

UNIVERSITATEA „ALEXANDRU IOAN CUZA” DIN IAȘI  
FACULTATEA DE ISTORIE  
CENTRUL INTERDISCIPLINAR DE STUDII ARHEOISTORICE

# FONTES PERENNITATIS

STUDIA IN HONOREM MAGISTRI  
NICOLAE URSULESCU  
OCTOGESIMUM ANNUM PERAGENTIS

EDIDERUNT  
VASILE COTIUGĂ, FELIX-ADRIAN TENCARIU ET ANDREI ASĂNDULESEI

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Nicolae Ursulescu  
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Ediderunt

Vasile Cotiuță, Felix-Adrian Tencariu et Andrei Asăndulesei

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*N. Arslany*

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## ASPECTS OF TECHNOLOGY AND CRAFT PRODUCTION IN THE LATE NEOLITHIC: THE CASE STUDY OF THE SETTLEMENT AT VINČA–BELO BRDO

Selena VITEZOVIĆ<sup>1</sup>, Dragana ANTONOVIĆ<sup>1</sup>

**Abstract.** Technological changes that occurred during the Neolithic period had the most lasting and the most far-reaching consequences upon human societies. They brought changes in subsistence and economy, and along with them new tasks, new activities, new needs, and, eventually, they led to occupational specialisation and modern organisation of societies.

The site of Vinča–Belo Brdo is one of the most extraordinary sites of the Vinča culture. It is among the largest Vinča culture settlements and the one with the longest occupation, which left an impressive 9m-thick cultural layer. Furthermore, the material culture recovered here stands out from the majority of other Vinča settlements by its quantity, quality and diversity. This suggests that the settlement at Vinča had a special place within the economic organisation of the Vinča culture and there is even some evidence that this was a centre of sorts for craft production and trade.

In this paper, we will examine some of the aspects of technology and craft production at the Vinča settlement, with special focus on technologies for lithic and osseous raw materials, as well as indirect evidence on perishable technologies.

**Rezumat.** Schimbările tehnologice care au avut loc în timpul perioadei neolitice au avut cele mai durabile și cele mai profunde consecințe asupra societăților umane. Au adus schimbări ale strategiilor de subsistență și ale economiei, iar odată cu ele noi sarcini, noi activități, noi nevoi și, în cele din urmă, au dus la specializarea ocupațională și la organizarea modernă a societăților.

Situl Vinča–Belo Brdo este unul dintre cele mai spectaculoase așezări ale culturii Vinča. Este printre cele mai mari așezări vinčiene și cea mai longevivă, cu o stratigrafie impresionantă, de 9 m grosime. În plus, elementele culturii materiale recuperate aici se remarcă în comparație cu majoritatea celorlalte așezări Vinča prin cantitatea, calitatea și diversitatea lor. Acest lucru sugerează că așezarea de la Vinča a avut un loc special în organizarea economică a culturii cu același nume și există chiar unele dovezi că acesta a fost un fel de centru de producție artizanală și comerț.

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<sup>1</sup> Institute of Archaeology, Belgrade.

În această lucrare, vom examina câteva aspecte legate de tehnologie și de producția meșteșugărească din așezarea de la Vinča, cu accent deosebit pe tehnologiile materiilor prime litice și osoase, precum și dovezi indirecte privind tehnologiile materiilor perisabile.

**Keywords:** bone technology, lithic technology, craft production, Vinča culture.

**Cuvinte cheie:** tehnologia osului, tehnologie litică, producție artizanală, cultura Vinča.

## Introduction

The Neolithic period was the milestone for very important changes in human subsistence, economy and way of life, which changed the human society forever, and led to our modern ways of life. Introduction of agriculture and permanent settlements brought new activities, new types of social bonds, relations and interactions. It is precisely in the Neolithic period that many scholars are trying to identify the origins of social stratification and the roots of complex societies in Europe. It is also the period when craft production of diverse goods, either “practical” or “prestigious”, increased in quantity, quality and diversity, leading to increased production and higher standardisation. Increased demand for craft goods certainly influenced the need to experiment with new raw materials and new technologies, thus leading to the emergence of metallurgy, and the overall changes in the scale of production and technological improvements which, in turn, lead to specialisation. Occupational specialisation, i.e., the creation of professions, can actually be considered as one of the most important traits of our modern societies, the one that drastically changed the organisation of societies and social relations.

Studies of craft production in prehistory were often focused on the emergence of specialisation, since the works of Gordon Childe (Childe 1950; 1951; 1973 [1942]). Childe considered the specialisation as one of the most important steps in development of human societies (Childe 1950; 1951; 1973 [1942]). Numerous researchers also relied on Childe’s works and they often assumed that specialisation was directly linked to social stratification. Craft specialisation was perceived as a result of the increasing social complexity and the forming of hierarchical societies, because new elites needed crafts to produce politically valued items and to control the production and surplus (Peregrine 1991; cf. also see also Vitezović 2022 and references therein). The presence of craft specialisation was often used to infer aspects of cultural complexity, and vice versa, a possibility of craft specialisation would be dismissed immediately in cases of non-complex societies (cf. Clark, Perry 1990, 289–290).

The definition of specialisation changed considerably in the past three decades, to a more nuanced signification that includes many different ways of organising production, and that also acknowledges that there are many types of specialisations and that specialisation can have different degrees (Costin 1991; Clark, Parry 1990; in particular, see Costin 2005 for further discussion and references therein). According to C. L. Costin (Costin 1991; 2005 and references therein), specialisation is not a single organisational

state, nor is it a present/absent condition, and it can be organised in many ways. Clark and Perry (1990, 297) suggest a distinction between 1) non-specialised production of craft goods, and 2) specialised production of non-craft goods. According to them, the production is “specialized if the consumers are not members of the producer’s household; if the consumers and producer are members of the same household, production is not considered specialized. In essence, craft specialization is production of alienable, durable goods for nondependent consumption” (Clark, Perry 1990, 297). Rowan Flad and Zachary Hruby emphasised that we should also distinguish *producer specialisation* and *product specialisation* (Flad, Hruby 2007). Furthermore, we may add to this *site specialisation*, which may be identified within certain socio-economic systems (e.g., Perlès 2004; Vitezović, Antonović 2020).

In recent years, numerous research activities insisted on moving the focus to larger studies of the organisation of production, that would try to identify all the possible variations and nuances within diverse socio-economic systems, instead of focusing on the identification of the presence or absence of specialisation (see Costin 2005 and references therein, also Vitezović 2022). As Clark emphasised, “I suggest production to be dealt with broadly, in all its particulars” (Clark 2007, 31).

As Costin noted, “studies of craft production are a fundamental part of archaeological inquiry in that they are central to the reconstruction of ancient lifeways and the explication of sociocultural evolution” (Costin 2005, 1035).

The material culture is utilitarian, but at the same time it is a means of social communication; it is the main expression of identity, power and social relations, and both the craft goods and the process of production itself reflect the social organisation, social roles and identities among groups and individuals (Appadurai 1986; Hodder 1982; Costin 2005; Hodgkinson, Lelek Tvetmarken 2020; Hruby, Flad eds. 2007; Miloglav, Vuković eds. 2018). Studying the craft production is important for studying the role of material culture in everyday and ritual life of past societies.

Research activities that focused on the production of diverse, primarily utilitarian objects, increased considerably in the past three decades and changed drastically our view of Neolithic societies and their economic organisation. The work by C. Perlès and K. Vitelli on the Neolithic in Greece should be particularly singled out (Perlès 1992; Perlès, Vitelli 1994; 1999), as well as the work of some other authors (e.g., Miller 1996). Perlès, Vitelli analysed craft production of diverse goods and suggested that specialised production existed in the Neolithic Greece in contexts that varied considerably, depending on the craft, and also argued that “procurement, production, distribution and consumption did not vary independently, but together form a coherent system within each category of products” (Perlès, Vitelli 1999). Furthermore, the production of prestige items played an important role in prehistoric societies. Power and prestige status are not solely linked to control over resources and larger amount of material goods, but also to their character – prestige objects are an important factor in the development of crafts,



the emergence of craft specialisation, and emergence/increase in social inequality (see Vitezović 2022 and references therein).

Studies of technology and craft production within the Late Neolithic / Early Eneolithic Vinča culture can contribute significantly to our understanding of different aspects of economy. It is within the Vinča culture that we can observe the increase in production and standardisation, as well as different changes in technologies, including the introduction of a new technology – metallurgy (see Vitezović 2018; Vitezović, Antonović 2020; Vuković, Miloglav 2018; also, papers in Radivojević *et alii* eds. 2021).

In this paper, we will focus on two aspects of Vinča technologies that were less exploited in archaeological literature – bone and lithic technologies, and the indirect evidence they provided on perishable technologies.

### **The archaeological background**

The Vinča culture existed in the period between 5400–4500/4450 cal BC (Borić 2009, Tasić *et alii* 2015). Hundreds of sites of the Vinča culture are known today in the Central Balkans and southern Carpathian basin, in present-day Serbia, Croatia, Bosnia and Herzegovina, Montenegro and Romania (Chapman 1981; Garašanin 1979; Srejović ed. 1988). In fact, new sites are found even today, with new field reconnaissance projects and rescue excavations (e.g., Perić, Bulatović eds. 2016; Prodanović Ranković ed. 2017), thus showing a pattern of settlements that are often clustered and located closely to vital resources – water, fertile soil, and/or other raw materials. Settlements were usually large, long-living, with a thick cultural layer and several layers of habitation (Chapman 1981; Garašanin 1979; Srejović ed. 1988; Porčić, Nikolić 2021).

The subsistence practices in the Vinča culture included small- to medium-scale cultivation of different plant resources, as well as gathering of wild plants (Borojević 2006; Filipović, Obradović 2013) and animal herding, predominantly cattle, but also sheep, goats and pigs. Hunting and fishing were also practised, but their importance differs from region to region and over time (Bulatović 2018; Dimitrijević, 2008; Greenfield 1986; Legge 1990; Orton 2008; Russell 1993).

Material culture was very rich and diverse. Ceramic production is particularly well represented and includes vessels for storage, cooking and consumption, peculiar decorated and zoomorphic vessels with presumed ritual functions, zoomorphic and anthropomorphic figurines, daily utensils such as weights and spindle whorls, and many more (Chapman 1981; Ignjatović 2008; Garašanin 1979). The analysis of ceramic production showed a high level of standardisation (Vuković 2011; Vuković, Miloglav 2018).

The Vinča culture artisans experimented with new raw materials and new technologies. It is in the Vinča culture that we have the first evidence of metallurgy in this region. The mine of Rudna Glava near Majdanpek was exploited by Vinča culture communities, and copper objects, as well as traces of metallurgical processes, can be found on several sites, including Belovode, Pločnik, Divostin, Vinča–Belo Brdo

(Jovanović 1982; Antonović 2002; Radivojević, Kuzmanović Cvetković 2014, Radivojević *et alii* 2021).

Finally, the Vinča culture also had connections with neighbouring and distant regions. Evidences of trade and exchange are visible today in the archaeological records of objects made from exotic raw materials, such as obsidian or marine shells, especially *Glycymeris* and *Spondylus* (Dimitrijević, Tripković 2002; 2006; Tripković, Milić 2008). We may assume that the exchange also included other raw materials and/or products that cannot be traced within the archaeological evidence available today (such as food, items made from organic materials, etc.).

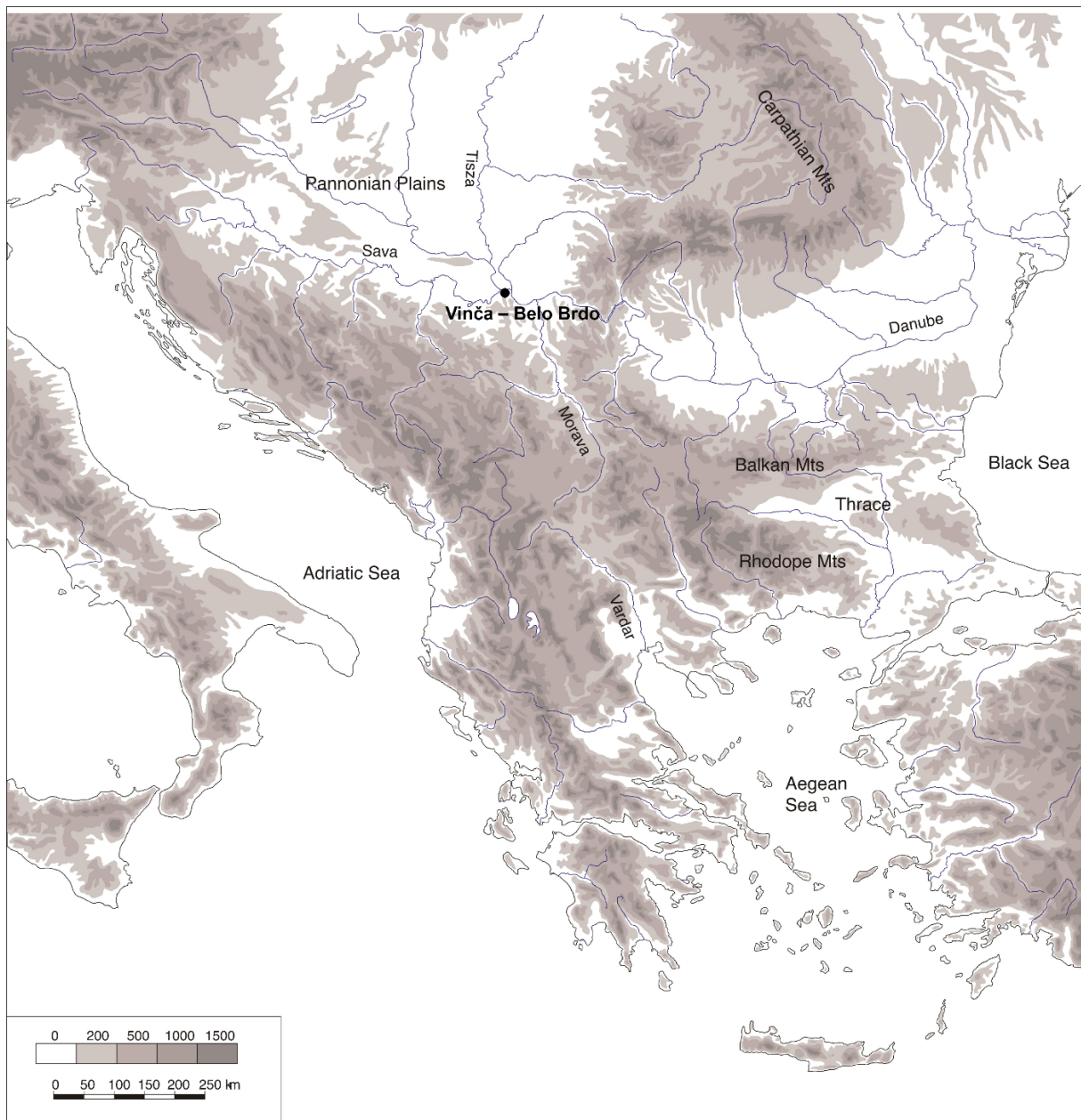


Figure 1. Map showing the position of the site of Vinča-Belo Brdo.

Crafts and craft production within the Vinča culture have been an interesting topic to different scholars, but they have never been systematically analysed. The first

excavator of the Vinča culture, Miloje Vasić, paid attention to some of the aspects of crafting (see, for example, his hypotheses on mining activities – Vasić 1932). Among other studies, we can mention work by B. Tripković on some of the aspects of household production (Tripković 2007), and one chapter in J. Chapman's book was focused on *Village crafts and industry* (Chapman 1981). The majority of studies, however, was focused on single technology – ceramic (e.g., Amicone *et alii* 2021; Tringham, Krstić 1990; Vuković 2011), lithic (e.g., Antonović 2003; Dimić, Antonović 2021; Ibragimova 2021), or bone (e.g., Russell 1990; Vitezović 2017; 2018; 2021).

The site of Vinča–Belo Brdo, the first systematically excavated Vinča culture site, and at the same time the longest-living settlement, provided very important evidence for the study of craft production (Fig. 1). The site of Vinča–Belo Brdo is situated 28 km from Belgrade, in the village of Vinča, a present-day suburb of Belgrade. It is located on the bank of the Danube River, near the mouth of the Bolečica stream. It was discovered in the early 20<sup>th</sup> century; the excavations started in 1908, and, with some breaks, are still on-going (Ignjatović 2008). The most important campaigns are those carried out by Miloje Vasić in the first half of the 20<sup>th</sup> century. M. Vasić excavated through the entire stratigraphic sequence of the site, thus providing the evidence from all phases of life in this settlement (for history of research, see Nikolić, Vuković 2008). Both lithic and osseous industries had an important place within the settlement's economy, and provided data on the level of technological knowledge and on diverse aspects of daily activities and craft production.

### **Bone technology**

Osseous industry had an important place within the settlement of Vinča–Belo Brdo. Almost 1000 artefacts were collected by its first excavator, Miloje Vasić, and we may assume that a certain quantity of broken pieces was not collected or that it was later discarded from the collection (a large percentage of analysed objects is 90–100% complete). Already this quantity shows that osseous raw materials played an important role in the production of every-day items, and their technological traits show a high level of knowledge and skill<sup>2</sup>.

Raw materials include bones, antlers, teeth and mollusc shells. Among the bones, mainly sheep/goat and cattle long bones were selected (predominantly metapodials) and ribs, while other skeletal elements occur rarely. Antlers were mainly from red deer, with rare occurrences of roe deer antlers. Teeth were predominantly boar tusks. Objects from mollusc shells were mainly from *Spondylus* and *Glycymeris*, although there are examples of *Dentalium* and *Cardium* shells as well. The majority of these raw materials was obtained from within the settlement or its immediate vicinity. However, raw

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<sup>2</sup> Bone tools from excavation campaigns headed by M. Vasić were briefly analysed and published by D. Srejskić and B. Jovanović in one short article in *Starinar* (Srejskić, Jovanović 1959) and in a book by A. Bačkalov (1979). Shell objects were partially analysed by Dimitrijević and Tripković (2002; 2006). S. Vitezović analysed the entire assemblage from a technological viewpoint – raw material selection, manufacturing procedures, morphology, use-wear traces (publication in preparation).

material choices were by no means random or expedient, but strict and planned. One of the most frequently used skeletal elements were metapodial bones from small ruminants, sheep/goats. Metapodial bones are the ones that are removed during the primary butchering (cf. Olive 1987), therefore, they had probably been stored to be used when needed. One of the well represented raw materials are also antlers, which can be obtained from hunted animals, but also gathered, since deer shed their antlers annually and often in the same place (cf. Clutton-Brock 1984). The presence of shed bases shows that collected antlers were used (although there is a possibility that a smaller amount was obtained through hunting), suggesting planned, systematic collecting of antlers, as well as good knowledge of the environment.

Techno-typological analyses revealed a well-developed bone industry, high level of skill and good knowledge of the mechanical and physical properties of the material. Selected techno-types will be presented here.

Medium pointed tools or awls are the most frequent techno-type. They show a high level of standardisation; and two variants can be singled out, produced from two skeletal elements. The first variant are awls made from long bones. Bones were usually longitudinally split (by using the standardised method of grooving and cutting with a chipped stone tool), thus creating a blank with a semi-circular cross-section. They were almost exclusively made from sheep/goat metapodials, and the distal portion was selected more often than the proximal (Fig. 2).



Figure 2. Awls made from sheep/goat metapodials.

Globular distal epiphysis of the metapodial bone was preserved as a handle, presumably because of its ergonomic characteristics, while the other end would be sharpened into a fine point by using abrasive stones. The same method was used for

re-sharpening and repair. The second variant are awls made from split ribs, with a flat cross-section. Thicker, larger segments were sometimes transformed into double points, while the majority of artefacts just have a finely cut base and sharp point at the distal end. Here, abrasion was also used for the final stages of shaping and for repairs. Standardised manufacturing procedures, along with the strict choice of skeletal elements, resulted in a large number of almost identical tools.

Another interesting techno-type that should be mentioned are fishing hooks (Fig. 3). They were almost all made from antlers (there is just one example produced from a boar tusk), similar in size, produced through a standardised set of steps in manufacturing (cutting the blank, scraping and burnishing to create an L-shaped object and final burnishing by abrasion of the shank and the tip), and very similar in morphology. They all have a slightly profiled head, elongated shank and sharp tip, and the only variation is in the shape of the tip – it may be simple or barbed. The forming of the curved shape of the hook required a certain skill level, thus showing that, although these objects seem to be simple, there was also a lot of skill, labour and time invested in their manufacture.



Figure 3. Fish hooks made from red deer antler.



Figure 4. Decorative needle made from long bone segment.

Antlers are generally a very resilient raw material, they can absorb much energy under impact before breaking, and it is this feature that makes antlers such an ideal material to be used for weapons or percussion tools (Guthrie 1983, 278; Clutton-Brock 1984, 16–17, see also Vitezović 2017). Aside from fish hooks, they were also used for harpoons, as well as for heavy duty tools such as hammers or combined percussion tools. This shows that Vinča craftspersons had high knowledge on the mechanical and physical properties of raw materials.

Large labour, time and skill investment may be noted on the production of ornamental items. Ornaments are less frequent than every-day tools, as they were discarded under different circumstances, and mainly represent lost items (single beads, smaller fragments of ornaments). Ornaments such as decorative needles, rings or pendants made from bones, antler or teeth, were produced locally (Fig. 4). Besides the careful execution of the final shape, we may also notice that all of them were carefully burnished and polished, sometimes in several stages. On the other hand, ornaments from marine shells were imported, and their presence at Vinča – Belo Brdo shows that the Vinča settlement was an important place on a larger trade and exchange route (cf. Séfériadès 1995; 2010).

### Lithic technology

The Neolithic settlement at Vinča yielded a vast collection of stone material, which remained unsurpassed by the number of items for a long time in Serbian archaeology, all the way until archaeological research activities were carried out at the sites of Divostin and Selevac within international projects (McPherron, Srejović ed. 1988; Tringham, Krstić ed. 1990). It was the basis for the making of the first typology of ground stone tools (Antonović 1992), for more detailed research of raw materials and use of chipped stone tools (Radovanović *et alii* 1984), as well as the first synthesis of the Vinča chipped stone industry (Bogosavljević Petrović 2015). Selective collecting of findings, which had been applied in archaeology for a long time, thus also during the research in Vinča conducted by Vasić, resulted in a poor level of research of the chronological representation and horizontal distribution of certain types of tools, and thus also their function in the lives of prehistoric inhabitants of Vinča<sup>3</sup>. The situation changed considerably only with the last research campaigns at Vinča (Tasić, Ignjatović 2008) and analyses of the lithic material collections gathered on this occasion. Considering the fact that this excavation comprehended only the layers of the final phase of the Vinča culture (Vinča–Pločnik II), no conclusions can be made on the settlement of Belo Brdo as a whole, but we may, however, assume that the former practice of discarding material disrupted the general picture of the lithic industry of Vinča and that the earlier

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<sup>3</sup> Due to such practices, abrasive tools remained poorly examined for a long time. Heavy and large pieces of groundstones and querns weren't kept in museum collections because they were massive and took up a lot of space in the depots, and other abrasive tools were insufficiently attractive (Antonović 2008). Selection was performed for fragmented axes and adzes as well, and also for chipped stone material (Bogosavljević Petrović 2015, 319).

conclusions, especially some concerning the presence of certain types of stone tools (Antonović 1992, 47; Antonović 2003, 128), should be taken with a grain of salt and a critical attitude. This is most pertinent for abrasive tools, which turned out to be the most numerous types of stone tools during recent research<sup>4</sup>. Also, numerous raw material flakes used to make chipped and ground stone tools proved that there were workshops for the production of stone tools of various types, on several locations within the settlement (Bogosavljević Petrović 2015, 313) (Fig. 5).



Figure 5. Manufacturing debris from lithic artefact production.

All the basic types of ground stone objects appeared in Vinča in their most developed shaped already from the earliest layers. Typologically speaking, those were axes, adzes, chisels, hammers, pickaxes, groundstones, whetstones, querns, and from decorative and cult objects – pearls, bracelets, pendants, amulets and figurines. All these objects indicate that a long period of technological improvement preceded them, and that it was in the beginning of life in this settlement that they appeared in those forms which would last, without substantial changes, for the rest of the Vinča culture period. The same can be said of raw materials: fine-grained sedimentary rocks and contact metamorphic rocks, in various shades of grey and green, which give the Vinča ground stone industry its characteristic and recognisable appearance, remained, for the entire

<sup>4</sup> An analysis of ground and abrasive stone material from research campaigns from the period 1998–2005 was performed by D. Antonović, and unpublished results of this work are presented in this paper.

existence of the Neolithic settlement of Vinča, the most commonly used raw material for ground stone tools.

Types and shapes of tools which can be found at Vinča, from the earliest layers (from 9.8 m), already existed in the Starčevo culture (Antonović 2003, 131). The Vinča culture merely “inherited” them and perfected them, bringing a larger diversity of shapes. Thus, already before the end of the Vinča–Tordoš I phase, that is to say, from the depth of 8.5 m in the settlement at Vinča, when it was considerably expanded, a notable diversity of shapes can be noted in hammers. This diversity, however, wasn't a result of a specialisation of tools; instead, it indicates that ground stone tools still had a high value. Damaged axes and adzes, which couldn't be fixed any more, were used secondarily as hammers. Adzes of all shapes and sizes were the most commonly used ground stone tools in Vinča, and also the entire Vinča culture. The largest number of them displays use-wear traces made while working on wood, and there is also a large number of semi-finished items, and they were used considerably less in secondary contexts for earth works.

Research activities conducted in Vinča from 1998 provided a new picture of abrasive tools (groundstones, whetstones, querns). These were the most numerous stone tools in the most recent layers of the Neolithic settlement in Vinča. Querns were a part of household inventories, and there was usually several of them per habitation unit (Antonović 2008, 347; Borojević *et alii* 2020). A large amount of mostly fragmented groundstones and whetstones, which often remained in use even after being damaged, all the way until the phase of complete destruction, ended up as the debris material in substructures of ovens and levelling layers between houses.

Chipped stone industry followed the same trend noted in the making of ground stone tools. From the earliest layers of Vinča, it was a fully developed and organised activity (Bogosavljević Petrović 2015). During the older phase of the Vinča culture, it was characterised by diverse raw materials, among which a prominent place was taken by obsidian, imported from the Carpathian Mountains, and local silica rocks (chert) and minerals from the near surroundings of the settlement (Bogosavljević Petrović 2015, 434). The import of obsidian influenced the basic technological process – making blades from cores already prepared in workshops, for which it is assumed that they existed in the vicinity of the settlement. Tools production also took place inside the settlement itself, judging on the basis of a small number of flakes in comparison to the number of blades, which are prevalent. During the Vinča–Gradac phase, more flakes can be noted, while the blades were the basic goal of production. Tools were made outside of the settlement, and a decline in production can also be noted. This ratio continued during the later phases of the Vinča culture as well – blades remained the primary tools, with a large number of flakes and small number of previously prepared cores (Bogosavljević Petrović 2015, 318). Research activities at Vinča performed from 1998 up to today show a slightly changed image in comparison to previous research (Radovanović *et alii* 1984). The technological pattern hadn't been changed to an important extent, and the making



of blades remained the basic goal in the production of chipped stone tools. At the same time, an increased production of flakes and blades can be noted in the settlement, as well as an increased usage of local stone. This is an important difference in respect to the period of full use of obsidian, when this raw material used to be procured in the form of cores or ready-made tools (Bogosavljević Petrović 2015, 440).

During the later phase of the Vinča culture, there was a notable decrease in quality in the making of all types of stone tools within the settlement at Vinča, which was the consequence of a narrowed choice of good raw materials. It was followed by an ever-growing presence of recycling in the making of stone tools, reflected in the maximal usage of fragmented items. Recycling is especially visible when it comes to abrasive tools, which were used until fully destroyed, but also in chipped stone industry, where fragmented adzes were used as cores for making them (Fig. 6).



Figure 6. Fragments of adzes used as cores for chipped artefacts.

### Technologies of perishable materials

Bone and lithic artefacts were used in diverse crafts, but the most important crafts were those with organic (perishable) materials: leather, hide, fur, textiles, woodworking.

#### *Textiles, leather, hide and fur*

Rich evidence on textile working is already available from the analyses of ceramic objects. First, some of the pots have imprints on their bottoms from textiles (Ninčić 2016 and references therein), and also there are diverse objects made from clay that had some function in the textile production. Weights of different shapes and masses are a relatively frequent find, and it is reasonable to assume that at least some were used for vertical looms. There are also diverse spindle whorls, as well as a range of peculiar ceramic objects for which it was suggested that they had a function related to textile production (Chapman 1981; Svilar 2017).

If we add to this already diverse tool kit objects made of bone, it becomes apparent that the production of different items from plant fibres was an important activity. Medium and fine pointed tools (awls and needles), as already mentioned, were quite frequent on the site and they often have traces of intensive polish and shine – results of use on soft, organic materials, such as plant fibres, leather and hide (traces of use compared with published criteria – see Legrand 2007; Maigrot 2003; Peltier 1986). Furthermore, bone industry from Vinča–Belo Brdo also contains a significant amount of burnishing tools – scrapers, spatulae, as well as double-sided spatulae-awls, again, with traces of working with soft, organic material – fine polish on the entire distal portion, often expanding on the mesial and basal parts as well, and characteristic fine striations. A particularly large number of scrapers and burnishers is needed in early stages of processing animal hide, for the removal of the remains of soft tissue, for rubbing them with grease for impregnation, for colouring, etc. (Beyries 2008).

Beside osseous, some lithic artefacts might also have been used in final stages of leather and hide processing, such as smaller pebbles of silica rocks (quartz, chert, jasper) without any traces of working on them, but with a use-wear polishing on one side, created precisely through the friction of soft materials against the stone<sup>5</sup>. Some pebbles were also used for polishing outer surfaces of ceramic vessels before baking (Vuković 2014, 184). It is not very probable that this type of use would leave a trace such as polishing, for which it is known to be a result of actions of soft organic materials (Bogosavljević Petrović *et alii* 2017, 35), thus, pebbles with polishing should be regarded as tools used on organic materials.

#### *Woodworking*

Ground stone tools were most commonly used for woodworking. Almost one half of the adzes discovered during excavations lead by Vasić, which were the most numerous tools from those excavation season, displayed use-wear traces caused by woodworking (45.54%). The abundance of adzes can be linked, in any case, to carpentry work, which

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<sup>5</sup> When working on stones, modern jewellers perform hand polishing with leather or textile on which the finest, powdered abrasive is added (Antonović A. 2004, 43).

was probably one of the basic activities of the inhabitants of this settlement. Above-the-ground houses, which required a lot of wood for the building, were being built already from the depth of 8.8 m upwards, all the way to the end of the Neolithic settlement (Stalio 1984, 35, 40). Pieces of house daub with imprints of regularly cut beams were discovered during more recent research at Vinča in notable numbers (Borojević *et alii* 2020).

Wood was probably used significantly more, not only as timber for houses. There is indirect evidence on the existence of furniture within households. House 01/06 had been destroyed in a sudden fire, because of which it had been abandoned with the complete mobile inventory in it, sealed with layers of daub (Borojević *et al.*, in preparation). Ceramic inventory consisted of vessels for storing and consuming food of all sizes, which was entirely destroyed in the abovementioned fire. It can be, therefore, assumed that there were wooden shelves along the walls of the house, on which smaller vessels were kept (larger ones were, undoubtedly, placed on the floor), which collapsed along with the walls. Traces of shelves haven't been found in the house, and the assumption was formed on the basis of regularity in which fragmented vessels were distributed (Fig. 7).



Figure 7. The imprints of wooden planks on daub fragments, discovered within debris layers.

We may assume, on the basis of a large number of adzes and chisels of all shapes and sizes that wood was also used for the making of small household items. It is probable that wooden vessels and spoons had been in use, judging on the basis of numerous ethnographic analogies from all over the world, and also the territory of the Central Balkans. However, no traces of such objects have been discovered in Vinča. Also, no traces of wooden parts of lithic and osseous tools have been discovered, most importantly handles, without whom the tools could not have been used (Dimić 2015, 53–58). Some of the antler items also had perforations for handles, presumably wooden ones. It is assumed that sickles were also made of wood, which was to be found in abundance in the vicinity, and not from antler, as was assumed in the experimental

examining of the functioning of certain types of stone tools from Vinča (Bogosavljević Petrović *et alii* 2017, 39).

Some of the large antler tools were also used in woodworking, especially cutting tools – axes, adzes and chisels. Antler axes and adzes may have been used for dividing larger tree trunks into smaller segments, while chisels were probably used in final stages of shaping wooden artefacts.

Craft production within the Neolithic/Early Eneolithic settlement at Vinča–Belo Brdo.

Judging on the basis of the analyses of lithic and osseous objects, Vinča was a large crafts centre. Remains of smaller workshops for production of lithic artefacts have been discovered within the settlement (Bogosavljević Petrović 2015, 367–380) (Fig. 5), and there are indications that the larger ones were certainly located in the vicinity of the settlement (Bogosavljević Petrović 2015, 436), or even at its periphery (Antonović 1992, 48). Thus, in the earlier layers of the Vinča settlement, the final production of blades from imported obsidian cores (previously prepared on another location that, for the time being, remains unknown) was being performed in the workshops located within the settlement (Bogosavljević Petrović 2015, 436). Concentrations of small amounts of flakes discovered at the Late Vinča settlement would rather suggest that repairs and modifications of stone tools were performed within the settlement.

Bone and antler tools were also produced within the Vinča settlement, as evidenced by manufacture debris in different stages of production process – from débitage phases up to almost finished items. There is also evidence of repair and modification of broken / completely used objects. Unfortunately, the archaeological documentation from the excavations by M. Vasić does not allow us to reconstruct if there was a distinct place with larger amounts of debris that could point to the location of the activity / working area(s).

A large number of abrasive tools (groundstones, whetstones), discovered in the most recent layers in Vinča (research from the period 1998–2008), bears witness of the fact that every household in this settlement performed a number of craft activities. Sharpening of cut-edge stone tools (adzes, chisels, axes), as well as sharpening and repair of bone pointed and cutting tools (awls, needles, heavy points, chisels, etc.) was a part of domestic crafts.

The Neolithic settlement at Vinča is unique, in the entire Vinča culture but also in the Neolithic of Serbia in general, according to the number of lithic and osseous decorative and other non-utilitarian objects. On the basis of this, we could assume that the production of decorative and non-utilitarian objects from stone and some osseous items (with the exception of those made from marine shells *Spondylus*, *Glycymeris* and *Cardium*) was performed within the settlement. There is also another possibility, that decorative and cult objects were made in other settlements as well and that they were all coming down to Vinča, which was a distribution centre from which exchange was made with other cultures. Decorative objects from the Vinča culture have been

discovered in a settlement of the Tisza culture in Čoka, in vessels convenient for transport, on the basis of which it was suggested that these items had been imported from the Vinča culture (Garašanin 1973, 148).

### Concluding remarks

Analyses of technologies, technological systems and craft production within a wider socio-economic context in the Neolithic is important for understanding the organisation of production, social and economic relations, as well as for studies of the origins of occupational specialisation and complex societies.

The Late Neolithic / Early Eneolithic Vinča culture was on the breaking point when increased standardisation, increased production and important technological changes occurred. The site of Vinča – Belo Brdo is particularly important. The comparative analyses of lithic and osseous industries showed that craftspersons engaged in these activities were highly skilled. Both lithic and osseous industries include examples of standardised, almost identical items, made according to strict rules, from the same raw materials and by using the same technological procedures (such as bone awls, antler fish hooks, or stone axes, adzes, chisels, blades and scrapers), and also examples of bespoke, rare, carefully made, entirely or almost unique objects (such as ornamental and other non-utilitarian items) (*sensu* Caple 2006).

Lithic and osseous raw materials had a very significant place in the every-day life of the inhabitants of the Vinča settlement. They systematically acquired raw materials they needed, modified them into objects by exploiting their physical and mechanical properties to the maximum, and they used them intensively, often re-using and recycling them.

Lithic and osseous industries also provided some indirect evidence on the importance of perishable (organic) raw materials. They were predominantly used for processing leather, hide, plant fibres, and also for woodworking, thus showing a rich, varied tool-kit for each of these activities.

The inhabitants of the Neolithic settlement at Vinča were skilful craftspersons and they had a need for diverse craft goods that were used for basic, every-day needs, but also for other social roles, such as the display of status and/or prestige (ornaments, particularly nicely made non-utilitarian objects, etc.).

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