum, Porolissum, Potaissa, Romula, Ulpia Traiana Sarmizegetusa)[36], military camps (Buciumi, Gilău, Gherla, Inlăceni, Râşnov)[37] and *villae rusticae* (Cetea, Mediaş, Micăsasa, Răhău, Valea Chintăului)[38]. In Dobrogea they were present at Callatis, Capidava, Fântânele, Niculițel, Ostrov-Durostorum, Telița, Tropaeum Traiani[39] and also at Histria – the *Thermae* Sector[40].

The typology of bone hairpins and needles takes into consideration the international standards. We applied the criteria proposed by J.-C. Béal, K. Biró,

[34] Beldiman *et alii* 2010c; 2011b.

[35] Daremberg *et alii* 1877, 61–64; Ciugudean 1997, 17 – with bibliography; Elefterescu 2008, 221–224 – with bibliography.

[36] Gudea, Bajusz 1991, pl. I–XXI; Alicu, Nemeş 1982, 345–347, pl. I, 22; Popilian 1976, 250, figs. 12, 10; Cociş, Alicu 1993; see Ciugudean 1997, 17; Ciugudean 1997, 17–24, 53–60, 62–75, 152–161, 165–175, pl. II–IX, XV–XXV; Bajusz, Isac 2000.

[37] Gudea, Pop 1970, 59, pl. LVIII, 1, 3; see bibliography at Ciugudean 1997, 17.

[38] Gudea, Bajusz 1991, 83, note 17; see bibliography at Ciugudean 1997, 17.

[39] Barnea *et alii* 1979, fig. 155, 10.11; fig. 163, 10.1; Preda 1980, pl. LVII, 10; Baumann 1983, pl. XLIII, 3–4; see Ciugudean 1997, 18; Suceveanu 1998, pl. V, 7, 9–10; Elefterescu 2008, 221–255; Beldiman, Sztancs 2007b, 110–111.

[40] Suceveanu 1982, 123–124, pl. 22, 1 B–C, 3; I C; II A, 2; see Ciugudean 1997, 18.

E. Riha, H. Mikler and the typological considerations included in the catalogue published by A. Schenk[41].

The artefacts from the *Basilica extra muros* Sector were typological classified according to the criteria proposed by N. Gudea, I. Bajusz (1991) and D. Ciugudean (1997)[42].

3.1. Items found in 2010

The bone hairpins discovered in 2010 in the *Basilica extra muros* Sector (figs 6–10) belong to the following types: with a convex proximal end (N = 1), with a globular proximal end (and probably, because of the fragmentary preservation, without a proximal end) (N = 2); undetermined type (and because of the fragmentary preservation, without a proximal part) (N = 2).

There is nothing remarkable in the typological aspects of the bone hairpins for the sector mentioned above. The types are the common ones, with dimensions and morphology quasi-standardized, as found in many archaeological sites from Romania and other regions of Europe. The most suitable analogies are with the items found at Histria – the *Thermae* Sector[43].

The majority of the artefacts in our catalogue are fragmented or fragments, a situation easily explained by their abandonment.

The studied artefacts were made of fragments of cattle long bones (*Bos taurus*) through techniques such as chopping, sawing, intense axial scrapping with a metallic tool (knife), complete shaping and finishing through polishing (probably with a piece of leather). The frequent break of the unfinished pieces probably during the manufacture sequence allowed us to conclude that the bone hairpins were made in a local workshop functioning in the handicrafts area located in the *Basilica extra muros* Sector[44]. This conclusion is supported by the presence of raw materials, blanks and waste products discovered in various features (pits) alongside the bone pins.

[41] Béal 1983; 1984; Biró 1994; Riha 1990; Mikler 1997; Schenk 2008.

[42] Gudea, Bajusz 1991, 81–126; Ciugudean 1997, 17–24, 53–75; Elefterescu 2008, 221–224 – with bibliography.

[43] For analogies and discussions as well as bibliography see *above*, papers cited in notes no. 30–31.

[44] Beldiman *et alii* 2010c.

4. THE BONE TUBE

The bone tube (fig. 11) has a total length of 53.70 mm. It is made from a tibia diaphysis of a small mammal. It is a fragmentary piece and one of the extremities is missing a sector (*ca.* 1/2 of the circumference). There is evidence for old fractures, reshaping, abrasion of the edges. We noted the intense bluntness and polish of the broken edges, the débitage by transversal cutting with a blade knife on the circumference and detaching by direct percussion/fracture. Specific traces of cutting are preserved at the ends which are blunted and polished. We also observed superficial traces of transversal cutting, also at the base of the broken sector. There is a superficial axial scraping on the diaphysis. The broken end was reshaped by abrasion. Possible use: tube for needles, whistle.

5. CONCLUSIONS

The analysis of the bone and antler anvils (which are relatively rare and not systematically studied until now in Romania) not only touched on a unique and complex problem regarding the ancient economy and technology in the region of the Lower Danube[45], but it also outlined the connections between various activities (in our case, the iron smelting and the manufacturing of agrarian tools, and the bone and antler industry and the harvesting techniques).

The Roman bone hairpins discovered in the *Basilica extra muros* Sector and analysed on this occasion represent the second assemblage from Histria published in a detailed manner[46]. The extensive data regarding the context of discovery enriches the catalogue of discoveries and the available data regarding the complex activities specific to the west coast of the Black Sea during the IInd century AD, revealing the existence of one or more workshops for manufacturing artefacts of skeletal materials.

In the same time, the category of bone pins adds to the assemblage of skeletal materials artefacts from Histria that had already been studied in a detailed manner.

[45] For general aspects regarding the ancient economy in the Dobrudja region see Suceveanu 1977; Suceveanu 1998.

[46] Beldiman *et alii* 2010c.

The bone tube enriches the typological repertory of artefacts discovered at Histria – the *Basilica extra muros* Sector.

The artefacts presented in this paper offered us the opportunity to sum up some conclusions regarding the bone and antler industry at Histria. The study should be continued with further approaches regarding the pieces that were discovered in ancient or recent archaeological excavations carried out in other sectors of the site.

6. CATALOGUE OF FINDS

We present below the detailed descriptions of the bone hairpins, bone anvils, bone tube and raw materials discovered in the *Basilica extra muros* Sector in 2010 and 2012. The catalogue presents the complete data (archaeological context, detailed description, morphometry). The codes were established taking into account the year of the discovery (HST/ 2010-BEM 1 – 10; HST/2012-BEM 1 – 9). The number of a specific artefact as it appears in the illustration is the same with the one in the catalogue.

6.1. The Histria-*Basilica extra muros* Sector, 2010

HST/2010-BEM 1 • Fig. 1. Section IA. Square 3, depth – 0.83 m. At about 0.10 m east of the western profile and 5.94 m south of the northern profile. No. 6/2010. • Complete cattle metapodial; without traces of manufacture; probably raw material used for an anvil; dimensions (mm): total length 212; proximal end 66.42/45.04; medial part 37.54/26.20; distal end 72.44/35.69.

HST/2010-BEM 2 • Fig. 2. Section IA. Square 1, depth – 1.14 m. G1/2010. At 0.05 m south of the northern profile and at 0.10 m west of the eastern profile. • Complete cattle metapodial; on the left edge of the medial part there are short fine overlapped cut marks, probably produced during the skinning; its presence in the complex suggests its possible use as raw material for an anvil; dimensions (mm): total length 232; proximal end 69.90/44.68; medial part 77.97/26.68; distal end 73.74/39.62; length max. cut marks 9.

HST/2010-BEM 3 • Fig. 3. Section IA. Square 7, depth – 0.80 m. At 3.70 m north of the southern profile of the SIA and at 0.10 m west of the eastern profile. No. 4/2010. • Whole cattle metapodial; it does not preserve traces of manufacture; probably raw material used for an anvil; dimensions (mm): total length 197; proximal end 51.48/31.20; medial part 31.41/21.84; distal end 56.54/28.82.

HST/2010-BEM 4 • Figs 4–5. Section IA. Square 1, depth –1.14 m. G1/2010. At about 0.10 m south of the northern profile and at 0.15 m west of the eastern profile. • Cattle fragmentary metapodial (distal); split for marrow extraction?; fine skinning cutmarks were preserved on the lateral sides of the epiphyseal condyles; traces of cutting and chopping with an axe were preserved on the anterior and posterior sides of the condyles; without traces of shaping on the active part; its presence in the complex suggests its use as raw material for an anvil; dimensions (mm): length 120.35; medial part 27.42/26.23; length cut marks 4.50–5.90.

HST/2010-BEM 5 • Fig. 6. Section IA. Square 2, depth – 1.95 m. M6. At 1.19 m east of the western limit of the M6 and 0.14 m south of north limit of M6. No. 3/2010. • Cattle distal radius; split for marrow extraction?; detached epiphysis; traces of dog gnawing preserved on the medial part; without traces of shaping of the active part; its presence in the complex suggests its use as raw material; probably raw material used for an anvil; dimensions (mm): length 130.38; distal end 55.68/41.10; medial part (diaphysis) 38.99/28.42.

HST/2010-BEM 6 • Fig. 7. Section IA. Square 3, depth – 0.98 m. G2/2010. At 0.74 m east of the western profile and at 4.80 m south of the northern profile. No.10/2010. • Bone hairpin with convex proximal end; fragmentary, the distal end has been recently fractured; broaded proximal part, asymmetric oval sections, a side of the proximal part is flat, the other convex; the sections of the medial and distal parts are circular; surfaces well preserved; shaping by abrasion and axial scraping with a knife blade; traces preserved on the inferior side of the proximal part; entirely shaped – eliminated the traces of scraping and abrasion; use-wear traces: bluntness, polish; dimensions (mm): total length *126*/113; proximal end 5.70/2.89; medial part 4.36/4.04; distal part 2.72/2.32; distal end about 1.

HST/2010-BEM 7 • Fig. 8. Section IA. Square 6, depth – 1.00 m. CXT 14. At 0.97 m west of the eastern profile and at 0.82 m north of the southern profile. No. 9/2010. • Bone hairpin; fragmentary, mesio-proximal segment, old fractures; the proximal end is detached; possible spherical end?; proximal part – thickened and bevelled, with unfinished traces of transversal and oblique abrasion; the medial part is bevelled, finished; circular and asymmetric polygonal sections; dimensions (mm): length 53.20; proximal end (actual) 3.47/3.36; proximal part max 4.70/4.55; medial part 3.58/3.55.

HST/2010-BEM 8 • Fig. 9. Section IA. Square 7, depth – 0.82 m. CXT 6. At 0.10 m west of the eastern profile and at 2.07 m north of the southern profile. No. 5/2010. • Bone hairpin: fragmentary, mesio-proximal segment, old fractures; the proximal end is detached; possible spherical end? the proximal part is thickened, bevelled, with unshaped traces of abrasion; the medial part is bevelled, finished; circular and asymmetric polygonal sections; dimensions (mm): length 52.20; proximal end (actual) 4.37/4.04; proximal part max 4.62/4.31; medial part 4.21/3.89.

HST/2010-BEM 9 • Fig. 10. Section IA. Square 1, depth – 1.07 m. G1/2010. At 0.84 m south of the northern profile and at 0.10 m east of the western profile. • Bone pin; fragmentary, distal segment, old fractures; the distal part is bevelled and finished; distal end is entirely preserved, bevelled; use-wear traces of bluntness and polish; the morphology of the distal end suggests the reshaping after fracture; circular and polygonal sections; dimensions (mm): length 48.14; distal part 4.30/3.96; distal end 2.42/2.31.

HST/2010-BEM 10 • Fig. 11. Section IA. Square 7, depth –0.95 m. Loose, yellowish sand layer with shells, pottery from the room No. 2, bordering south with 2/2010. • Bone tube made from a tibia diaphysis of a small mammal; fragmentary piece, one of the extremities has a sector missing (cca 1/2 of the circumference), old fractures; reshaped; the edges were abraded; intense bluntness and polish of the broken edges; débitage by transversal cutting with a blade knife on the circumference and detaching by direct percussion/fracture; specific traces of cutting are preserved at the ends; blunted and polished ends; superficial traces of transversal cutting are observed and at the base of the broken sector; superficial axial scraping on the diaphysis; the broken end was reshaped by abrasion; possible use: tube for needles, whistle; dimensions (mm): total length 53.70; proximal end (entire, conventionally established) 10.63/10.09; medial part 10.31/10.14; distal end 10.41/9.79.

6.2. Histria-*Basilica extra muros* Sector, 2012

HST/2012-BEM 1 • Figs 12–13. Section I. Squares 2–3. From the soil collapsed from the northern profile and from the disused pits of the furnaces. • Double anvil made from a metapodial; whole piece (entire anatomic support); the active part was shaped on the main anatomic sides (anterior and posterior); raw material: cattle metapodial (*Bos taurus*); shaping: direct percussion/chopping applied on both sides; shaping of the distal part/anterior side by chopping in order to reduce the thickness (for an optimal fit in the wooden bank?); traces of dents with intact morphology are preserved on the anterior side which indicates a single use cycle of piece; on the opposite side (the posterior one) – possible reshaping by axial scraping after the first cycle of use; use-wear traces: traces of dents of approx. 1–2 mm; these are triangular, elongated made by indirect percussion using a metallic tool and they are placed in linear, slightly curved, lines which are transversal and oblique; dimensions (mm): total length 235; proximal end 49.74/44.75; medial part 29.82/19.98; distal end 54.77/30.74; length shaped of the anterior side 145; width of the shaped anterior side 22.36; length of the shaped posterior side 155; width of the shaped posterior side 28.08; length area with use-wear traces anterior side 75; length area with use-wear traces posterior side 25 + 67.

HST/2012-BEM 2 • Fig. 14. Section I. Square 5, depth –2.10 m. No. 9/2012. At 2.10 m west of the eastern profile. From the 2nd level of the workshop. At the flattening of the profile. • Double anvil made from metapodial; whole piece (entire anatomic support); the active part was shaped on the main anatomic sides (anterior and posterior); raw material: cattle metapodial (*Bos taurus*); shaping: intense axial scraping applied on both sides, more obvious on the posterior side; the distal epiphysis was entirely removed; the ends were chopped on sides and edges – specific overlapped traces; chopping applied in order to reduce the thickness (for optimal fit in the wooden bank?); both sides do not preserve any specific use-wear traces; anvil prepared for using; dimensions (mm): total length 192; proximal end 38.75/19.13; medial part 30.75/19.63; distal end 21.09/18.14; length area shaped by direct percussion/chopping max 55–60, min 25; length shaped anterior side 110; min. 25; max. width shaped on anterior side 12.69; length shaped on posterior side 120; width shaped on posterior side 27.90.

HST/2012-BEM 3 • Figs 15–16. Section I. Squares 2–3. From the soil collapsed from the northern profile, from the disused pits of the furnaces. • Simple anvil made from metapodial; cattle metapodial without diaphysis; dog chews; recent fractures at the distal end/posterior side; exfoliations; active part shaped on the posterior side (anatomic); raw material: cattle metapodial (*Bos taurus*); shaping: intense axial scraping; use-wear traces: dents of approx. 1–2 mm, triangular and elongated-shaped, made by indirect percussion using a metallic tool, placed in linear and slightly curved lines transversally and oblique arranged; used as a percussion support for shaping the dents of the active part of a sickle; a single use cycle; the active part is covered on approx. 2/3 of the length with traces of dents which are oblique placed, preserving unchanged the morphology of dents – this indicates a single use cycle; dimensions (mm): total length 158; proximal end 41.90/41.87; medial part 23.50/24.33; distal end 25.82/37.80; length of the shaped part 80; max. width of the shaped part 14.88; length of the part with use-wear traces 47.

HST/2012-BEM 4 • Figs 17–18. Section I. Squares 2–3. From the soil collapsed from the northern profile and from the disused pits of the furnaces. • Double anvil made of a metapodial; fragmentary piece; old oblique fracture at the level of medial part; approx. 1/3 of initial length (distal part) is preserved; the fracture of the support was due to the attenuation of the diaphysis during the reshaping and during the use of the piece as a support for percussion; the right edge preserves traces of chopping at the level of epiphyseal condyle on a length of approx. 50 mm; the active part was shaped on the main anatomic sides (anterior and posterior); raw material: cattle metapodial (*Bos taurus*); shaping: axial/oblique abrasion; after the first use cycle, possible reshaping of the posterior side by scraping and abrasion; use-wear traces: traces of dents of approx. 1–2 mm, triangular and elongated-shaped, made by indirect percussion using a metallic tool, placed in linear, slightly curved, lines, arranged transversally and oblique; dimensions (mm): length 145; distal end 70.92/36.32; medial part *41.60*/17.64; length shaped on anterior side 110; shaped width anterior side (preserved) 26.90; length shaped posterior side 111; shaped width posterior side 44.58; length area with use-wear traces anterior side 50; length area with use-wear traces posterior side 61.

HST/2012-BEM 5 • Fig. 19. Section I. Squares 2–3. From the soil collapsed from the northern profile and from the disused pits of the furnaces. • Raw material for shaping an anvil; cattle distal metapodial; old fractures at the proximal/medial level (marrow extraction?); exfoliations; traces of skinning are preserved on the anterior side, as well as on the right edge (cut marks); dimensions (mm): length 140; distal end 56.40/29.69; medial part 27.45/26.17.

HST/2012-BEM 6 • Fig. 20. Section I. Squares 2–3. From the soil collapsed from the northern profile and from the disused pits of the furnaces. • Simple anvil made from a metapodial; fragmentary piece; old oblique fracture at the medial part; approx. 1/3 from the initial length (distal part) is preserved; fracture was probably produced during the use of the piece as anvil; corroded and exfoliated surfaces; the active part was shaped on the posterior side; raw material: cattle metapodial (*Bos taurus*); shaping: by intense axial scraping; it

is entirely covered with lines of dent traces produced by percussion; the epiphyseal condyles were chopped on the posterior side revealing the spongy tissue; the posterior side was probably reshaped by scraping and abrasion after the first use; use-wear traces: dents of approx. 1–2 mm, triangular and elongated-shaped, made by indirect percussion using a metallic tool, placed in linear, slightly curved, lines, arranged transversally and oblique; dimensions (mm): length 112; distal end 54.62/29.41; medial part 27.44/23.84; length of the shaped area 71; width of the shaped area 30; length of the active part 60.

HST/2012-BEM 7 • Fig. 21. Section I. Squares 1–2. Found during section cleaning. Passim No. 4/2012. • Simple anvil made from metapodial; fragmentary piece; exfoliations, corroded; about 2/3 from the initial length (proximal and medial parts); old oblique fracture during the use at the level of medial part; its fracture was determined by the attenuation of the diaphysis produced during the reshaping or during its use as an anvil; the active part was shaped on the posterior side; raw material: cattle metapodial (*Bos taurus*); shaping: by intense axial scraping; reshaping of the active side after the first use cycle by scraping and abrasion then it was abandoned; lines of un-scraped dents are preserved at the medial part; their aspect might be compared with the one from the rest of the active part; use-wear traces: dents of approx. 1–2 mm, triangular and elongated-shaped, made by indirect percussion using a metallic tool, placed in linear, slightly curved, lines, arranged transversally and oblique; dimensions (mm): length 165; proximal end 57/52.63; medial part 32.72/26.94; length shaped posterior side 111; max. width shaped posterior side 29.13.

HST/2012-BEM 8 • Figs 22–23. Section I. Squares 2–3. From the soil collapsed from the northern profile and from the disused pits of the furnaces. • Triple anvil made from a metapodial bone; fragmentary piece; exfoliations, corrosion; about 1/3 from the initial length (proximal part) is preserved; at the level of medial part – oblique fracture produced during the use of the piece; the active part was shaped on the posterior side; raw material: cattle left metapodial (*Bos taurus*); shaping: by intense axial scrapping; the anterior side was not technically modified; the slightly convex lateral sides could have been used as an anvil, without being previously prepared in this respect; at the proximal end/right edge and on the posterior side/left edge traces of impact and cutting for skinning are preserved; use-wear traces: triangular and elongated-shaped marks of 1–2 mm made by indirect percussion using a metallic tool, placed in linear, slightly curved, lines, arranged transversally and oblique; the active side (the posterior one) is almost entirely covered with lines of dents; on both lateral sides, use-wear traces are preserved: on the medial side there are six lines of dents and on the lateral one, three lines of dents; dimensions (mm): length 160; proximal end 49.68/44.76; medial part 27.32/26.76; length shaped posterior side 62; max width shaped posterior side 20.88; length area with use-wear traces posterior side 53.28; length area with use-wear traces medial side 29; length area with use-wear traces lateral side 10.30.

HST/2012-BEM 9 • Figs 24–25. Section I. Squares 2–3. From the soil collapsed from northern profile and from the disused pits of the furnaces. • Double anvil made of a metapodial; fragment proximal; the epiphysis is not preserved; multiple axial and oblique fractures which were produced during the use of the piece as an anvil; about 1/2 of the initial width is preserved; the active part was shaped on the main sides (anterior and posterior); raw material: cattle metapodial (*Bos taurus*); shaping: by intense axial scrapping; re-shaping of the active part after the first cycle of use by axial scraping; the piece was abandoned before a new cycle of utilisation; use-wear traces: triangular and elongated-shaped marks of about 1–2 mm made by indirect percussion using a metallic tool, placed in linear, slightly curved lines, arranged transversally and oblique; dimensions (mm): length 123; distal end 22.46/20.73; medial part 20.40/17.17; proximal end 12.14/9; length shaped (preserved) posterior side 54.57; length shaped anterior side 123; length area with use-wear traces posterior side 66.

Note. All photos in the figures were taken by Corneliu Beldiman.

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HST-2010/BEM 1

Fig. 1.

HST-2010/BEM 2

Fig. 2.

HST-2010/BEM 3

Fig. 3.

HST-2010/BEM 4

Fig. 4.

Fig. 1. Histria *Basilica extra muros* Sector (all figs.). Raw material (cattle metapodial) for anvil: HST/2010-BEM 1;
Fig. 2. Raw material (cattle metapodial) for anvil: HST/2010-BEM 2;
Fig. 3. Raw material (cattle metapodial) for anvil: HST/2010-BEM 3;
Fig. 4. Raw material (cattle metapodial) for anvil: HST/2010-BEM 4.

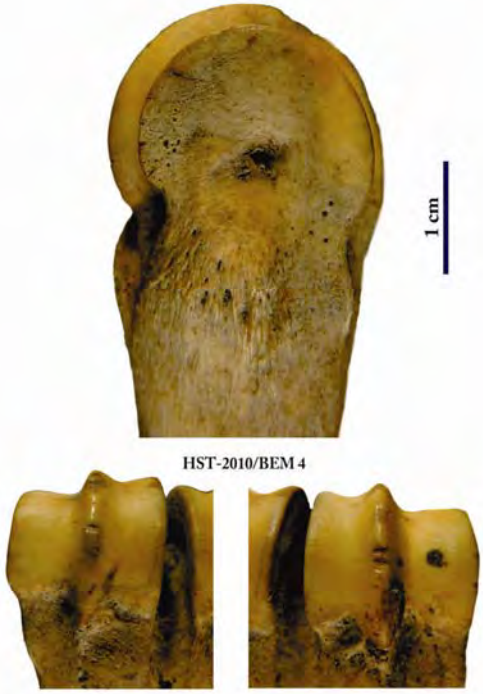
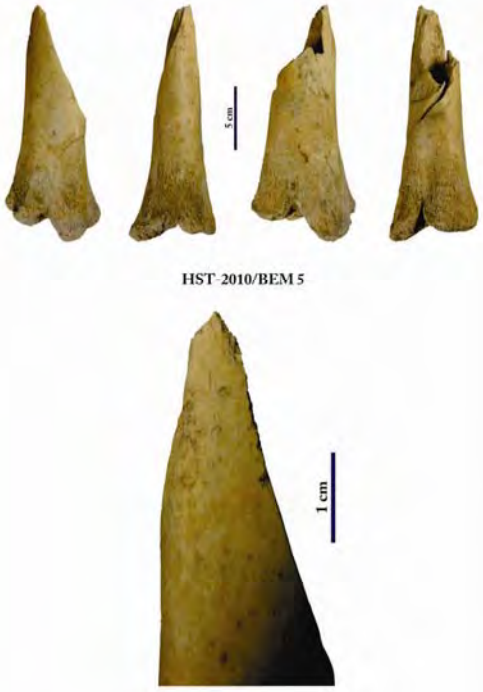


Fig. 5.



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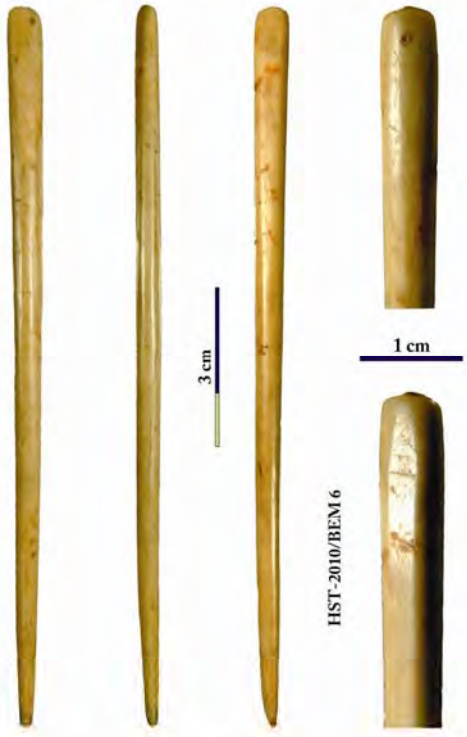
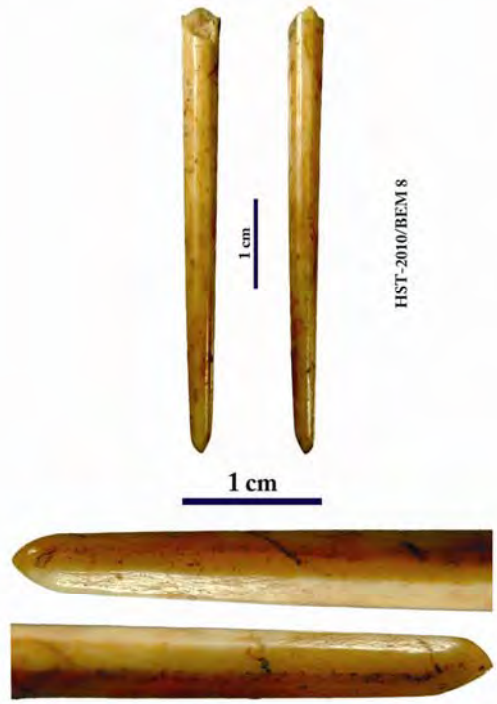


Fig. 7.

Fig. 8.

Fig. 5. Histria *Basilica extra muros* Sector (all figs.). Raw material (cattle metapodial) for anvil: HST/2010-BEM 4;
Fig. 6. Raw material (radius metapodial) for anvil: HST/2010-BEM 5;
Fig. 7. Bone hair pin: HST/2010-BEM 6;
Fig. 8. Bone hair pin: HST/2010-BEM 7.



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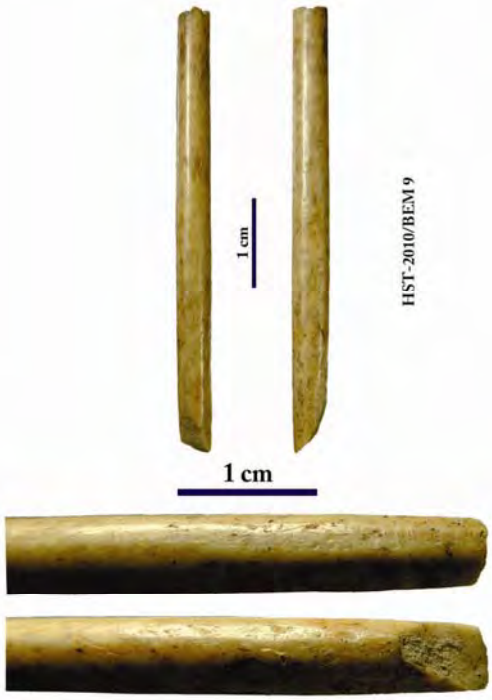

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 9. Histria *Basilica extra muros* Sector (all figs.). Bone hair pin: HST/2010-BEM 8;
Fig. 10. Bone hair pin: HST/2010-BEM 9;
Fig. 11. Bone tube: HST/2010-BEM 10;
Fig. 12. Bone anvil on cattle metapodial: HST/2012-BEM 1.

Fig. 13.

Fig. 14.

Fig. 13. Histria *Basilica extra muros* Sector (all figs.). Bone anvil on cattle metapodial: HST/2012-BEM 1;
Fig. 14. Bone anvil on cattle metapodial: HST/2012-BEM 2.

Fig. 15.

Fig. 16.

Fig. 15. Histria *Basilica extra muros* Sector (all figs.). Bone anvil on cattle metapodial: HST/2012-BEM 3;
Fig. 16. Bone anvil on cattle metapodial: HST/2012-BEM 3.

Fig. 17.

Fig. 18.

Fig. 17. Histria *Basilica extra muros* Sector (all figs.). Bone anvil on cattle metapodial: HST/2012-BEM 4;
Fig. 18. Bone anvil on cattle metapodial: HST/2012-BEM 4.

Fig. 19.

Fig. 20.

Fig. 21.

Fig. 22.

Fig. 19. Histria *Basilica extra muros* Sector (all figs.). Bone anvil on cattle metapodial: HST/2012-BEM 5;
Fig. 20. Bone anvil on cattle metapodial: HST/2012-BEM 6;
Fig. 21. Bone anvil on cattle metapodial: HST/2012-BEM 7;
Fig. 22. Bone anvil on cattle metapodial: HST/2012-BEM 8.

Fig. 23.

Fig. 24.

Fig. 25.

Fig. 23. Histria *Basilica extra muros* Sector (all figs.). Bone anvil on cattle metapodial: HST/2012-BEM 8;
Fig. 24. Bone anvil on cattle metapodial: HST/2012-BEM 9;
Fig. 25. Bone anvil on cattle metapodial: HST/2012-BEM 9.