Close to the bone: current studies in bone technologies

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INTRODUCTION

Studies of worked osseous materials were neglected for a long time, but in the past two decades they are on the rise. In recent years, numerous methodological and theoretical innovations were introduced and the quantity and quality of publications increased, including numerous individual articles, PhD thesis, monographs. Particularly important were several conferences and thematic sessions held in Europe, North America and Asia, devoted to the problems of worked bone. As a result, several edited volumes appeared, with high quality and diverse papers – for example, those edited by H. Luik et al. (2005), Ch. Gates-St-Pierre and R. Walker (2007), A. Legrand-Pineau & I. Sidéra et al. (2010), J. Baron and B. Kufel-Diakowska (2011), F. Lang (2013), A. Choyke and S. O'Connor (2013), Mărgărit et al 2014, to mention just a few.

Osseous materials began to be recognized as an important part of the archaeological finds first by the French school, and the most important theoretical and methodological work was done by French researchers. The most significant was the work by H. Camps-Fabrer, who initiated a large research program on bone industry, *La Commission de Nomenclature sure l'Industrie de l'Os Prehistorique*, later continued by other researchers. Work organized by M. Patou-Mathis on the *industrie osseuse peu élaboré* should also be mentioned. However, the most important role in spreading and promoting the research on bone artefacts and its importance in the past few decades has been that of the Worked bone research group (WBRG), formed almost 30 years ago, and one of the official working groups of the International Council for Archaeozoology (ICAZ) since 2000. The main role of the WBRG is to improve communication between individuals studying worked animal hard tissues (especially bone, antler, and ivory) with a special emphasis on archaeological finds. A broad diachronic and multi-disciplinary approach is emphasized in order to promote the exchange of ideas concerning attitudes towards and procurement of raw materials, technology, and cognitive aspects of bone working.

Since the first meeting, held in London in 1997, eight other meetings took place and in 2014 Belgrade was the host of the jubilee 10th Meeting of the WBRG (for more information, see www.wbrg.net).

Over sixty oral and poster presentations were held during the five conference days, contributed by 100 authors. Thirty-nine papers were selected for this volume, and I. Riddler, the organiser of the very first meeting in London, also contributed a paper with N. Trzaska-Nartowski.

Selected papers encompass the wide chronological and geographical range – from the Mesolithic period to the 18th century AD, from South America to the Eurasia and South Africa. Selected case studies do not simply present interesting archaeological material, but they also cover a wide range of topics – methodological issues, in particular traceological investigations, reconstructions of technological procedures, problems related to the interpretation of functions, problems of the identification of workshops, and also symbolic use of osseous raw materials in both prehistoric and historic times. Papers are organised by alphabetical order, since the topics overlap and it was not possible to create distinctive thematic groups.

Such a variety in topics, as well as an increasing number of researchers focusing on studies of osseous raw materials, clearly shows that these studies have an important potential to contribute to the more general archaeological studies. Osseous artefacts are no longer disregarded, but are slowly gaining more and more space and are slowly taking place alongside with lithic industries and other classes of raw materials. However, there is still much work to be done, and bone tool studies still have to show all the potential they have.

Last but not least, I would like to thank all the people who helped during the conference and afterwards, during the preparation of the book. Special thanks to all the colleagues from the Institute of Archaeology and to all the colleagues and staff from the National museum in Belgrade, which generously offered the room for the conference and also helped with the lovely post-conference excursion to the Lepenski Vir. I would also like to thank for the hospitality to Dragan Janković, curator of the City museum, who welcomed us at the site of Vinča-Belo Brdo, and to dr Mira Ružić, who welcomed us at the Archaeological collection of the Faculty of Philosophy.

Finally, special thanks to the reviewers, who helped to enhance the scientific value of this volume.

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Selena Vitezović

BONE WORKING AND THE ARMY: AN EARLY EIGHTEENTH–CENTURY BUTTON WORKSHOP AT THE BELGRADE FORTRESS

Vesna Bikić
Selena Vitezović

Abstract: During excavations in 2008 at the Belgrade fortress, a large quantity of portable finds dated from the early 18th century were discovered within one structure, known as the Blockhouse. The Blockhouse, situated at the Upper Town's south-eastern wall, was a defensive structure that had been built between 1718-1721, but was never completed due to changes in plan. Shortly after its aboveground portion was partly torn down the vaulted subterranean chamber was largely filled with waste, i. e., with items used by the Austrian troops (who occupied the fortress at the time) between 1717 to 1725. Finds included ceramic and glass vessels, knifes, leather shoe soles, buckles, etc., and bone manufacturing debris. The bone manufacturing debris included c. 85 pieces of large herbivore ribs from which circular pieces, c. 1.15-1.20 cm in diameter, and larger, c. 1,4-1,5 cm had been cut out. Some technological aspects will be analysed in this paper, as well as the choice of raw material, manufacturing techniques, and the entire mode of production. We will also discuss the origins of this debris, the nature of its end-products and the implications for an analysis of everyday life in the Belgrade Fortress in the early 18th century.

Apstrakt: Tokom iskopavanja 2008. godine na Beogradskoj tvrđavi, otkrivena je veća količina nalaza s početka 18. veka u okviru jednog objekta, poznatog kao Bunker. Bunker, smešten na jugozapadnom zidu Gornjeg Grada, bio je defanzivni objekat koji je građen tokom 1718- 1721, ali nikad nije dovršen usled promena u planovima. Ubrzo posle ovog perioda, bio je delimično srušen i podzemna zasvođena prostorija je velikim delom ispunjena otpadom, tačnije, različitim predmetima koje su koristile austrijske trupe (u to vreme smeštene u tvrđavi) u period između 1717. do 1725. godine. Među nalaze spadaju keramičke i staklene posude, noževi, kožni đonovi cipela, kopče, itd., kao i otpaci od kostiju.
Koštani otpaci obuhvataju oko 85 komada od rebara krupnih herbiovra iz kojih su isečeni kružni komadi, prečnika oko 1,15-1,20 cm, i nešto krupniji, c. 1,4-1,5 cm. U ovom radu biće analizirani neki od tehnoloških aspekata, kao i izbor sirovina, tehnike proizvodnje, kao i ceo način proizvodnje. Takođe ćemo raspravljati o poreklu ovog otpada, prirodi gotovih proizvoda i implikacijama za proučavanje svakodnevnog života na Beogradskoj tvrđavi na početku 18. veka.

INTRODUCTION

Osseous raw materials, widely used in almost all corners of the world since the early prehistory, stayed in use into pre-modern and modern times (e. g., MacGregor 1985, 1989, Schlenker & Wahl 1996, Moreno García et al. 2010, Rijkelijkhuizen 2009, 2013), including the 20th century (cf. Stordeur 1980, Mapp 2013), although their mode of exploitation changed significantly as new technologies, new raw materials and new cultural preferences came into use and fashion.

Osseous artefacts in the Middle Ages and modern times included a variety of raw materials, from the easily available, cheaper ones, such as long bones, horns, even hooves (e. g., Rijkelijkhuizen 2013), to expensive, exotic walrus and elephant ivory (e. g., Smirnova 2002, Rijkelijkhuizen 2009). They encompassed a variety of items, everyday tools (e. g., Stordeur 1980), toilet and textile combs, beads, buckles, pins, needles, knife and rifle handles, powder containers, crossbow nuts, sledge runners, game pieces (chess figures, dice) and many more (e. g., MacGregor 1985, Schlenker & Wahl 1996, Konczewska 2011).

The importance of animal-originated products in pre-industrial and industrial societies is still not sufficiently explored in archaeology, especially in regions, where the most important trade and industries were based on wool, leather and hide (cf. Albarella 2003: 71), along with production in osseous raw materials (bones, horns, ivory, etc.). Publications of pre-modern and modern osseous artefacts have oftenlimited themselves to cataloguing attractive finds, and have less often focused on typologies and distributions (e.g., Kovács 2002: Kat. Nos. 81, 227-243, Popović and Bikić 2004: 97-98, Kühtreiber 2006, Taf. 108/D5, 109, 110, 113/E5-E7, 114/E9, E10) Only a small number of publications have dealt with complex analyses and the technological aspects of bone manufacturing (e. g., MacGregor 1985, 1989, Jaworski 1999, Moreno García et al. 2010, Konczewska 2011, Pawłowska 2011, Rijkelijkhuizen 2013).

THE CONTEXT OF THE FIND

During archaeological excavations at Belgrade Fortress in 2008, a defence building, called Blockhouse, was thoroughly investigated. It was situated at the south-eastern wall of the Upper Town of the Belgrade Fortress (figs. 1, 2).

The Blockhouse has a rectangular shape in its aboveground segment, with five windows – loopholes, while the subterranean section has comprised one vaulted room. These two parts were connected by an aperture in

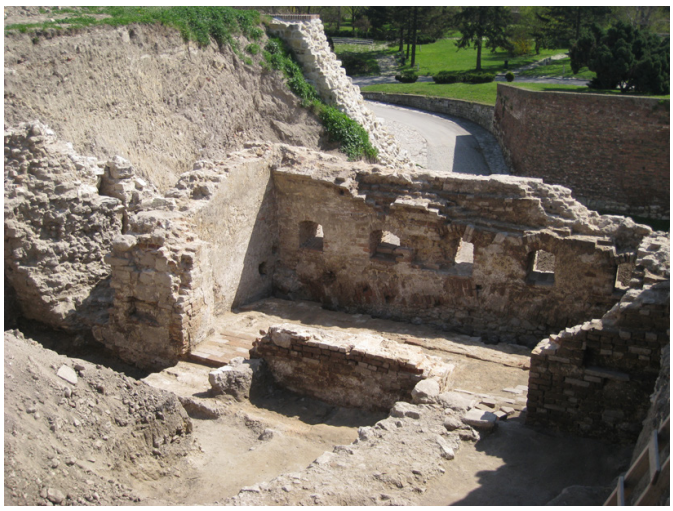

Fig. 1. The Blockhouse, during excavations in 2008.

Fig. 2. The subterranean chamber of the Blockhouse.

the floor of the upper level, and the subterranean room also had one opening in the opposite side, within the trench (Bikić 2012: 210-211).

The building was constructed during the Austrian occupation, between 1718 - 1721, but was never completed, due to changing to construction plans.(Popović 2006:211-218). Soon afterwards, the Blockhouse was partially destroyed, and the subterranean room was filled with debris from surrounding areas of the Upper Town. As two large barracks were in the vicinity, it may be assumed that artefacts contained within this waste had been used by Austrian army during their occupation of 1718-1721. . The assemblage is dominated by ceramic and glass vessels, clay pipes, knives, shoe soles, buckles, but also included bone manufacture debris, which is the subject of this paper (fig. 3).

THE BONE MANUFACTURE DEBRIS

The find consisted of *c.* 85 pieces (some had fresh breakage and could be fitted together) of bone debris of different shapes and dimensions, but predominantly rectangular pieces from which rounded segments had been removed.

Raw materials

All these pieces came from the ribs of large mammals, and judging from their size, were most likely from cattle (cf. Wolsan 1982). Almost all rib segments were present – proximal, mesial and distal (only epiphyses were not noted, i. e., all segments belong to the *corpus costae*) although those belonging to wider and more flat segments prevailed.

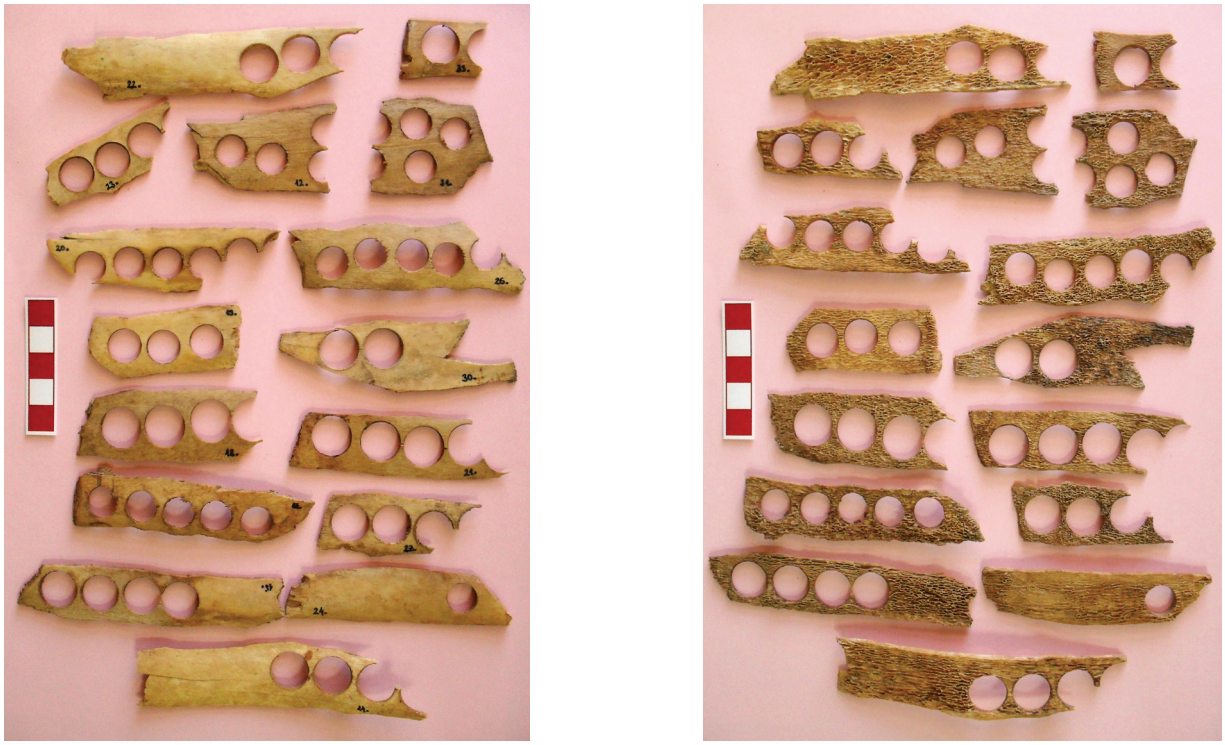

Fig. 3. Several fragments of bone debris.

As mentioned above, an attempt was made for refitting, but without much success; only pieces with fresh breakages could be fitted together, suggesting that either ribs were not cut into pieces at the spot, or that a considerable loss of volume had occurred during cutting. However, judging from the shape of the segments themselves, it is most likely that the raw material was already fragmented elsewhere. This means that the raw material most probably represents kitchen refuse, where the ribs had been removed during the process of food preparation and/or consumption (cf. Kunst 2013), and had not been separated during the first stage of butchering of the animal body, or later from a tannery or hide-workshop (for butchery practices, cf. Olive 1987).

Bones and horns from domestic animals, especially cattle, were used in bulk in medieval times, and it is assumed that this was because they were easily available and obtainable in large quantities as the by-products of meat consumption, or from skinner's and tanner's workshops (cf. Konczewska 2011: 305). Other (cheaper) raw materials were used as well – such as hooves (cf. Rijkelijkhuizen 2013). Furthermore, unlike antlers, which had to be gathered if large quantities were needed (cf. Billamboz 1977), cattle skeletal elements were available all yearround and presumably at lower prices. Cattle bones may also have been preferred for their aesthetic, mechanical and physical properties: colour, shape, size and thickness (cf. Konczewska 2011: 305, with references).

Apart from horn, bone is a strong and at the same time flexible material, which has thermoplastic properties and is easily modified into a variety of shapes (cf. Rijkelijkhuizen 2013). Thearge bones, from cattle and horses, especially metapodials, were used for a variety of purposes. The use of cattle ribs has been reported only occasionally.

Manufacturing process

Analysis of the bone manufacturing waste from the Blockhouse has allowed the manufacturing process to be reconstructed. Differently sized rib fragments, already broken into pieces elsewhere, were brought to the working area for further processing. The main blank was of more or less rectangular shape. Most of the rib fragments just had irregular, broken edges, with fibres torn, suggesting that they were simply smashed by direct percussion, most likely with some heavy cutting or punching tool, such as an axe or cleaver (cf. Brugal and Defleur 1989, see also Klippel and Schroedl 1999).

A smaller number of pieces had traces of transversal division. Onsome of these pieces, deep grooves may be observed near to the edges where they have been broken into pieces by a heavy cutting tool, such as an axe, whereas other pieces have traces of irregular cutting, most probably by a large knife.

These more or less rectangular pieces were then trimmed along their outer longitudinal edges. In most cases, again, rough edges with fibres torn may be noted, as a result of direct percussion, and more broken off than cut off. As only a few pieces show traces of a cutting tool, such as a knife, are visible – these cut edges have a slightly wavy appearance and show the movements of a tool, stopping, hesistating, changing and showing evidence of small mistakes, etc.

Breaking into pieces and removing the side portions was necessary to ease the longitudinal splitting, as ribs are very resistant, and it impossible to split an entire rib longitudinally. Splitting was done by posing a cutting tool between two plates and then applying indirect percussion (cf. Christidou 1999, see also Klippel and Schroedl 1999: 226-227). Only three smaller pieces come from unsplit ribs, presumably too small to split and thin enough to be cut through.

From the blanks thus obtained (single bone plates of ribs) rounded segments were cut out, by drilling, from the lower and upper surfaces. Traces of drilling, in the of shape of horizontal concentric lines, are visible in negative within the hole. A slightly thicker, wider centre at the cross-section represents the meeting point of the two drilling operations. On all but one of the bone pieces, where the drilling tool had not been precisely positioned at the inner/ lower side. the drillings meet perfectly.Two groups of perforations can be distinguished – smaller ones, around *c*. 1.10 -1.15 cm in diameter, and larger *c*. 1.4-1.5 cm in diameter. This indicates that at least two drilling tools of different dimensions had been used. The type of tool used was a simple three-forked drilling tool (cf. Luik and Maldre 2003, also Luik this volume, Klippel and Schroedl 1999: 226), i. e., a drill that had a central spike for making the central perforation (see below). According to MacGregor (1985: 101), "the implement used was evidently a centre-bit with a curving profile and with an extended central point which, when it had penetrated the bone from one side, allowed the drill to be aligned on the same spot from the other". Such tools have been used since Roman times (cf. Vecsey 2012) and their use is confirmed by finds from medieval Visegrád (Gróf and Gróh 2002: 283, fig. 2).

It is interesting to note that the internal positioning of the holes on the blanks varies a great deal. Sometimesthey holes almost overlap, sometimes the gap between the holes is wide, sometimes the holes are aligned in one row, sometimes in two. Furthermore, several pieces show that the surface available was maximally used, i. e., the entire space is used, while other pieces had been discarded even though a few more discs could have been cut out.

At the lower (inner) surfaces of the ribs the spongy tissue is completely exposed, it has been left unworked and is very rough. Only a few examples have traces of whittling, i. e., a knife was used to cut thin strips of material, but even on these this was not done on the entire surfaces, and it is therefore more likely the result of incomplete splitting (removal of the other bone plate) and was not originally intended for smoothing the surface.

These traces were only observed on one piece, on the upper side, and may be related to the removal of soft tissue. As it would have been much easier to smooth entire rib segments with some sort of abrasive tool prior to drilling, we may conclude that the final products retained these rough surfaces.

Final product

All these bones represent debris, discarded pieces from which blanks for final products have been removed. From the shape of the final product it is clear from the trace itself – that these were small circular pieces, with a diameter a of *c.* 1.40-1.00 cm. According to Klippel and Schroedl's work on bone button production on St Kitts, there was less than 1 mm difference between maximum disc diameters and minimum hole diameters, (1999: 227-228) Our material shows a similar pattern.

In several examples, discs were not cut out completely, but where left partially embedded in the bone. This enables us to make a relatively precise reconstruction of the bone discs. It can suggested that the buttons – were circular in shape, with their outer edges slightly truncated at the upper surface. At the centre, they had small perforations *c.* 1-2 mm in diameter. As mentioned above, the bone discs fall into two sizes with only small variations.

It has been estimated that the total number of end products from this debris will have amounted to at least 370 bone discs.

DISCUSSION

Similar finds, consisting of both debris and finished items, have been discovered at several sites in Europe, but also in colonial contexts outside Europe, dating from late medieval into modern times. Their interpretation is twofold, as rosary beads and as buttons.

In Tallinn, Estonia, over 40 bone scrap fragments and 6 semi-finished or finished pieces were discovered in the street called Roosikrantsi, and were dated to the medieval and early modern periods (Luik and Madre 2003, also Luik, this volume). The debris itself can be dated to 15th-17th century (Luik and Maldre 2003), although some may be a little more recent in date (see Luik, this volume). Most of this debris originated from large mammals, mainly *Bos* ribs, although scapulae and a few long bones were also discovered. They were interpreted as beads or buttons, and it was noted that some scrap fragments were quite thick and were therefore more likely to be the remains of bead-making.

Fig. 4. Bone debris plaque with chopping traces.

In Visegrád, Hungary, such debris was discovered along with other bone refuse, from dice making, and also with a rare find of an iron bit used in manufacture, suggesting that this had been bone carving workshop. This material was interpreted as the remains of a rosary bead making workshop and wasdated to the 14th-15th centuries (Gróf and Gróh 2002).

Remains of bone manufacturing debris from the late medieval –early modern period has been discovered at several locations in In Wrocław, Poland, (Konczewska 2010, 2011, Pawłowska 2011). Debris from the production of disc-shaped final products, mainly from large long bones, was noted in several streets (Konczewska 2011), including those areas where written documents mention rosary manufacturing (Konczewska 2010).

In Konstanz, Germany, morphologically similar types of debris have also been discovered, although in the case

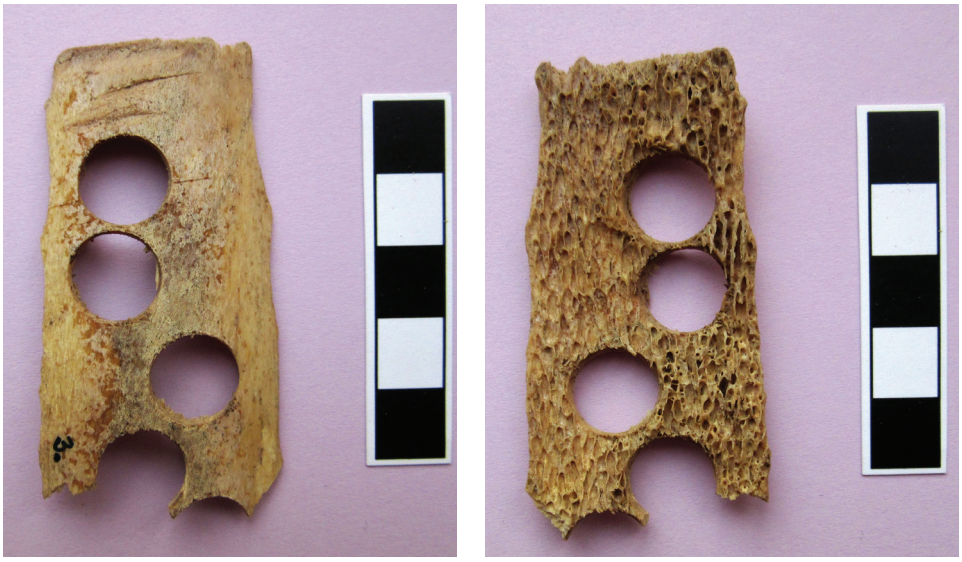

Fig. 5. Bone debris plaque with traces from some heavy cutting tool.

Fig. 6. Bone debris plaque with traces of whittling.

mainly from long bones, and the end-products seemed to have been more carefully made, with smooth surfaces, perhaps even with additional polishing (cf. Röber 1996: 118-119, Spitzers 1999: abb. 2, 6). These finds were date from the 15th and 16th century (Spitzers 1999: 242).

Similar findings are known from France (Maire 1998) and Italy (Bianchi 2014 with references). The closest European comparison to our assemblage comes from Pavia (Bianchi 2014: fig. 1). The bone working debris in Pavia also dates from the 18th century and contains a similar range of rough rectangular plaques from large mammal ribs with spongy tissue exposed on the lower surface. Three of these were made from other flat bones and only one was smoothed on both surfaces (Bianchi 2014: 177).

The process of manufacture of beads can also be reconstructed after written sources and illustrative evidence. Miniatures and engravings from the 15th to the late 18th century provide representations of artisans working, so some details may be observed, especially tools used, such as diverse boring and drilling tools. Particularly important are Diderot and D'Alembert's Encyclopaedia from the 18th century, that shows several artisans at work and below the tools they used (Moreno García et al. 2010: 187, fig. 9) and a drawing of a German Paternosterer at work, from the Stadtbibliotheken in Nürnberg, dated into the first half of the 15th century (Sandor 1961: Fig. 40; Spitzers 1999: abb. 3, Das Hausbuch) (see also Gróf and Gróh 2002: fig. 4, 5).

In addition to the examples discussed above, particularly interesting bone working assemblages have been recovered in the European colonies – in North America and the Caribbean. Both manufacturing debris and the corresponding single-hole discs have been reported from numerous 18th and 19th century sites in North America (Klippel and Schroedl 1999, Klippel & Price 2007). Many of these (up to two thirds) came from American or British military sites (Klippel & Price 2007: 137-138). One of the richest finds, with over 1000 fragments, comes from Brimstone Hill, St Kitts, West Indies, and was uncovered during excavations of the British fortress, in an area that is known to have been occupied by African slaves (Klippel and Schroedl 1999).

The St Kitts debris is mainly from flat cattle bones (predominantly ribs and occasionally scapulae) and from turtle bones. The bones of coastal turtles are somewhat different to cattle ribs, since they are joined by sutures and do not have cortical bone on the edges; they seemed to have been mainly chopped and not split. Klippel and Scroedl were also able to reconstructed the shape and size of their single-hole bone discs from pieces that several pieces that had not been successfully extracted. The dimensions of these final products showed large variations, with diameters from *c.* 8.5 mm to *c.* 32 mm. In this instance the large buttons had been mainly intended for topcoats, and the smaller ones for waistcoats, trousers, etc. (Klippel and Schroedl 1999, Klippel & Price 2007).

The method of making both beads and buttons by simply drilling discs for further shaping from flat bone segments was, widespread in Europe has also been seen in the examples that have been discussed from the colonies. Distinguishing between beadand button f making debris is not easy, and there is always the possibility that

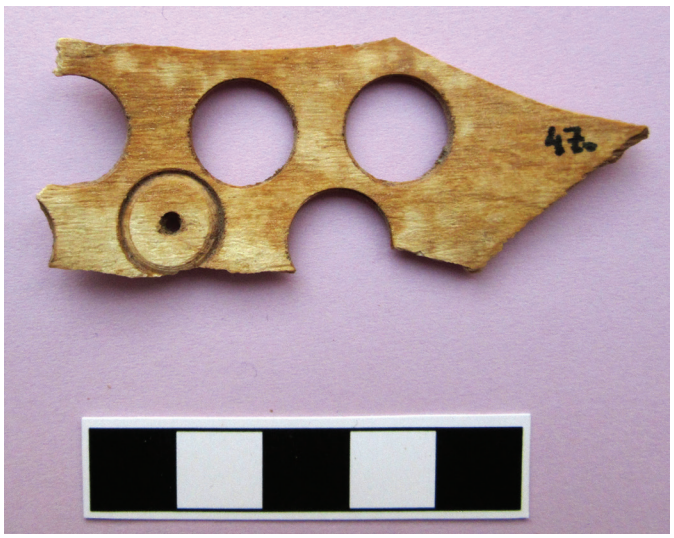

Fig. 7. Bone debris plaque with one bone disc still embedded.

t that both beads and buttons were produced in the same place and by the same technique.

This was not the only method for bead making. Finds from Seville, Spain, dated from the 18th century (Moreno García et al. 2010) include several groups of from several phases of working, allowing the reconstruction of manufacturing techniques (Moreno García et al. 2010: 186-187; similar finds also came from France – Maire 1998). In these examples, both beads and buttons could have been produced by using the a same technique, only the buttons would have had different dimensions, being larger in diameter and thinner.

In distinguishing the debris of buttons from those of beads the very choice of raw material is important. Long bones, particularly cattle metapodials, were preferred for beads, as more thick end-products could be made from them. Also, such bones are naturally smooth, so they do not require a great deal of polishing, while flat bones (scapulae, ribs, and occasionally other flat bones) seem to have been preferred for buttons. The choice of raw material depended largely on availability, especially in the case of buttons made for military,where the most available raw material was used (see, for example, use of turtle bones – Klippel and Schroedl 1999). Out of flat bones, ribs are the most abundant, and can be obtained from kitchen waste; although scapulae may have been easier to work, requiring less preparation for obtaining one blank, the quantity available would have been much smaller.

When considering possible uses the the context of finds must be carefully considered. Some examples have further evidence in the form of written documents, confirming that rosary manufacturing occurred in certain quarters, in the immediate vicinity of the deposited debris (e. g., Konczewska 2010, Ryc. 174/523-526; 2011: 308, see also the name of the street in Tallinn – Luik, this volume).

Covered buttons

MacGregor (1989: 121) suggested that bone discs from many medieval sites were probably the "skeletons" of covered buttons. According to S. Hinks (1995) and W. Klippel and his co-authors (Klippel and Schroedl 1999, Klippel & Price 2007), most of these specimens formed the cores for cloth thread covered buttons.

The analysis of the 18th century cloth covered buttons from the Colonial Williamsburg Foundation collection, done by X-rays, clearly showed that single-hole discs formed the button core (Klippel and Schroedl 1999: 230). One of the recent examples comes precisely from Belgrade fortress, where one such button in a final phase, with cloth covering, may be seen (fig. 8, 9) (Bikić 2013: fig. 3b). With the distribution of finds within this grave context (Bikić 2013: fig. 2), and also the dimensions – 12 pieces with c. 1.4 cm in diameter and two more pieces with c. 1.1cm in diameter – taken into consideration, these were most likely shirt buttons.

M. Sandor (1961: fig. 43) offered a different reconstruction, with rather a complicated scheme of posing a thread and attaching such a button on the clothes. However, such a central perforation is not particularly convenient for such a method of usage, and K. Jaworski (2012: 178-179) has argued that these bone discs are unfinished, and offered another reconstruction, by adding four more holes around the central one. Numerous finished buttons from osseous materials (mainly more "expensive" ones, such as antlers, discovered in the Crimea, have only one, single hole at the centre (Душенко 2013). We may therefore conclude that in most cases the final shape of the majority of buttons was a single-hole disc, mainly covered by some cloth.

Clothing the army

These finds open interesting questions about how the needs of consumers were met. Most of the debris is related to the army, although numerous buttons were probably produced for civilians as well. In cases from British fortresses, the sheer quantity of debris demonstrates how large the needs of the army were. Most of armies in early modern times had their own supplying centres. Clothes were the next most important item after food (Tallett 1992: 119). Furthermore, shoes, coats, socks, wore out rapidly, so soldiers would borrow, even steal clothes from civilians, other soldiers, or even plunder from the dead and

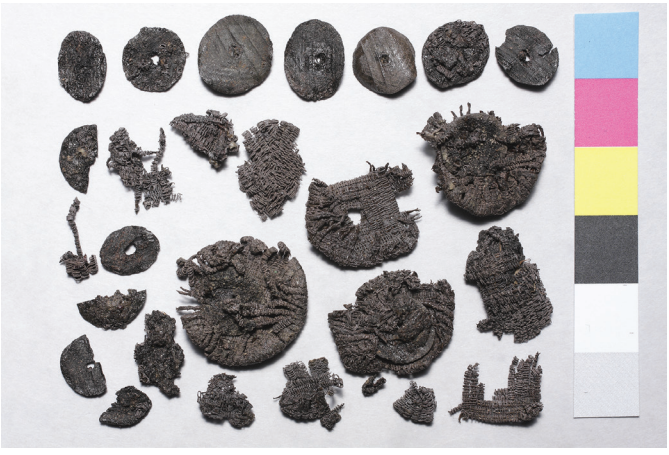

Fig. 8. Bone buttons with a cloth covers from the Belgrade fortress.

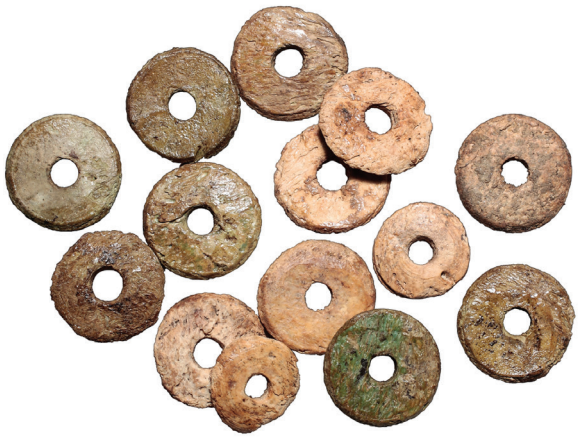

Fig. 9. Bone buttons from the Belgrade fortress.

wounded. Particularly new recruits would join in their own, personal clothes. In the early eighteenth century only elite troops would have worn something resembling the full uniform, ordinary soldiers were often identified as belonging to the same side by markings or badges (an armband, a sash, piece of fern or feather in their cap, etc.).

Over time, regular government contracts for large quantities of clothing, boots, etc., and increasingly detailed specifications concerning cut, colour and pattern of soldiers' clothes, led inevitably to increased standardization. We may in fact observe the emergence of uniforms in attempts to make the supplies of clothes regular and sufficient. For example, the Austrian War Council ordered in 1707 that all infantrymen should wear clothes of light grey, the colour which had increasingly been associated with the Imperial forces from the time of the Thirty Years War (Tallett 1992: 118-120). However, there are no archaeological examples of how and on when this decree on army clothes was put into practice and to what extent.

As for our example from Belgrade fortress, although the quantity seems modest when compared to British military sites, it is important to outline that the time span is quite short and the entire find most likely presents a single-event, i. e., one episode of preparing / repairing the clothes for soldiers. It is interesting to note that within the same context, within Blockhouse, bronze buttons with imperial initials were also discovered, thus confirming the logical assumption that high-ranking officers were present at the Fortress.

CONCLUSIONS

This, for the time being unique find from the territory of Serbia, offers some interesting information on button production and the the army, but also raises some interesting questions. It is evident that the debris was produced in a short time period, most likely representing a single event, therefore, the question is, who made the buttons and why? Was this the work of a specialized craftsperson orworkshop? Was there a need for Austrian army to quickly renew the uniforms? Or was this regular activity? Furthermore, it is difficult to assess what the the quantity of bone debris means, for example, how many uniform pieces could this quantity of button blanks furnished and for which parts exactly were these buttons used?

This Belgrade find is particularly important as it demonstrates the wide geographical distribution of this method of button production, which now includes South-Eastern Europe. Our assemblage comes not only from a securely dated context, but also one with a very narrow time frame. Good preservation also revealed some interesting technological traits, and enabled the full reconstruction of the *chaîne opératoire* and comparisons with analogous finds from other parts of the world.

Most of the button production debris reported from other parts of the world show the same main characteristics with the use of raw materials that were most available and the easiest to work (large ungulate ribs in our case, turtle bones in West Indies) and the use of simplest, crude techniques for *débitage* phases. The examples from Belgrade Fortress were not particularly carefully made, nor attractive, with very rough, unworked surfaces, although standardized in shape. They were made from kitchen waste, quickly, by using a simple but efficient technique, thus revealing a standardized method and a skilful craftsperson, most likely the work of a specialist.

The context of the find indicates that the buttons were produced in one of the barracks in the immediate vicinity. Bone manufacturing was just one of many activities noted on the Fortress, along with smiths, barrel-makers, tailors, etc. during archaeological researches of this unique and valuable context from the early 18th century. All this points to a well-organized, and economical army that used all available resources and raw materials with care. However, if we have in mind the tough life of military garrisons in fortresses, non-hygienic conditions of life, inordinately supplying, and more than modest payments, as F. Tallet stated (1997: 112-113):"If the soldier was constantly at hazard from sickness and disease, he also had more mundane concerns: the availability of fuel to keep warm, a roof over his head, food to eat, clothes for his back and money in his pocket" – we may assume that in this particular case such button production was more likely a simple necessity.

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