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СТАРИНАР

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фото: Горан Стојић

Sur la couverture: La quenouille en ambre, Viminacium,
fin du II^{e} – commencement du III^{e} siècle
Photo: Goran Stojić

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LEPENSKI VIR CHRONOLOGY AND STRATIGRAPHY REVISITED

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Abstract – This article offers a new look at the stratigraphy and chronology of Mesolithic and Neolithic deposits at Lepenski Vir, particularly based on newly available Accelerator Mass Spectrometry (AMS) dating and aDNA genomic evidence. It focuses on a detailed analysis of several key contexts for which new radiocarbon dates are available while at the same time reviewing taphonomic and age-offset problems when dating human remains and other materials affected by the aquatic reservoir effect in the Danube Gorges area. The robust chronological evidence as well as available stratigraphic data overwhelmingly show that the start of the main and iconic phase of the occupation of this site, represented by the architecture of trapezoidal buildings and sculpted sandstone boulders, should unequivocally be dated to the period of the Mesolithic-Neolithic transition in the last two centuries of the seventh millennium cal BC. At this time, local forager populations of distinct hunter-gatherer genetic ancestry came into contact and mixed with incoming Neolithic, farming populations of north-western Anatolian genetic ancestry, based on the available genomic data but also supported by studies of material culture traditions. The article deals directly with the recent criticism of this chrono-stratigraphic model for Lepenski Vir.

Key words – Mesolithic, Neolithic, foragers, farmers, AMS dating, aDNA, Lepenski Vir, Danube Gorges

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Although more than 50 years have passed since the discovery of Lepenski Vir (Fig. 1), the controversy as to how one should best interpret its stratigraphy and accurately date various discovered features has not ceased. Over the past 20 years, several versions of a revised view of the stratigraphy and chronology of this site have been offered[1]. These reinterpretations have predominantly relied on a new understanding of the most dominant phase with trapezoidal buildings and associated material culture, with an important grounding in the extant conventional radiocarbon dates and more recently obtained Accelerator Mass Spectrometry (henceforth AMS) measurements. The offered revised understanding of the site's stratigraphy and chronology significantly changed initial interpretations that had been offered by the excavator of the site, Dragoslav Srejović[2]. Most recently, these revised understandings of the site have further been supported and nuanced by a series of new and more precise AMS measurements on human and animal bones and archive charcoal samples from various contexts, Bayesian statistical probabilistic modelling of radiocarbon dates as well as new analysis of the associated material culture and human remains found at the site[3].

With smaller or greater differences among the authors who have studied this cultural phenomenon over the last two decades, a minimal consensus has been reached about the stratigraphy and chronology of Lepenski Vir

[1] Borić 1999, 2002; Borić, Dimitrijević 2007/2009; Bonsall et al. 2008; Garašanin, Radovanović 2001.

[2] Srejović 1969, 1972, 1988; Srejović, Babović 1983.

[3] Borić 2016; Borić et al. 2018.

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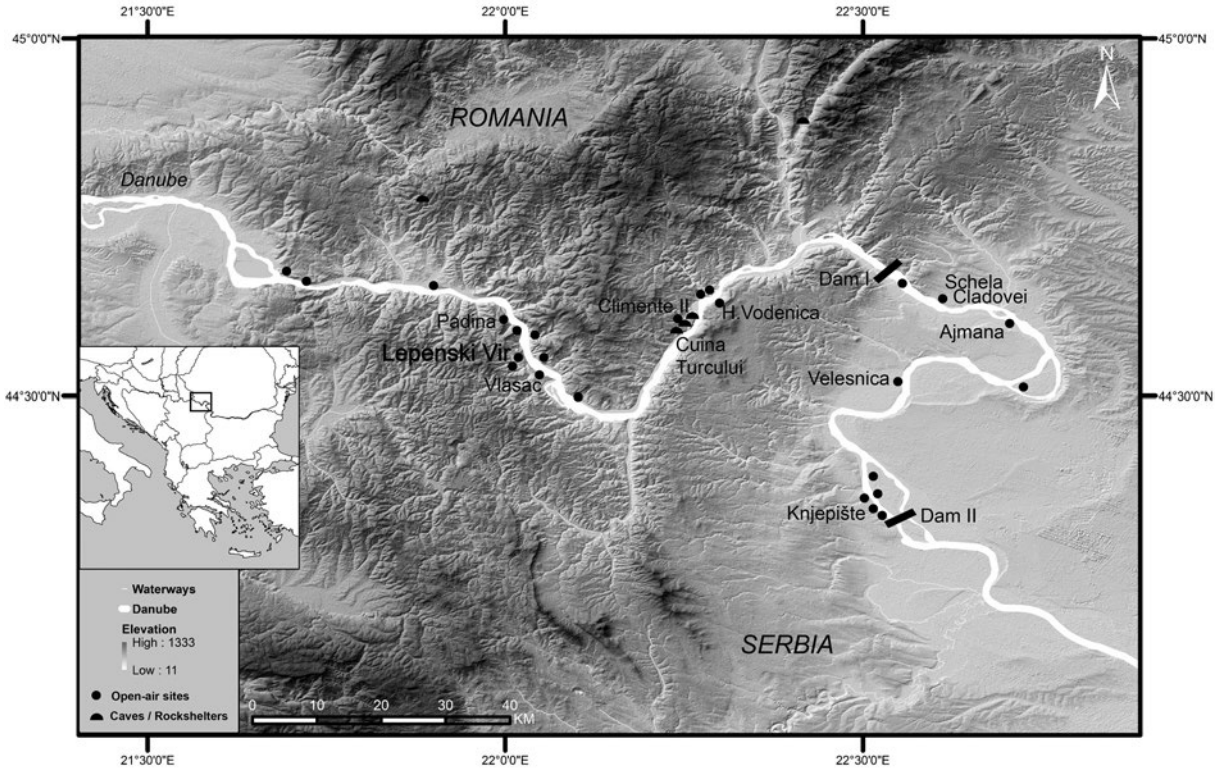

Fig. 1. Map of the Danube Gorges area showing Lepenski Vir and other Mesolithic and Neolithic sites along the Danube. Base map elevation data source: ASTER GDEM („ASTER GDEM is a product of METI and NASA") courtesy NASA/JPL-Caltech (Base map by Karol Wehr, figure prepared by Dušan Borić)

Сл. 1. Карта Ђердапа са Лепенским Виром и другим мезолитским и неолитским локалитетима дуж Дунава. Извор података за рељефну подлогу: ASTER GDEM („ASTER GDEM је производ METI и NASA"), са захвалношћу NASA/JPL-Caltech (подлогу направио Карол Вер, слику припремио Душан Борић)

that sees the best represented phase with trapezoidal buildings (Fig. 2) attributed to the period of the Mesolithic-Neolithic transition, also referred to as the "Final Mesolithic"[4], absolutely dated to the last two centuries of the seventh millennium cal BC, representing a continuous process of transformation caused by cultural contacts between Mesolithic indigenous foragers and newly emerging Neolithic agro-pastoralist groups.

However, recently, Perić and Nikolić[5] offered their own reinterpretation of the stratigraphy and chronology of Lepenski Vir with a different understanding of stratigraphic relationships at the site and absolute chronological attributions of the main architectural units when compared to the views held by other authors who have written about this phenomenon in more recent years. According to Perić and Nikolić, buildings with trapezoidal floor bases were constructed prior to 7,500 years cal BC, based on their reading of associated radiocarbon dates, and there was a pronounced discontinuity between the Mesolithic and Neolithic settling of Lepenski Vir. The view of these authors represents a significant deviation from the recently established consensus among researchers studying Lepenski Vir and, thus, requires a new consideration of the questions of chronology and stratigraphy of this site, due to the discrepancy of more than a millennium in the suggested dating of the site's most notable features.

In this article, the stratigraphy and chronology of Lepenski Vir are reconsidered once more through a focused analysis of several contexts with newly available AMS dates and with a detailed discussion of taphonomic and other issues surrounding the dating of samples from this site and the Danube Gorges area more generally. An attempt is made to clarify ways of using radiocarbon

[4] Bonsall 2008, 264–266; cf. Bonsall, Boroneanț 2018.

[5] Perić, Nikolić 2016.

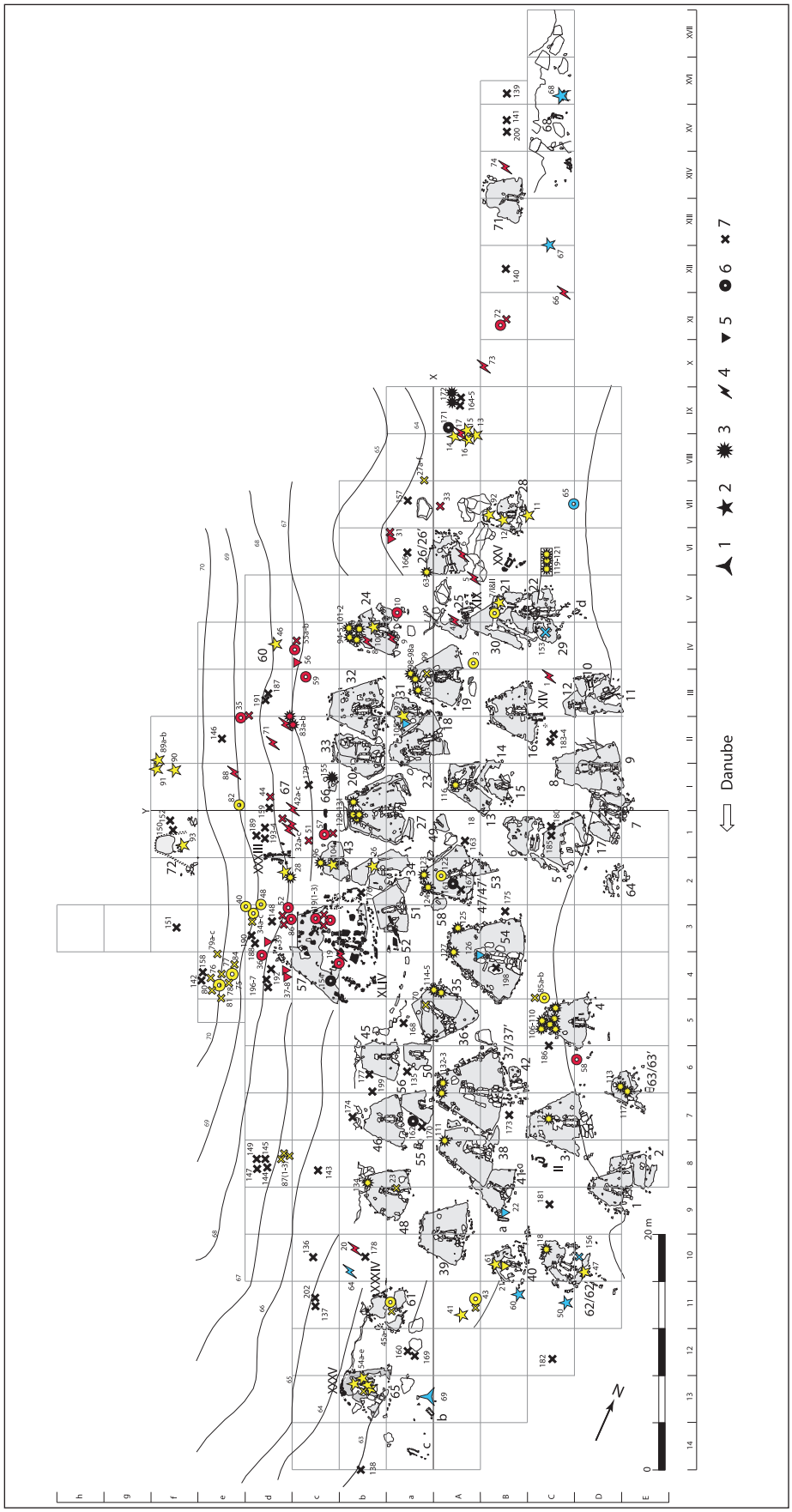

Fig. 2. Site plan of Lepenski Vir with features from different phases shown. Key: 1 – primary burial, flexed lower limbs ('seated'); 2 – primary burial, extended supine; 3 – neonate; 4 – primary burial on its lateral sides and flexed lower limbs; 5 – secondary burial, disarticulated mandible; 6 – disarticulated cranial remains; 7 – disarticulated postcranial remains. Blue: Proto-LV; yellow: LV I–II; red: LV III; green: Copper Age; orange: Roman; purple: medieval; black: unclear dating (figure prepared by Dušan Borić)

Сл. 2. План Лепенског Вира са уцртаним различитих фаза. Кључ: 1 – примарно сахрањивање, савијени доњи удови ('седећи'); 2 – примарно сахрањивање, на леђима у испруженом положају; 3 – новорођенче; 4 – примарно сахрањивање, скелет на латералној страни, савијени доњи удови; 5 – секундарно сахрањивање, дезартикулисана мандибула; 6 – дезартикулисани кранијални остаци; 7 – дезартикулисани посткранијални остаци. Плаво: Прото-LV; жуто: LV I–II; црвено: LV III; зелено: бакарно доба; наранџасто: римски; љубичасто: средњовековни; црно: нејасно датовање (слику припремио Душан Борић)

measurements with the highest level of scrutiny following modern scientific standards and best practice – from the selection of samples to the modelling and interpretation of the obtained data. This is followed by an analysis of stratigraphic issues and the nature of depositional processes at the site. Finally, the chronological picture of Lepenski Vir that emerges from this review is compared to recently obtained ancient DNA (henceforth aDNA) genomic data on human remains from Lepenski Vir and several other Mesolithic-Neolithic sites in the Danube Gorges area.

A brief overview of the research and debate

In the following section, a brief overview will be offered regarding different views about the stratigraphy and chronology of Lepenski Vir held by various authors who have written about these questions, presented in chronological order.

Even before the final, 1970 campaign of excavations at Lepenski Vir, in 1969[6], in a monograph published in Serbian and several years later translated, with minor modifications to the original text, and published in English[7] and German[8], the principal excavator of the site, Dragoslav Srejović, offered the first authoritative view of the stratigraphy and chronology of Lepenski Vir. According to Srejović, there are four main stratigraphic phases at the site. The earliest Mesolithic phase is labelled Proto-Lepenski Vir and is represented by rectangular stone-lined hearths without limestone floors, with the occupation restricted to a narrow belt along the Danube's bank. In continuity with this phase, follows Mesolithic phase I with trapezoid-shaped limestone building floors and centrally located rectangular stone-lined hearths, which in their dimensions and style of construction differ from the hearths attributed to the Proto-Lepenski Vir phase (Fig. 2). Phase I was subdivided into phases Ia to If, representing different building horizons within phase I, primarily based on evidence of complete superposition of some building floors, partial overlapping and horizontal displacement of building floors and hearths, or intercutting of older floors by new ones. Buildings of this phase are marked by Arabic numerals (1, 2, etc.). Furthermore, this continuous Mesolithic development, according to Srejović, is followed by the final Mesolithic phase II, consisting of stone walls creating trapezoidal outlines, sometimes with rectangular stone-lined hearths, lacking limestone floor packings, and generally found at a higher level than the trapezoidal building floors of phase I. The assumed buildings of this phase are marked by Roman numerals (I, II, etc.). Srejović argued that this continuous Mesolithic development was interrupted by the abandonment of the site, during which period a thin sterile layer covered the site and its Mesolithic features. According to his view, the site was resettled again at the start of the Early Neolithic, which, in the stratigraphy, is marked as phase III, subdivided into phases IIIa and IIIb. While occasional finds dated to the Copper Age, Bronze Age, Iron Age, Roman, and Medieval periods were also found at the site, these were not marked as separate phases and no distinct "layers" in the site's stratigraphy can be associated with these later periods of the site's use.

Already at the time of the writing of Srejović's first book on Lepenski Vir, there appeared a series of 19 radiocarbon dates dating 14 charcoal samples associated with the occupation of 12 trapezoidal buildings of phase I and two dates dating charcoal samples from the contexts attributed to two structures of phase II[9]. It was obvious to H. Quitta, who reported the results of radiocarbon dating in one of the appendices of Srejović's book, that these dates suggest the contemporaneity of phases I and II with various Early Neolithic sites in south-eastern Europe for which radiocarbon dates started to become available at the time. However, for Srejović, the dating evidence did not play an important part in his narrative regarding the chronological and cultural attribution of the main features found at Lepenski Vir. At that time, he had already obtained confirmation through radiocarbon dating of an earlier, Mesolithic occupation of the neighbouring site of Vlasac (Fig. 1), the excavations of which he also oversaw, together with Zagorka Letica[10], which preserved the roots of the cultural tradition seen at Lepenski Vir during phases I and II based on the similarities in the shape of rectangular stone-lined hearths and trapezoid-shaped dwelling floors. Such a dating of Vlasac might have strengthened his conviction that Lepenski Vir phases I and II should be dated to the Mesolithic too, separate from the subsequent Early Neolithic occupation of the site.

Challenges to this view came soon after the publication of Srejović's book in English. One of the first

[6] Srejović 1969.
[7] Srejović 1972.
[8] Srejović 1975.
[9] Quitta 1975.
[10] Srejović, Letica 1978.

reviews of the book was published in the *Proceedings of the Prehistoric Society* by John Nandriș who argued that "Lepenski Vir I and II, deriving from those predecessors, were nevertheless largely contemporary with the beginnings of the First Temperate Neolithic, and not, as Srejović claims, rigidly antecedent stages"[11]. Nandriș rather critically ends his review by stating: "With regard to the age of Lepenski Vir, surely the attempt to make it older than it is, is an indication that the site is being used to answer the wrong sorts of questions"[12]. In the following years, several internationally recognised authors working on various aspects of south-eastern European prehistory had similarly critical views of Srejović's dating of Lepenski Vir[13].

Locally, the challenge to Srejović's dating of the site came early, while the excavations were still ongoing, through the work of one of his peers, Borislav Jovanović, who excavated the contemporaneous Mesolithic-Neolithic site of Padina-Gospođin Vir (Fig. 1), located five kilometres upstream of Lepenski Vir. Among other features, Jovanović discovered the architecture of trapezoidal buildings similar to those from Lepenski Vir and documented abundant associations of several discovered features with Early Neolithic, Starčevo type ceramics[14]. Subsequently, he suggested that Lepenski Vir phases I–II, similar to his Padina B settlement phase, should be dated to the Early Neolithic. These two different views remained entrenched throughout the 1970s and 1980s with no resolution of the debate.

After Michael Tellenbach[15] dealt a blow by challenging the stratigraphy and dating of Padina, Jovanović felt compelled to reinstate his conviction regarding the material associations of trapezoidal buildings at Padina with Early Neolithic Starčevo ceramics by publishing a piece on his findings in *Germania*[16]. As it was probably difficult to ignore such compelling evidence of Early Neolithic associations with trapezoidal structures at Padina, Srejović[17] conceded to Jovanović's views and accepted that Jovanović's Padina phase B-2, which related to the middle row of trapezoidal buildings at sector III of Padina–Gospođin Vir, could be attributed to the Mesolithic-Neolithic transition phase, while the uppermost row of buildings attributed to Phase B-3, with the clearest examples of the association of Early Neolithic ceramics with trapezoidal building floors and hearths, was assigned to the Early Neolithic. In the same comparative chronological table provided by Srejović in 1988, Lepenski Vir I and II remained firmly linked to the Late Mesolithic. A similar regional synchronisation of the site's phasing, with minor differences to the one offered by Srejović, can also be found in a synthesis of the Danube Gorges evidence provided by Voytek and Tringham[18].

In 1996, Ivana Radovanović's synthesis entitled *The Iron Gates Mesolithic* for the first time in a detailed way systematised the available evidence regarding the Mesolithic of the region. Trapezoidal buildings from Lepenski Vir remained fixed to six Mesolithic developmental stages proposed by Radovanović, while this author only briefly acknowledged the problems surrounding the chronological synchronisation of Padina and Lepenski Vir with Early Neolithic sites elsewhere in the Balkans, and provided only a very limited discussion of the then available radiocarbon evidence. Radovanović spread the timing of the Lepenski Vir phase I from the second half of the eighth and throughout the seventh millennia cal BC, despite the existing evidence of charcoal dates from the site. Radovanović also suggested a new division of Srejović's phase I derived from her architectural rephrasing of building horizons based on the presence and absence of ∀-shaped "supports" in association with buildings' hearths and other "stylistic" differences[19].

A major step forward in the understanding of this cultural taxonomic unit came with new AMS dating of human bones from Lepenski Vir, Vlasac, and Schela Cladovei[20]. These new measurements from Lepenski Vir provided the first dates for five burials attributed to phase III, while suggesting a significant time depth for some of the dated human remains from neighbouring Vlasac. Bonsall et al.[21] also published the first stable isotope study from the same three sites that not only provided indications of dietary practices but also suggested that the dating of human remains from this region raises the problem of the aquatic reservoir effect due to the significant consumption of fish resources that introduce concentrations of carbon into the human body

[11] Nandris 1972, 427.
[12] Nandris 1972, 429.
[13] Ehrich 1977; Gimbutas 1976; Milisauskas 1978.
[14] Jovanović 1969.
[15] Tellenbach 1983.
[16] Jovanović 1987.
[17] Srejović 1988, 10.
[18] Voytek, Tringham 1989; cf. Tringham 2000.
[19] For a critique of this rephrasing of Lepenski Vir building horizons see Borić, Dimitrijević 2007/2009.
[20] Bonsall et al. 1996.
[21] Bonsall et al. 1997.

from an ecosystem different than the atmosphere. The introduction of "old carbon" made the obtained dates older than reality and required a correction of the age-offset. The correction factor was derived from the comparative dating of the so-called "perfect pairs", i.e. both human remains and associated contemporaneous herbivorous remains in the form of bone tools, sometime found embedded in the skeletal remains as projectile points in Late Mesolithic burials at Schela Cladovei[22].

In 1999, I published a critique of the hitherto widely held views on the stratigraphy and chronology of Lepenski Vir by stressing the Early Neolithic historical context already suggested by the conventional radiocarbon dates and by arguing for the contemporaneity of the trapezoidal building phases from Lepenski Vir and Padina-Gospođin Vir in the context of absolute dating of Early Neolithic sites elsewhere in the Central Balkans[23].

This critique was then followed by the publication of previously unpublished photographs showing Early Neolithic ceramics on the floors of two buildings (4 and 54) from Lepenski Vir[24]. It should be noted that the publication of such evidence, previously kept secret, became possible only after the death of Srejović in 1996. While accepting the chronological contemporaneity of Lepenski Vir phases I and II with Early Neolithic settlements elsewhere in the Balkans, Garašanin and Radovanović retained the label "Iron Gates Mesolithic" for the nature of occupation of the two settlements during these phases.

In 2002, I expanded my revision of the stratigraphy of Lepenski Vir by suggesting that phases I and II are part of the same building horizon, with the stone walls of phase II seen as retaining walls of dug-in features of phase I buildings with trapezoid-shaped limestone floors[25]. Also, a new reconstruction of the upper construction of the semi-subterranean trapezoidal buildings was suggested, envisaged with upright wooden pillars holding a flat roof. The early series of conventional radiocarbon dates from Lepenski Vir and Padina was further supported by the first, newly obtained and more accurate AMS measurements on animal bones associated with the occupation of trapezoidal buildings from Lepenski Vir and Padina[26]. Some of these dates made on fish and dog bones showed the same reservoir effect problems as with the dating of human remains, demanding the age-offset correction. In addition, as part of my doctoral research, I obtained the first direct AMS dates on human remains from the sites of Padina and Hajdučka Vodenica (Fig. 1), and further dates on animal bones from Padina. These new measurements suggested a significant depth in the occupation of these sites and, importantly for the understanding of the chronological position of phase I at Lepenski Vir, confirmed the assumed dating of trapezoidal structures from Padina in the last centuries of the seventh and the first century of the sixth millennia cal BC[27].

In the 2000s, 34 further AMS dates were obtained from 32 different contexts of Lepenski Vir, dating three human bones and 29 animal bones[28]. This dating programme provided a more robust series of measurements for the overall stratigraphy of the site. We dubbed the main phase with trapezoidal buildings as phase I–II and provided the first realistic indication of the time depth at Lepenski Vir with some contexts dating back to the second half of the tenth millennium cal BC. This already representative series of dates further supported the earlier suspicion that Lepenski Vir might not have been settled during the Late Mesolithic, dated in this regional context to the last centuries of the eighth and the largest part of the seventh millennia cal BC. Also, the first direct AMS dates were obtained on five bones of domesticated animals (goat, cattle, and pig) found in contexts attributed to phase III, providing the first indication of the timing of the introduction of domestic stock to this site, starting from the first century of the sixth millennium cal BC[29].

Around the same time, Bonsall et al.[30] published 26 AMS dates on 25 human burials from Lepenski Vir that, apart from dating 19 Mesolithic-Neolithic contexts, also provided 4 measurements dating medieval burials, 1 dating Roman age skeletal remains, and 1 dating a Copper Age burial. The remainder of the obtained dates provided earlier Mesolithic, ninth-millennium cal BC dates or late-seventh and early-sixth millennia cal BC dates, after their correction for the reservoir effect. Unfortunately, this series of measurements was affected by a technical problem caused by the application of

[22] Cook et al. 2002; cf. Cook et al. 2009.
[23] Borić 1999.
[24] Garašanin, Radovanović 2001.
[25] Borić 2002.
[26] Borić 2002; Whittle et al. 2002.
[27] Borić, Miracle 2004; cf. Borić 2011.
[28] Borić, Dimitrijević 2007/2009.
[29] Borić, Dimitrijević 2007/2009.
[30] Bonsall et al. 2008.

the ultrafiltration protocol in the Oxford laboratory from 2000 to 2002, resulting in artificially older values[31], and all had to be remeasured. They were replaced by new measurements reported by Bonsall et al.[32], and now mostly fall in line with the rest of the available radiometric evidence from the site, including the dating results obtained separately on four of the same dated individuals in another lab – the NSF Arizona AMS Laboratory[33] (see below).

In 2016, I published the first dedicated study focusing on the contextual analysis of all human remains from Lepenski Vir, based on archival documentation and new analysis, firmly grounded in a stratigraphic analysis of different contexts in which human remains are found throughout the main phases of occupation of the site and supplemented by a robust series of available radiocarbon measurements[34].

In the same year, there came a challenge to the previously described years of painstaking build-up of chronological revisions and refinements of the stratigraphy and chronology of Lepenski Vir. In the book entitled *Lepenski Vir. Stratigraphy, Chronology and Periodization. Excavations 1966*, Slaviša Perić and Dubravka Nikolić[35] undertook a detailed analysis of a portion of the archival documents from Lepenski Vir, providing a critique of the hitherto held views, and suggested a periodisation of the site and its chronology dramatically different in the cultural and chronological attribution of different features found at the site. As suggested by the subtitle of their book, the provided detailed analysis of archives, for unknown reasons, did not encompass all excavation campaigns but only 1966, even though in certain parts of the book contexts and features excavated in 1965[36] and later campaigns are also discussed. In short, these authors suggested a rephasing of the site into two main phases: Lepenski Vir I, which represents a Mesolithic development of the Lepenski Vir culture from around 9500 to around 7500 cal BC associated with trapezoidal buildings, while a hiatus in the occupation of the site from 7500 cal BC to 6300 cal BC is subsequently followed by their phase Lepenski Vir II, which represents the occupation of the site in the Early Neolithic by the Starčevo culture taxonomic unit. Perić and Nikolić reject the contextual and active association of trapezoidal buildings with charcoal samples and material culture found on their floors, suggesting that almost all materials found on the floors and in the fills of trapezoidal buildings, except for sculpted boulders, come from Early Neolithic intrusions into these features.

There are a number of problematic aspects in the book published by Perić and Nikolić that require close scrutiny—from their understanding of the depositional processes at the site and its stratigraphy to their selective and arbitrary use of available radiocarbon evidence. After the publication of their volume, several new radiocarbon measurements also became available from secure contexts of the site that fundamentally challenge the main postulates of their stratigraphic and chronological reckoning of the evidence from Lepenski Vir. While the treatment of various chronological and stratigraphic issues of Lepenski Vir with the application of Bayesian probabilistic modelling of all the then available radiocarbon dates has recently been provided elsewhere[37], in the following I would like to offer a more focused discussion, on the one hand, about the nature of the radiocarbon dataset from this site, zooming in on a few key contexts that have recently been AMS-dated, and, on the other hand, returning to the issue of depositional processes and site build-up as seen in its stratigraphic sequence.

Radiocarbon chronology of Lepenski Vir

The current dataset and charcoal dates

Currently, Lepenski Vir is one of the sites with the largest number of available radiocarbon dates in southeastern Europe. There are in total 114 radiocarbon measurements (including several duplicates and triplicates of the same samples), while 108 measurements date Mesolithic and Neolithic contexts (Table 1)[38]. The dates are made on charcoal (26), animal bones (47), and human bones (41)[39].

Apart from the previously mentioned first series of 21 charcoal dates obtained in the late 1960s, there are now five new AMS dates on four charcoal samples that were selected from the preserved archive with charcoal samples collected at the time of excavations

[31] Bronk Ramsey et al. 2004.

[32] Bonsall et al. 2015.

[33] Borić, Price 2013; Borić et al. 2018; cf. Bonsall et al. 2015.

[34] Borić 2016.

[35] Perić, Nikolić 2016.

[36] See Perić, Nikolić 2004.

[37] Borić et al. 2018.

[38] Borić et al. 2018.

[39] I become aware of two additional AMS dates on human remains (burials 68 and 91, see Table 1) from Lepenski Vir after the publication in 2018, and these are here added to the constructed chronological model for the first time.

at Lepenski Vir. Prior to their dating, these samples were analysed in order to identify wood species and four samples were selected, of which two were associated with trapezoidal buildings: an oak (*Quercus* sp.) beam found during excavations in building 37 in 1967 (OxA-32866 and OxA-32887—duplicate measurements on the same sample) and dogwood (*Cornus* sp.) charcoal remains found during excavations in building 62 in 1968 (OxA-32865). These new dates on charcoal from Lepenski Vir have much smaller error terms than early charcoal dates, reflecting significant improvements in measuring precision, and are consistent with the series of AMS dates on animal bones and human remains associated with trapezoidal buildings. Even before being modelled with other dates within the Bayesian statistical framework, using prior stratigraphic information (see below), these dates, when individually calibrated at 95% confidence (Table 1), fall into a relatively short period of the last century of the seventh millennium cal BC, and correspond with the assumption of a short duration of the phase with trapezoidal building structures.

In their book, Perić and Nikolić[40] rightly comment on the problematic nature of the first series of charcoal dates, especially regarding the large error terms, which extended the duration of the phase of trapezoidal buildings to almost a millennium (ca. 6500 to 5500 cal BC). Especially problematic seem to be the dates produced in the Berlin (Bln-) and Zagreb (Z-) labs which appear consistently younger than other measurements (Table 1). However, Perić and Nikolić's uncertainty over the reconciliation of the long duration indicated by the old series of conventional dates and new AMS dates for the occupation of trapezoidal buildings is unjustified – while these two different series overlap, more recent and more precise dates have shortened the duration of the dated phase significantly, and we can now provide even more precision using the Bayesian statistical modelling of the dates (see below).

Dating human remains and age-offset

In Chapter 3 of their book, Perić and Nikolić[41] spend a lot of time discussing the absolute chronology of Lepenski Vir by casting doubt on various aspects of the dating evidence. However, there are significant problems with the evidence they chose to use, the way they understand various issues surrounding radiocarbon dating, and the way they discuss the existing dating evidence. For instance, regarding human bone samples they say "that the span of time assumed for individual buildings is very long due to reservoir-corrected human bone ages"[42]. This is a misunderstanding. As previously explained, since the late 1990s, it has been known that the majority of human bones from the Danube Gorges area as well as the dated bones of dogs or fish and other organisms linked to the riverine ecosystem require an age-offset correction. In other words, the obtained dates are "too old" and need to be corrected similar to various regional examples where a food-chain dependence on marine/freshwater ecosystems has been documented.

In the early 2000s, for the Danube Gorges region, three methods were suggested for the correction of the dates on humans based on the dating of the so-called "perfect pairs" of terrestrial animal and human remains from the same contexts, thus assumed to be contemporaneous (e.g. grave offerings and similar, see above). The estimated percentage of aquatic diet was calculated on the basis of the $\delta^{15}N$ isotope values, which reflect protein intake, the majority of which in the Danube Gorges was derived from the consumption of fish[43]. While error terms of dates corrected for the aquatic reservoir effect are slightly larger, these do not affect our estimates for the duration of particular buildings and other contexts in which burials are found. In the future, it is hoped that the precision of the correction factor will increase by obtaining multi-isotope signatures, including ^{34}S isotope values as accurate indications of fish intake rather than just measuring protein intake through $\delta^{15}N$[44], and by Bayesian FRUITS modelling of multi-isotope values[45] in order to estimate the most likely contribution of aquatic foods in the diet of an individual and, thus, enable more precise corrections of the reservoir ages. Another alternative is dating compound-specific single amino acids[46]. For the moment, there are independent indicators through dating animal bones sometimes associated with human remains indicating that the correction factor we continue to use across the Danube Gorges area to arrive at the real ages for the dated materials affected by the age-offset is adequate for the purpose.

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[40] Perić, Nikolić 2016, 95–100.

[41] Perić, Nikolić 2016.

[42] Perić, Nikolić 2016, 100.

[43] Cook et al. 2002; cf. Cook et al. 2009.

[44] Nehlich et al. 2010.

[45] Fernandes et al. 2014; Nehlich, Borić 2015; Jovanović et al. 2018.

[46] Honch et al. 2012.

Perić and Nikolić also single out discrepancies in the obtained AMS measurements on several burials of the same individuals obtained in two different laboratories, saying that these "in some cases do not overlap at all" [47]. As this statement is erroneous, let us have a detailed look at these instances. For burials 7/I, 26, 54d, and 8 (the last being omitted from the mention by Perić and Nikolić), measurements were obtained, on the one hand, by Clive Bonsall in the Oxford Radiocarbon Accelerator Unit (ORAU)[48], and, on the other hand, by T. D. Price and myself in the NSF Arizona AMS Laboratory[49]. One of the reasons for the discrepancies between the initial series of dates obtained on human remains from Lepenski Vir in Oxford and those obtained in Arizona relates to the previously mentioned problem of the ultrafiltration protocol in the Oxford laboratory[50]. In the article that was, judging by their list of references, available to Perić and Nikolić, Bonsall et al.[51] reported newly measured AMS dates that replaced the dates on the same burials initially published in 2008, with all of the remeasured bones, apart from two samples, producing, as expected, younger dates than the samples measured using the ultrafiltration protocol. This reduced some of the discrepancies between the Arizona and Oxford dates on the same four individuals.

However, it is true that the two different dates from two different labs on burial 8, even after remeasuring the sample in Oxford, still remain statistically distinct despite similar reported $\delta^{15}N$ and $\delta^{13}C$ values (Table 1). The Oxford measurement on this burial is surprisingly older rather than younger than the initial ultrafiltrated date[52], which may raise doubts as to some of the possible problems associated even with this new measurement. Only a new date on another bone sample of this individual could resolve the problem. Yet, both of the obtained dates on burial 8 fall into the assumed duration of phase III after 5900 cal BC, in accordance with the assumed stratigraphic position of this crouched inhumation (see below). A similar situation exists with burial 54d (Table 1), where again the Arizona date is somewhat younger than the Oxford date with the two being statistically distinct. Again, in this case the differences do not change the fact that both dates fall into the assumed duration of the phase with trapezoidal buildings to which the burial stratigraphically belongs (see below). On the other hand, both of the dates obtained in different labs on burial 26 are statistically consistent (Table 1). Finally, there exists a significant discrepancy in the radiocarbon ages obtained in the two different labs on burial 7/I, with a significant difference of ~4.6‰ between the obtained $\delta^{15}N$ values (Table 1). However, once the correction factor is applied to each date based on their respective $\delta^{15}N$ values, the two corrected dates become statistically consistent. Bonsall et al.[53] put forward an interesting possibility that the observed discrepancies between these radiocarbon ages and $\delta^{15}N$ values in the case of burial 7/I may stem from the fact that two different skeletal elements were analysed respectively—a femur sample in the Oxford lab and a rib sample in the Arizona lab. Due to the fast collagen turnover in ribs and a much slower turnover in other bones of the skeleton, the $\delta^{15}N$ signal from the rib could be an indication of a significant dietary change in this individual prior to his death while the value obtained on the femur would be an indication of earlier life diet heavily based on fish.

These instances go to show the necessity of engaging closely with this complex set of data when trying to use them in wider interpretations as well as the fact that with new data and analyses, previous conclusions can be refined, adjusted, or entirely modified. This sense of constant influx of new data that could modify previous conclusions is surprisingly absent from the way Perić and Nikolić treat earlier studies and their conclusions rather than acknowledging the process of the adjustment and nuancing of previous conclusions on the basis of newly available evidence.

However, some of the mentioned "problems" with the dating evidence singled out by Perić and Nikolić are of minor importance compared to the main issue they take with those authors who have previously used radiocarbon dates to clarify stratigraphic and chronological problems of Lepenski Vir. In fact, Perić and Nikolić do not reject the reality of the dating evidence but rather the argued association of the dated material with the features these measurements are supposed to date. This is linked to the main claim they make that trapezoidal buildings are much older than the datable material culture associated with them. Hence, according to these authors, most of the existing dates are linked to intrusions made by Early Neolithic Starčevo

[47] Perić, Nikolić 2016, 100, footnote 580.
[48] Bonsall et al. 2008.
[49] Borić 2011; Borić, Price 2013.
[50] Borić 2011, 173, footnote 84.
[51] Bonsall et al. 2015.
[52] Bonsall et al. 2015, 36, Fig. 2.
[53] Bonsall et al. 2015, 40; cf. Bonsall, Boroneanţ 2018.

Fig. 3. Exposed floors of buildings 54 (right) and 47 (left) during excavations at Lepenski Vir, facing north (photo: Alan McPherron)

Сл. 3. Откривени подови грађевина 54 (десно) и 47 (лево) током ископавања Лепенског Вира, гледајући ка северу (фото: Ален Мекферон)

occupants of the site who brought various datable materials—charcoal and animal and human bones—in association with the floors of trapezoidal buildings which, as they argue, predate 7500 cal BC.

According to Perić and Nikolić, none of the articulated AMS-dated inhumations that cut through the floors of trapezoidal buildings or are placed over these floors should be linked to these buildings. It would take a separate article (or a book) to enlist all of the instances and provide a thorough refutation of this claim. For the moment, it suffices to say that such a blanket approach is unhelpful. The deposition of crouched inhumations in burials 8 and 9 in building 24, burial 4 in building 25/XIX, burials 5 and 6 in building 26, and 19 in building 57/XLIV are all instances of Neolithic phase III disposals of skeletal remains in the spaces of trapezoidal structures that were out of use and probably backfilled at the time when these interments took place, after ca. 5900 cal BC[54]. On the other hand, the deposition of extended inhumations in burials 7/I in building 21[55], individuals 54a-d in building 65/XXXV, burial 26 in building 34, burial 47 in building 62, and burial 61 in building 40 can undoubtedly be linked to

[54] Borić 2016, chapter 5.

[55] If burial 7/I were indeed a Neolithic intrusion, how could one possibly explain the presence of an ornamented stone boulder, typical of the forager tradition that was undeniably linked to the architecture of trapezoidal buildings, on the forehead of this individual at the floor level (Borić 2016, Fig. 4.3A)? One of the explanations, if only slightly eccentric, could be that it was a reuse of a much older sculpted/ornamented boulder accidentally found at the site by Early Neolithic settlers and subsequently placed here at the time of the burial. A more parsimonious explanation, however, is that the burial context and the context of the architecture of trapezoidal buildings and associated material culture, such as sandstone boulders, are directly linked. The same logic applies to the sculpted boulder found on the floor of building 40, directly above the head of the individual in burial 61 (see below on this context and the genomic ancestry of this individual).

the duration or the end of the phase with trapezoidal buildings[56]. One of the ways Perić and Nikolić explain that their Early Neolithic phase of occupation exhibits both crouched and extended inhumations is by arguing that both burial positions were used by Early Neolithic Starčevo groups. Needless to say, this does not square with the existing evidence from this and wider regional contexts, and I will come back to the question of burial positions and expression of identity through mortuary rites in the final section of this article.

One particular group of articulated burials, which show a distinct pattern of deposition in relation to trapezoidal buildings, are almost entirely omitted from Perić and Nikolić's account. This is the group of 39 neonate burials found in association with 18 trapezoidal buildings at the site[57]. It has been shown that neonate burials were almost always placed in the back of trapezoidal structures at the edge of the floor area, under rocks surrounding the floor and also by cutting through the floor. In one instance, a small burial pit cut through the floor of building 63', which was covered by the limestone floor of the younger structure 63, contained articulated neonate skeletal remains covered by a stone slab at the level of the floor[58]. It would be hard to argue that these are accidental intrusions as Perić and Nikolić[59] suggest for other burials associated with the floors of trapezoidal structures where, according to these authors, no "respect" was shown to the integrity of these structures by interring burials. Surely, neonate burials represent a coherent phenomenon with these burial events taking place broadly contemporaneously with the occupation/recognition of the trapezoidal buildings. Conveniently for their argument, Perić and Nikolić omit the mention of the AMS date on one of these neonates, burial 94, found in the back area of building 24 along with three other neonates found in the same area (see below). This neonate individual exhibits a nursing signal on the basis of its very high $\delta^{15}N$ value (19.5‰). After correction for the reservoir effect, OxA-16010 dates this individual to the very end of the seventh and the first century of the sixth millennium cal BC, which falls into the expected short span of phase I–II related to the use of trapezoidal buildings (Table 1).

Best practice, taphonomic issues, and AMS-dated animal bones

Currently, the best practice when selecting samples for radiocarbon dating prescribes choosing samples from articulated skeletal remains, human or animal alike, as these are the best indications of freshly deposited corpses/carcasses that have not been moved from the original place of their deposition.[60] By dating such articulated remains we can be reassured that the obtained date on such remains will have a close association with the layer in which the remains were found. For this reason, dates on articulated inhumation burials are the best type of dating evidence from Lepenski Vir. In a

Fig. 4. Orthophotograph of the exposed floor of Building 54 at Lepenski Vir (photo: Faculty of Philosophy, Belgrade)

Сл. 4. Ортофотографија откривеног пода грађевине 54 на Лепенском Виру (фото: Филозофски факултет, Београд)

[56] Borić 2016, chapter 4.

[57] Borić 2016; Borić, Stefanović 2004; Stefanović, Borić 2008.

[58] Borić 2016, 184.

[59] Perić, Nikolić 2016, 102.

[60] Differently, when trying to date human activity in a cave environment, which might have been intermittently shared between humans and (predatory) animals in the accumulation of bone remains, especially in the case of early (Palaeolithic) periods and due to a lower chronological resolution associated with such periods, cutmarked or anthropically modified bones are often the material of choice. Obtaining direct dates on particular species of plants and animals that might have been introduced to an environment or region by humans, as in the case of domesticates, can also be useful for estimating the timing of their arrival to a particular site. Depending on research questions and interests, typologically sensitive artefacts can also be good material for dating.

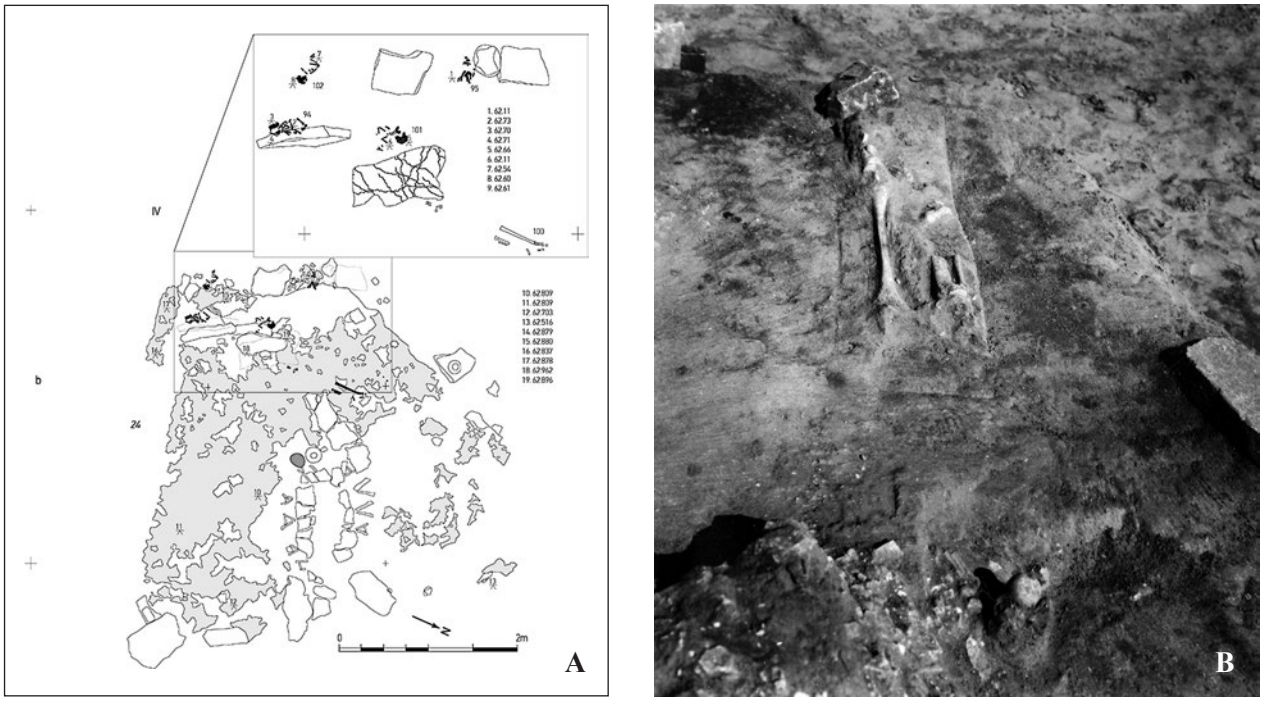


Fig. 5. A) Building 24, Lepenski Vir with subfloor burials 100 (OxA-34519), 94 (OxA-16010), 95, 101, and 102. Adapted from detail plans 251 (28/08/1970) and 330–331 (1970); B) articulated remains of primary burial 100 beneath the floor of building 24, facing north (after Borić 2016: Fig. 4.26)

Сл. 5. А) грађевина 24 на Лепенском Виру са гробовима 100 (OxA-34519), 94 (OxA-16010), 95, 101 и 102, пронађеним испод пода – прилагођено по детаљима 251 (28. 8. 1970) и 330–331 (1970); В) артикулисани остаци примарно сахрањене индивидуе у гробу 100 испод пода грађевине 24, гледајући ка северу (према: Borić 2016, Fig. 4.26)

limited sample of animal bones associated with various features of the site[61], there are only few positively identified articulated remains. One such example comes from AMS-dated articulated remains of a brown bear dated by OxA-24812. The remains were found beneath building 31 and have given the Middle Mesolithic, mid-eighth-millennium cal BC date for the occupation linked to the Proto-Lepenski Vir phase (see below, Table 1). Only by dating articulates is one able to avoid problems that arise from using single elements of unmodified animal bones that can potentially be residual or intrusive and, thus, have no active association with the contexts they are supposed to date.

Out of 47 AMS-dated animal remains, there are only three dates that do not correspond to the stratigraphic dating of the contexts in which they were found, representing much older, Early Mesolithic residual material from the disturbed remains of the Proto-Lepenski Vir phase that ended up in stratigraphically later contexts. In two instances, the residual dated materials come from the layer between two overlapping floors: OxA-16004 found between the floors of superposed buildings 47 and 47' and OxA-16071 found between the floors of superposed buildings 26 and 26'. In the third case, the dated material (OxA-16076) reportedly comes from the floor of building 54[62]. The most parsimonious explanation for the instances of dates relating to the overlapping floors could be that the area on top of the floor of an earlier building was levelled before the new structure was constructed and that the sediments used for such levelling contained materials from an earlier occupation of the site. The Field Journal from the lifting of the floors of different trapezoidal buildings in 1970 mentions cultural deposits between 20 and 50 cm in thickness between such superposed building floors (see below). On the other hand, in the

[61] Borić, Dimitrijević 2004, 2007/2009.

[62] Borić, Dimitrijević 2007/2009; Borić et al. 2018.

case of the dated antler fragment reportedly found on the floor of building 54, one explanation could be that it might have come from the area just outside of the building space and floor, i.e. it might have been included with the building floor contents due to overcutting during the excavation of this structure that reached into deposits containing materials from an earlier Mesolithic occupation of the site. Moreover, one dated wild boar tool (OxA-26547) was found beneath the floor of building 54 and falls in the expected date range 6393–6116 cal BC (95% confidence). As building 54 is one of the largest and best preserved structures at Lepenski Vir, and had no visible intrusions on its limestone floor (Fig. 3, 4), the obtained measurement on this artefact found beneath its floor should be taken as an acceptable and reliable *terminus post quem* for the construction of this building.

No matter how inconvenient the three previously mentioned outliers might be for the overall chronological picture of Lepenski Vir, statistically they are insignificant in the larger pattern achieved by dating different materials that represent the deposition of food and material culture residues on the floors of trapezoidal structures. Perić and Nikolić[63], in their criticism of the relevance of AMS dates made on animal bones from Lepenski Vir, echo the criticism raised by Bonsall et al.[64] who rightly pointed out various taphonomic issues when dating disarticulated animal bones, even when these come from the contexts beneath trapezoidal building floors and, thus, could serve as *termini post quos* for these building structures. Bonsall et al.[65] argue that in cases where documentary evidence cannot show the exact position of dated animal bone finds beneath limestone floors, we cannot be sure that various intrusions and damaged areas of building floors did not introduce through bioturbation younger materials to these subfloor contexts. In theory this is all true. However, I find such criticism in this research context completely decontextualized. At Lepenski Vir, we felt lucky when we discovered in the late 1990s that a rather small portion of the original animal bone assemblage and other organic materials had survived and had been available for dating. We also could not expect from the rescue nature of excavations carried out here in the late 1960s to have provided the type of detailed contextual information that would be required by modern standards of excavation and recording. Hence, the obtained AMS dates on animal bones, now including typologically sensitive artefacts[66], while not carrying the same weight in building an accurate chronological framework as the remains of articulates, still represent an important and, by their sheer number, robust indication of the stratigraphic integrity of the dated contexts. Even more importantly, they are entirely comparable to the dates on articulated inhumations.

In what follows, my intention will be to show that even leaving aside AMS-dated animal bones, it is possible to refute Perić and Nikolić's views on the chronology and stratigraphy of Lepenski Vir by providing contextual details of only three key AMS-dated contexts associated with trapezoidal buildings that furnish irrefutable evidence that the construction and abandonment of all of these structures can be dated to the period ca. 6150 to 5950 cal BC, i.e. at the time of the Mesolithic -Neolithic transition in this area[67]. I am aware that only incontrovertible dating evidence that completely excludes even a remote chance of dating intrusive or residual samples will be able to clear any remaining doubts, if these still exist, as to the chronological position of trapezoidal buildings.

The date for one of the contexts to be discussed was already available at the time when Perić and Nikolić[68] wrote their book, and it was discussed by these authors in a problematic and factually erroneous way. Two other AMS measurements and the contexts they are dating have recently been obtained, in 2017. One should mention that since the publication of Perić and Nikolić's volume, there have appeared an additional 23 measurements from Lepenski Vir in total (including new charcoal dates and new dates on osseous artefacts and human remains), with all of the measurements only further strengthening the pattern already reported more than ten years ago by Borić and Dimitrijević[69].

Articulated inhumation burial 100 (OxA-34519)

According to Field Journal entries from the 1970 season of excavations at Lepenski Vir, human remains marked as burial 100 were found on September 15th, 1970, beneath the floor of building 24 in the course of the lifting of trapezoidal building floors. The articulated burial remains were found under the back part of the

63 Perić, Nikolić 2016, 103.
64 Bonstll et al. 2008, 191.
65 Bonstll et al. 2008, 191.
66 Borić et al. 2018.
67 Borić et al. 2018 and references therein.
68 Perić, Nikolić 2016, 102.
69 Borić, Dimitrijević 2007/2009.

Fig. 6. Building 24 with the circled area of the floor underneath which the remains of subfloor primary burial 100 were found, facing northeast (photo: Alan McPherron)

Сл. 6. Грађевина 24 са означеном зоном пода испод које су пронађени остаци примарно сахрањене индивидуе у гробу100, гледајући ка североистоку (фото: Ален Мекферон)

building floor, in the natural (i.e. archaeologically sterile deposits) next to two stone slabs inserted into the natural. These stone slabs were assumed to have belonged to building 24. Two neonate burials, marked as 101 and 102, were found nearby, towards the back of the building. Burial 100 is a partially preserved inhumation with *in situ* articulated lower limbs placed parallel to each other as clearly visible both on the detail plan of this context and on the existing photograph (Fig. 5). To the excavators this suggested that the burial was laying in an extended supine position, so that it must have been oriented with the head to the south. This burial orientation would correspond with the Late Mesolithic burial norm of placing bodies of the deceased parallel with the Danube, head pointing downstream[70].

The skeletal remains comprised fragmented femurs, tibiae, patellae, several foot bones, metacarpal bones, and a phalanx. The preserved epiphyses of the tibiae are unfused, and the estimated age is around eight years. The presence of labile articulations, such as patellae and metacarpals and unfused epiphyses, are strong indications of a primary burial, i.e. remains that were deposited in this place without subsequent disturbances or movements of the preserved part of the skeleton[71].

Before obtaining a direct AMS date on the remains of this individual in 2017, in my analysis of the patterns of burial evidence from Lepenski Vir, I have tentatively dated these skeletal remains to the Proto-Lepenski Vir phase, i.e. to the occupation of the site in the course of the Early/Middle Mesolithic[72]. The reason

[70] E.g. Bonsall 2008; Borić 2016; Radovanović 1996.
[71] Borić 2016, 86–87.
[72] Borić 2016, 86, 523.
[73] Borić 2016; Borić, Dimitrijević 2004; 2007/2009.
[74] Borić 2016, Fig. 3.1.
[75] Borić 2016, 103.

for such a relative dating stemmed from following the general stratigraphic assumption proposed for Lepenski Vir, and aided by a number of AMS-dated contexts[73], that features found beneath many of the trapezoidal building floors likely represent the remnants of an earlier Mesolithic occupation of the site. Yet, in the discussion of the orientation of this burial, as well as another partially articulated primary burial, 104, found beneath the floor of building 43[74], which also had the same orientation as burial 100, I raised the doubt that "the difference between the orientation of these and other individuals more securely dated to the Proto-Lepenski Vir phase partly challenges the chronological attribution of burials 100 and 104"[75]. In addition, $\delta^{34}S$ values for these two burials, different from other burials analysed for ^{34}S attributed to the Proto-Lepenski Vir phase, suggested a high intake of aquatic foods, which was yet another signal that the two burials are

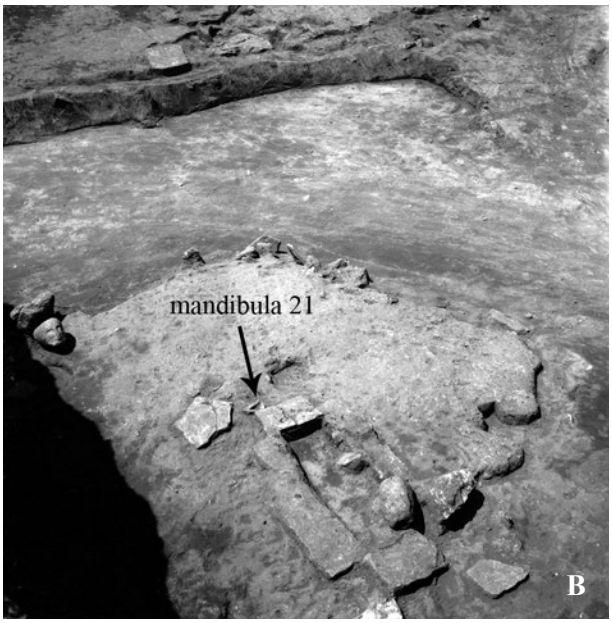


Fig. 7. A) Building 40 with mandible burial 21 (OxA-34968) next to the hearth and subfloor primary inhumation burial 61 (OxA-25211). Adapted from detail plans 49 (07/08/1967) and 164 (12/08/1968); B) Building 40 with boulder sculpted with a human face (inv. no. 21) placed above the head of burial 61 at the floor level, facing west; C) Close-up of mandible burial 21 in its in situ *position next to the hearth of building 40. (after Borić 2016: Fig. 4.22)*

Сл. 7. А) грађевина 40 са доњом вилицом, означеном као гроб 21 (OxA-34968), пронађеном уз огњиште грађевине и примарно сахрањена индивидуа у гробу 61 (OxA-25211) испод пода – прилагођено по детаљима 49 (7. 8. 1967) и 164 (12. 8. 1968); В) грађевина 40 са извајаним облутком с људским ликом (инв. бр. 21), постављеним изнад главе индивидуе у гробу 61 на нивоу пода, гледајући ка западу; С) детаљ доње вилице означене као гроб 21 у свом in situ *положају поред огњишта грађевине 40 (према: Borić 2016, Fig. 4.22)*

outliers to the Proto-Lepenski Vir phase, "leaving the possibility open that these disturbed remains of primary burials should be assigned to phase I–II. This dilemma can only be resolved by direct AMS dating of the skeletal remains"[76].

Direct AMS dating of the remains of the individual in burial 100 confirmed this suspicion, with OxA-34519 dating these remains after the applied correction for the aquatic reservoir effect to the range 6362–6052 cal BC at 95% confidence (Table 1; see later about the Bayesian modelling of the radiocarbon dates from Lepenski Vir and the further restriction of the probability estimates of this time range). Fig. 6 provides a good close-up of the floor of building 24 taken by Alan McPherron during his visit to the site in 1968. The circled area on the floor shows the zone under which the remains of burial 100 were found, suggesting an intact floor area covering these burial remains. This evidence should by all means be acceptable for ruling out any possibility for the insertion of chronologically younger burial remains into older trapezoidal building structures, as argued by Perić and Nikolić. Thus, the obtained AMS date on burial 100, in unison with the AMS date obtained on the remains of the articulated primary neonate inhumation burial 94 found in the same building, can serve as a secure *terminus post quem* for the construction of the floor of building 24, sometime in the last two centuries of the seventh millennium cal BC.

Mandible burial 21 (OxA-34968)

One of the unique burials at Lepenski Vir, singled out by Srejović[77] in his chapter with the evocative title "Hearth Guardians", is a disarticulated mandible marked as burial 21. This mandible was inserted with the occlusal surface of the teeth facing down into the floor of building 40 at the back, on the narrow side of the central hearth of this building (Fig. 7). Between the mandibular rami, a small, regular stone plaque was vertically inserted so that the mandible and the plaque resemble the typical ∀-shaped "supports" encircling rectangular stone hearths, characteristic of the majority of building structures at Lepenski Vir[78]. On the inferior side of the mandibular rami, the one that was facing up in the context in which it was found, there is a small trace of scorching by fire, presumably derived from the fire of the hearth during the time it was in use, i.e. during the use of the building structure. The mandible belonged to a possible male individual, around 30–35 years old (Fig. 8)[79].

Fig. 8. Mandible 21 from building 40, Lepenski Vir (photo: Emanuela Cristiani)

Сл. 8. Доња вилица означена као гроб 21 у грађевини 40, Лепенски Вир (фото: Емануела Кристијани)

The sample selected for dating comes from the right condylar process. OxA-34968 dates this individual, after age-offset correction, to the range 6050–5880 cal BC, with 95% confidence (Table 1). This is a unique context and sample for dating the actual architectural elements of trapezoidal buildings due to the fact that the datable material was very literally used in the construction of the hearth, as its integral constructive element, forming a recognisable form also found in other trapezoidal buildings at Lepenski Vir. This date alone should be able to remove any doubts as to the actual chronological place of trapezoidal buildings at Lepenski Vir.

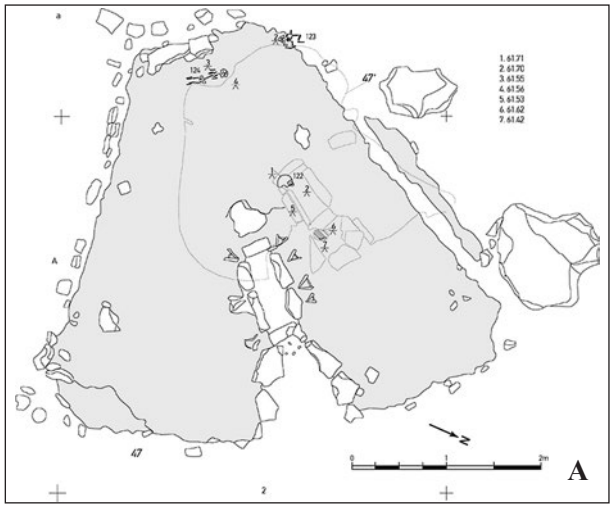
In this context, one should also mention the AMS-dated remains of a 2-6-year-old child in burial 61 found beneath the floor of this same building, towards its back part. This primary extended inhumation was directly AMS-dated by OxA-25211 with the obtained range of 6223–5916 cal BC (95% confidence) (Table 1). While Perić and Nikolić[80] suggest that those who buried this individual did not have any knowledge of

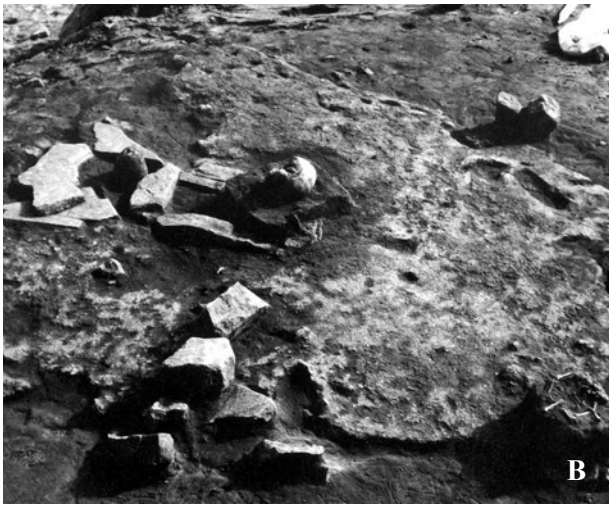
[76] Borić 2016, 113.
[77] Srejović 1972.
[78] E.g. Radovanović 1996; Srejović 1972.
[79] Borić 2016, 206, Fig. 4.45.
[80] Perić, Nikolić 2016, 102.
[81] Srejović 1972, 117.
[82] Borić 2016, 159, Fig. 4.22.

the existence of trapezoidal building structures, the excavator of the site, Srejović[81], suggests that this burial was interred before the construction of the floor of the building. Existing field notes, detail plans and photographs of this context do not mention or show any burial cut visible at the floor level (Fig. 7B). Moreover, a sculpted boulder with the depiction of a human face was found immediately above the head of the deceased at the floor level. It seems unlikely that a burial cut through the building floor was not recognised in this case and it is more likely that the burial was placed here before the floor was constructed or, alternatively, a burial pit cut through the floor might have been replastered[82]. The presence of the sculpted boulder here can hardly be coincidental and shows that there is a meaningful link between the burial and the boulder, suggesting that the deceased was within living memory of those who constructed and utilised this building structure, and carved sandstone boulders. Thus, the obtained date on this burial can be used as a *terminus post quem* for the construction of the floor of building 40. Moreover, the obtained ages for this burial and the dated mandible marked as burial 21 are consistent with their respective stratigraphic position within this building context.

Skull burial 122 (OxA-16005, OxA-16006)

Skull burial 122 was found between two overlapping limestone floors, i.e. beneath the floor of the later building 47 and 20 cm above the hearth of an older building in this location – marked as 47'. Building 47' was smaller than the later building 47, and there is a slight displacement of the location of the hearth of the two buildings, which nevertheless had the same orientations





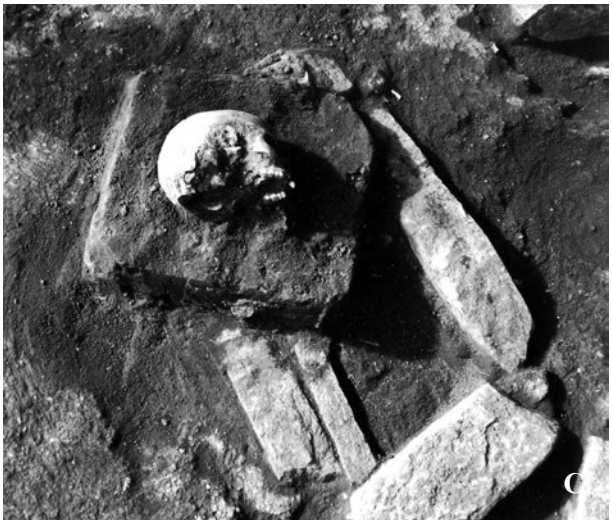


Fig. 9. A) Buildings 47 and 47' and subfloor burials 122 (OxA-16005, OxA-16006), 123, and 124. Adapted from detail plan 271 (27/10/1970); B) Floor of building 47' with burials 122–123, facing southeast; C) Close-up of burial 122 (after Borić 2016: Fig. 4.35)

Сл. 9. А) ѓрађевине 47 и 47' – оснаци индивидуа у ѓробовима 122 (OxA-16005, OxA-16006), 123 и 124 ѓронађени исѓод ѓода ѓрађевине – ѓрилаѓођено ѓо деѓаљу 271 (27. 10. 1970); В) ѓод ѓрађевине 47' са оснацима индивидуа у ѓробовима 122–123, ѓледајући ка југоисѓоку; С) деѓаљ ѓроба 122 (ѓрема: Borić 2016, Fig. 4.35)

(Fig. 9). The Field Journal entry for October 27th, 1970, when this context was excavated, notes that the cultural layer between the two structures was 40 cm thick. In the back area of building 47', which also corresponds to the back area of building 47, two neonate burials, marked as burials 123 and 124, were found. Similar to the skull marked as burial 122, burial 123 was found on a layer around 20 cm thick above the level of the floor of building 47'. Hence, it is likely that these two neonates were deposited here from the level of the floor of building 47. On the other hand, considering the fact that no burial pit was visible on the floor level of building 47 for the interment of the disarticulated skull (Fig. 3), burial 122, one could assume that it was deposited before the floor of building 47 was constructed. One of the possible ways to explain this situation is to argue that the space of building 47' might have been abandoned and partially backfilled in the course of the use of the site during phase I–II. This then might have been followed by the deposition of the skull into the backfilled area, followed immediately, or with some delay, by the construction of a new structure, i.e. the floor of building 47. Alternatively, the skull was deliberately placed into the layer that was deposited here immediately prior to the plastering of the new building floor. Yet another possibility is that a cut made through the floor to deposit this skull might have been replastered, leaving it imperceptible to the excavators. One should also note that, based on the field photographs (Fig. 3) and detail plan of the floor of building 47 (Fig. 9), it was one of the best preserved structures with no observable intrusions from above. The skull belonged to a subadult (15–18-year-old), possibly a female individual (Fig. 10). There are visible traces of slicing and scraping from the likely secondary mortuary treatment of this skull[83]. It might have been kept for an unknown period of time before being placed in its secondary burial location.

Consistent duplicate AMS measurements, OxA-16005 and OxA-16006, date this individual in the range 6102–5996 cal BC, at 95% confidence (Table 1). Based on the previously described stratigraphic information and contextual data, it is highly likely that this date can be used as a *terminus post quem* for the construction of the floor of building 47, which is consistent with the time span for all other discussed building structures. Perić and Nikolić[84], who discussed this dated context, claim that the skull must have been buried through the floor of building 47, mentioning a damaged part of the floor covered by a stone slab, thus hinting at a later

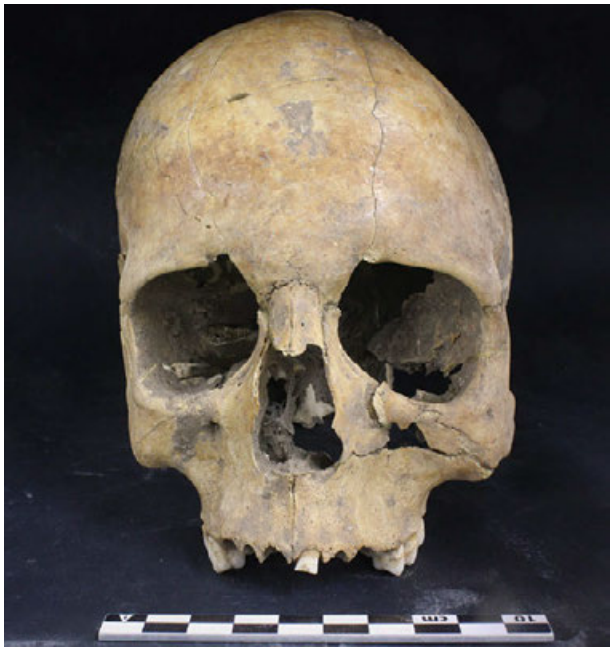


Fig. 10. Skull of the individual marked as Burial 122 (photo: Emanuela Cristiani)

Сл. 10. Лобања индивидуе означене као гроб 122 (фото: Емануела Кристијани)

intrusion. The documentary evidence from Lepenski Vir does not show any such stone slab above this skull in burial 122 (Fig. 9A). Perić and Nikolić also comment that it is "totally unlikely" that the skull would have remained preserved upon the construction of the floor of building 47. However, if the skull was already firmly encased within the layer covering the floor of building 47' at the time the floor of building 47 was constructed, there is no reason that it would have had suffered any particular damage.

In the context of building 47, there is also a conventional charcoal date measured in the Institute of Geophysics and Planetary Physics University of California (UCLA-) radiocarbon lab on the material collected from a well-preserved burnt rafter. According to the Field Journal of October 14th, 1967, along the longer, right-hand (north-western) side of the building floor, a metre long rafter was found, 10 cm wide and 6–8 cm thick, which might have been made from oak. The excavators assumed that the position the rafter was found

[83] Borić 2016, 251; Cristiani 2016, 491–492.

[84] Perić, Nikolić 2016, 102.

in indicates its original horizontal placement. We could speculate that these remains represented one of the horizontal beams holding the upper building construction of this trapezoidal structure that fell to the floor upon the destruction of the building by fire. During Marija Gimbutas's visit to the site, on October 20th, 1967, the remains of this rafter were lifted and a sample for dating was given to Gimbutas. This sample provided the UCLA date. Relative to the date obtained on the skull of the individual in burial 122, this charcoal date (UCLA-1407, Table 1) is somewhat younger, calibrated in the range 5983–5736 cal BC, at 95% confidence, which corresponds to its stratigraphic position, and can tentatively be seen as an acceptable date for the use/destruction of building structure 47 (see Table 1).

Field Journal notes from the excavation of this building structure also mention that on October 14th, 1967, ceramic fragments were found on a slightly depressed area of the floor between the central hearth of this building and a stone slab towards the narrower side, while on October 20th, 1967, in the narrow, back part of the building floor, fragments of a fine oval bowl fired in red were uncovered.

In summary, it is very unlikely that the construction of trapezoidal buildings as an intense period of activity at the site would not be associated with the majority of the obtained radiocarbon dates found in various associations with these architectural units.

Bayesian probabilistic modelling

In the preceding discussion, when presenting dating evidence from Lepenski Vir, I used only individually calibrated dates expressed as ranges at 95% confidence that were calibrated using OxCal v. 4.3.2[85]. The purpose of this was to show that even when using such "raw" dating information it is clear to what broadly defined periods of the occupation of this site should we attribute certain AMS-dated features, and particularly building structures with trapezoidal floors. Yet, over the past decade or so, archaeologists have increasingly started using formal modelling of raw radiocarbon data within the Bayesian statistical framework[86]. The modern standard and best practice when using radiocarbon evidence today is not to use the so-called "eyeballing" of the ranges of individually calibrated dates, which leaves us with relatively imprecise dating or even significantly wrong estimates of events about which we are keen to have precise information. It is, thus, unwise to underutilise the potential of the radiocarbon probability ranges.

Bayesian methods rely on the incorporation of prior information or "beliefs" for obtaining the highest statistical probability and can be described as qualitative statistics that are heavily dependent on what prior information/beliefs are. Any change in the prior beliefs of a model can change the obtained posterior density estimates. While, theoretically, probabilities could also be calculated with pen and paper, computing capacities of modern-day computers have facilitated the widespread application of this method. Markov Chain Monte Carlo methods—a simulation-based approach to deriving the solution to Bayesian problems—have been behind the recent boom in applications through their incorporation into programs such as OxCal and WinBUGS.

When it comes to the archaeological applications of Bayesian modelling for building reliable chronological frameworks from radiocarbon dates, information incorporated into our models primarily rely on the existing stratigraphic evidence of relationships between dated contexts recovered at a site. Such prior beliefs about what sample predates another based on reasonably secure stratigraphic inferences and information about the phasing of archaeological features within a stratigraphic Harris matrix are incorporated into chronological models and, when computed, significantly reduce the spread of probabilities, shortening the obtained radiocarbon ranges, i.e. providing more accurate estimates of the probability densities. This approach has allowed us to start constructing high-resolution chronologies that reduce estimates for events/durations/periods to less than a century for remote prehistoric periods, going as close as possible to the generational time scales of half a century, and even aiming at subgenerational precision[87].

Recently, we have used the large dataset of Mesolithic-Neolithic radiocarbon dates from Lepenski Vir along with the existing prior stratigraphic information to provide more accurate estimates for the construction and abandonment of certain architectural features,

[85] Bronk Ramsey 1995, 2001.

[86] E.g. Buck et al. 1996; Bayliss 2009; Bayliss et al. 2007; Bronk Ramsey 1998, 2009; Hamilton, Krus 2018; Whittle 2018; see also Weninger et al. 2015.

[87] For a series of recent dedicated applications of Bayesian modelling of radiocarbon dates to European Neolithic case studies see Whittle 2018 and references therein. For a criticism of the claims that the Bayesian radiocarbon dates modelling can provide subgenerational precision see Weninger et al. 2015.

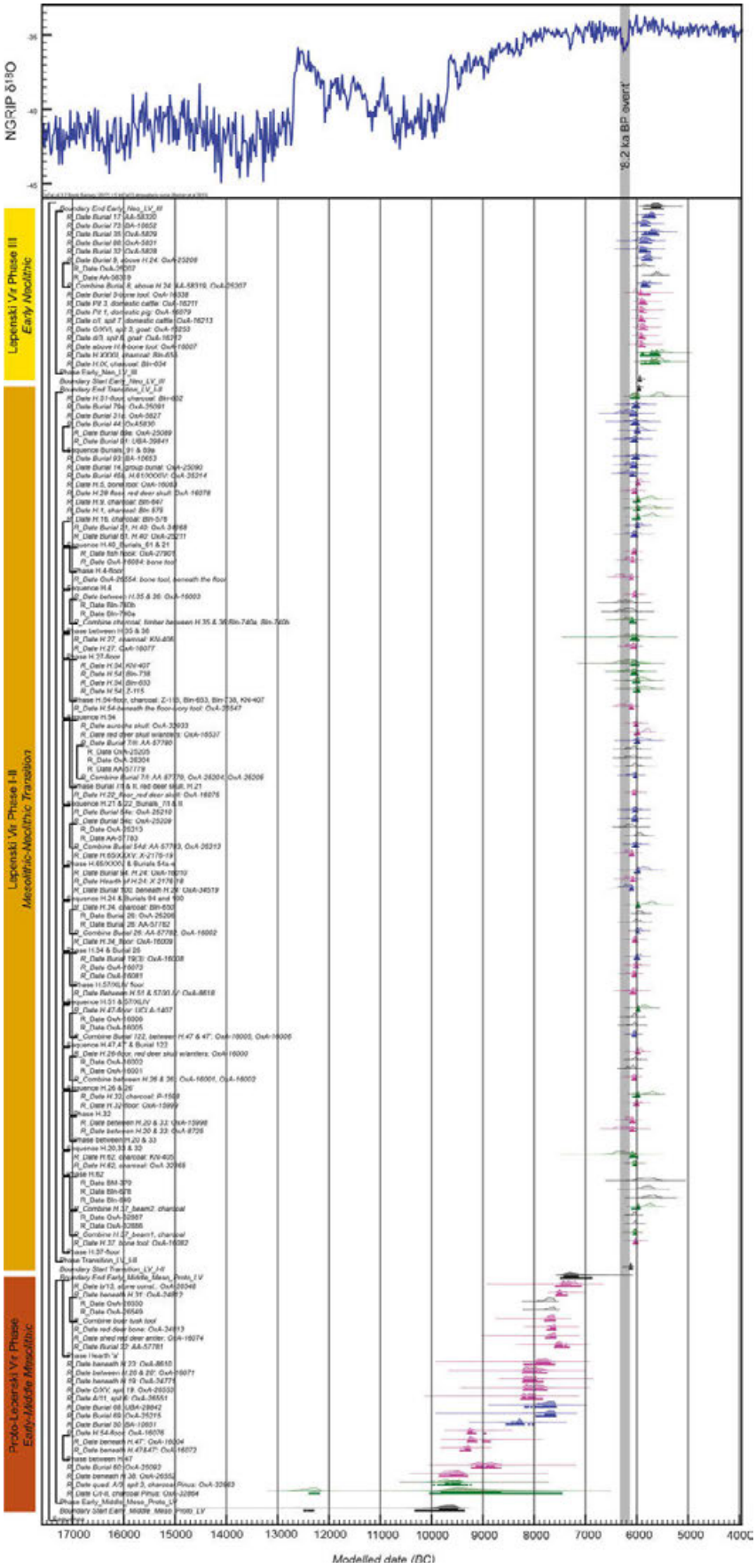


Fig. 11. Bayesian modelling of all available dates from Lepenski Vir based on Model 1 (n=108) plotted against the North Greenland (NGRIP) $\delta^{18}O_{ice}$ record and event stratigraphy. For the radiocarbon measurements, distributions in outline are the results of simple radiocarbon calibrations, solid distributions are the output from the chronological model. The large square brackets and OxCal v. 4.3.2 CQL2 keywords define the overall model exactly. Blue: human bone; magenta: animal bone; green: charcoal (figure prepared by Dušan Borić)

Сл. 11. Бајесово моделовање свих доступних датума са Лепенског Вира по Моделу 1 (n = 108) у односу на северногренландске (NGRIP) $\delta^{18}O_{ice}$ податке и догађајну стратиграфију. За радиокарбонске датуме, неисуњене расподеле вероватноћа резултат су једноставних радиокарбон калибрација, док су испуњене расподеле вероватноћа проистекле из хронолошког модела. Велике угласте заграде и OxCal v. 4.3.2 CQL2 кључне речи прецизно дефинишу модел. Плаво: људска кост; магента: животињска кост; зелено: угљен (слику припремио Душан Борић)

deposition of datable materials and duration of certain phases[88]. The proposed stratigraphic model suggested three main phases in the Mesolithic-Neolithic occupation of the site, slightly modified from the original Srejović's labels for the phases: Proto-Lepenski Vir (Early and Middle Mesolithic), Lepenski Vir I–II (Mesolithic-Neolithic transition period primarily associated with trapezoidal buildings), and Lepenski Vir III (Early Neolithic)[89]. As previously mentioned, curiously, none of the existing radiocarbon measurements suggests occupation of the site in the course of the Late Mesolithic, which is found at all other sites with overlapping stratigraphic sequences to the one found at Lepenski Vir. Various discussions of this stratigraphic model and features linked to various phases of occupation have already been provided elsewhere[90].

In order to check whether the obtained modelling results are dependent on the type of material that was being dated, we have provided Bayesian models that utilise all available dates (model 1, Fig. 11), only AMS dates on human and animal bones (model 2), and only dates on articulated remains of humans and animals (model 3). As expected, model 1 provides the poorest fit due to the inclusion of relatively imprecise and possibly problematic conventional early charcoal dates while model 3 provides the best fit once all possibly problematic and residual/intrusive samples are excluded[91]. However, there is a remarkable similarity between the models in the obtained estimates of each of the main phases.

The most interesting finding of the application of the Bayesian modelling on radiocarbon evidence from Lepenski Vir relates to the obtained formal estimates for phase I–II, which was surprisingly short, starting, according to model 1, in *6160–6080 cal BC (95% probability)*, probably in *6140–6100 cal BC (68% probability)* and ending in *5980–5940 cal BC (95% probability),* probably in *5980–5930 cal BC (68% probability)*. The duration of the phase is estimated between *120 and 210 years (95% probability)*, probably between *140 and 190 years (95% probability)*. The modelling also shows that there was no break in the occupation of the site between phases I–II and III, with the start of the latter estimated in *5970–5910 cal BC (95% probability)*, probably in *5960–5930 cal BC (68% probability)*. When these precise chronological estimates are compared to the climatic data from the North Greenland (NGRIP) $\delta^{18}O_{ice}$ record and event stratigraphy (Fig. 11), there is a significant correspondence between the estimated start date of phase I–II, i.e. resettling of Lepenski Vir after more than a millennium, and the end of the so-called 8.2 ka cal BP cooling event of climatic deterioration that lasted from around 6300 to 6100 cal BC[92].

After having reviewed the latest results on the absolute dating of Lepenski Vir—its occupation phases and individual features—I now turn to several aspects of the revised understanding of the stratigraphy of Lepenski Vir that underline the stratigraphic scheme used in modelling radiocarbon data. This will also serve to answer various issues raised in the recent criticism of this revised stratigraphic model.

Stratigraphy of Lepenski Vir

Formation processes and topographic gradient

Lepenski Vir was formed on a terrace remnant of the meandering Danube River, at its floodplain edge. These "promontories on the valley floor, composed of riverine sand, wind-blown loessic silt and/or scree off the adjacent steep slopes, [were] often re-cut and re-carved by channel avulsion processes. It was on [one of] these 'tongues' of land projecting at near right angles to the adjacent valley slopes"[93] that Lepenski Vir was established on finely laminated riverine sands[94]. These "terrace remnants" were likely above the immediate influence of the river and also might not have been covered by woodland that developed across the Danube

[88] Borić et al. 2018.

[89] While the underlying scheme remains the same, some of the labels for periods in question are slightly altered from the article in which this chrono-stratigraphic model was introduced for the first time (Borić, Dimitrijević 2007/2009). In that article, phase I–II was labelled "Transformational/Early Neolithic", in order to underline the Early Neolithic historical context for this phase during which the earliest Neolithic settlements were established across the Balkans at the end of the seventh millennium cal BC. Subsequently, phase III was labelled "Middle Neolithic" in order to emphasise the presence of well-established early Neolithic groups in the Balkans, making this period also comparable to the contemporaneous duration of the Middle Neolithic in the southern Balkans/Greece. While this logic still makes some sense to me, for practical reasons, more recently, I came to think that the labels used herein for these two phases at Lepenski Vir are more adequate as their usage is more widespread and this makes them self-explanatory.

[90] Borić 2011, 2016; Borić, Dimitrijević 2007/2009; Borić et al. 2018.

[91] For more details on the Outlier detection methods used in our Bayesian modelling, see Borić et al. 2018.

[92] For a further discussion of this correlation see Borić et al. 2018 and references therein.

[93] Borić et al. 2008, 262.

[94] See also Banu 1972; Grubić 1972; Marković-Marjanović 1978; Rabrenović, Vasić 1997; Stevanović 1997.

Fig. 12. Present-day riverbank section above the original location of Lepenski Vir with geoarchaeologist Charly French taking a micromorphological sample in May 2008 (photo by Dušan Borić)

Сл. 12. Профил данашње речне обале изнад некадашње локације Лепенског Вира, са геоархеологом Чарлијем Френчом како узима микроморфолошки узорак у мају 2008. године (фотографију направио Душан Борић)

Gorge's hills from the onset of the Holocene. The sequence at Lepenski Vir was developed on vertically faulted to blocky dark red limestones. Above the bedrock, the profile was, in places, over 4 m thick (based on the thickness shown on some of the sections from the excavations of the site) and is composed of a pale whitish/yellowish brown calcitic silt and very fine sand, probably a loessic-like deposit[95]. Micromorphological analyses of the section preserved today at the river's edge at the place where the Lepenski Vir settlement once stood, suggest that this is a colluvial sequence, where multiple episodes of hillwash were intermittent with anthropogenic activities (Fig. 12)[96].

These general remarks about the nature of this colluvial sequence must be a starting point for a re-evaluation of the stratigraphy of Lepenski Vir, along with an acknowledgement of the fact that the site is situated on a sloping topographic gradient, which is affected by processes of downslope erosion that directly impacted on the accumulation of material culture across this river terrace at different times. Yet, despite this situation, the way Lepenski Vir was excavated and the way the stratigraphy of the site was understood depended heavily on envisaging uniform depositions of "cultural horizons" across the whole area of the site rather than trying to document discrete episodes of cuttings and re-cuttings, depositions, and removals, as in the modern-day excavation of single contextual/stratigraphic units. This, by now, outdated type of excavation practice at Lepenski Vir should not be hugely surprising considering that when Lepenski Vir was excavated in the late 1960s, similar to many other archaeologists worldwide, Srejović and his team operated within a culture-historical paradigm that directly influenced their field methodologies. Within this paradigm, a layer equals a culture, and the aesthetics of this type of archaeological practice relied on representative stratigraphic sections as the key to understanding the successive change of one culture by another over time. This stands in contrast to the widespread and dominant modern-day methodologies of single-context recording that reflect our primary interests in action and behaviour[97].

The logic of excavating by supposed culture horizons and cuttings, i.e. spits, across the sloping topographic gradient of Lepenski Vir missed the opportunity for the stratigraphic excavation of various pits and semi-subterranean structures, including trapezoidal buildings. Here, I could wholeheartedly agree with Perić and Nikolić that "[t]he excavation by arbitrary horizontal excavation layers in the terrain where the difference in height between the surface points may have exceeded 1 metre, had an especially negative impact on the possibility of recognizing and differentiating the cultural contents of the horizontal excavation layers and their beddings, which led to obvious mixing up of materials from different stratigraphic units"[98]. Yet, I would add that not all is lost, and I have shown that there is no need for despair in attempting to productively use the Lepenski Vir archive[99].

Since 1999, I have argued that the fact that trapezoidal building structures were dugouts, i.e. semi-subterranean structures dug into the sloping terrace with their back parts inserted into the slope up to 1.5 m in certain places[100], must be taken into account when re-

[95] Cf. Brünnacker 1971.
[96] French forthcoming.
[97] Lucas 2001, 18–63.
[98] Perić, Nikolić 2016, 131.
[99] Borić 2016.
[100] Cf. Srejović 1972, 36.

interpreting the stratigraphic understanding of this site and the nature of depositional processes[101]. My other reason for insisting on this aspect of semi-subterranean building structures was to show that the layout of the settlement as visible on numerous photos from excavations of Lepenski Vir is misleading in showing these structures placed on flat terraces.

The best evidence we currently have for a topographically based three-dimensional post-excavation reconstruction of the site layout is in the recorded stratigraphic sections running along different lines of the *x* and *y* axes of the excavation grid (Fig. 2) that cross-section cuts of several trapezoidal building structures closer to the narrow, more deeply dug-in parts of buildings. Particularly useful and representative in this respect has been the section along line b through the cut for building 27 in its back part (Fig. 13). It is also the only section that Srejović[102] published in his main publication on Lepenski Vir. Borić and Dimitrijević[103] have compared Srejović's published section above building 27 to a sketch of the same section found in the Lepenski Vir archive in order to confirm the following: (a) the semi-subterranean space of trapezoidal buildings was cut into the natural/paleosol[104] and the layer that fills these cuts belongs to the phase we defined as phase I–II, combining phases that Srejović associated with trapezoidal building structures; (b) neither of the two sections has Lepenski Vir phase II shown, suggesting that its separation is problematic; and (c) that ceramic layers marked either as ceramic layers 1 and 2 (on the field sketch of the section) or IIIa (younger and older) and IIIb (younger and older) (in the final publication) are distinct from the layer that can be associated with the occupation, abandonment, and backfilling of trapezoidal structure dugouts.[105] All this went to show that the main postulates of our revised stratigraphic model for Lepenski Vir were further supported by radiocarbon dates.

Perić and Nikolić[106] have offered their view of the stratigraphy of Lepenski Vir by providing a detailed analysis of the available documentation for the 1965–1966 excavation seasons only, while sporadically also using the Lepenski Vir archive for the excavations that took place during later excavation seasons. For obvious limitations of space, a detailed discussion of various aspects of the stratigraphic data presented by Perić and Nikolić will not be attempted here. It suffices to say that Perić and Nikolić take great pains in discussing various existing section drawings and photographs in order to argue the main tenet of their stratigraphic

[101] Borić 1999, 2002, 2016; Borić, Dimitrijević 2007/2009; Borić et al. 2018.

[102] Srejović 1972.

[103] Borić, Dimitrijević 2007/2009.

[104] Perić and Nikolić (2016, 41–42, 122–123) spend a lot of time in their discussion trying to disentangle what the excavators of Lepenski Vir meant by the Serbian term "*prahumus*", marked on some of the sections. "*Prahumus*" can roughly be translated as "primary humus" rather than "pre-humus" as suggested by Perić and Nikolić. It suffices here to say that the designation when used in the documentation of Lepenski Vir was not based on any good understanding of pedological processes but was, in the course of the 1960s, 1970s, and 1980s, among some Yugoslav archaeologists, rather heuristically and indistinguishably used in order to indicate a vaguely defined palaeosurface. In the book that sums up methodological approaches of the time, Tasić and Jovanović (1979, 53) use a related or even equivalent term "*prvobitni humus*", which is literally translated as "primary humus"). In certain sections from Lepenski Vir, a "*prahumus*" designation is shown above the natural (in Serbian "*zdravica*") although in some photographs it seems indistinguishable from the natural. It is sometimes also shown as covering anthropogenic levels, so it is not always clear what the excavators meant by its use. The use of the term "*prahumus*" in the documentation of Lepenski Vir does not necessarily equal the well-established and widely used term *palaeosol*, or *buried soil*, as used in geology and pedology, meaning a formation of a soil horizon in the past that got buried beneath later deposits, thus preserving chemical and physical characteristics different from the present-day climate and vegetation.

[105] In their book, Perić and Nikolić (2016, 122–123, Fig. 218) criticise the fact that the archive section we published was adapted rather than identical to the drawing from the archive. The differences they stress in our adaptation of the section from the original are minor and banal. For instance, we changed what was labelled as "*prah.*", shortened for "*prahumus*" ("primary humus"), as shown on the original, since it was obvious from other documentary sources this was part of the infill of the same layer that filled building structures so could not be palaeosol. We also lumped the label of a layer marked as "*ker.*", shortened from "*keramički*" (ceramic) on a part of the section with the horizon that is on the other part of the section labelled as ceramic layers 1 and 2. As the archive sketch we used was not entirely coherent or completed in the way various shown layers along the section are marked (e.g. certain lines showing layers are not completed at all and run only up to a middle point of a quadrant), a fact also recognised by Perić and Nikolić (2016, 122), we adapted this drawing as closely as possible following the original and modified some of the labels by making a comparison with the section published by Srejović and other sources, such as colour photographs of this section (Fig. 13). Regardless of its incompleteness, this drawing remains an informative indication of the process of thinking on the part of the excavators in defining and recording stratigraphic units of Lepenski Vir. Differently from Perić and Nikolić, in using an excavation archive, I do not believe that the main task is criticising excavators by pointing out various technical errors and inconsistencies in field records, as Perić and Nikolić do throughout their book. I rather believe that we can use these records constructively and contextually. Surely, any archive should also be available to others to cross-check the conclusions reached by a researcher.

[106] Perić, Nikolić 2016.

and chronological understanding of Lepenski Vir—that Neolithic pits and intrusions repeatedly brought later Neolithic materials into close association with much (>1000 years) older architectural units.

It should be emphasised that different from the expectations of culture-historical approaches, to which Perić and Nikolić's book can also be attributed, individual profiles, i.e. section drawings at any site, regardless of how possibly representative they might be of the overall underlying stratigraphy, could never encompass the complete complexity of both geological and anthropogenic formation processes that can best be expressed through a Harris-matrix of contexts recorded during excavations, with the nature of each context/layer checked by micromorphological analyses[107]. Hence, any attempt to arrive at a consistent understanding of different sections from Lepenski Vir by comparing rather amateurish (in geoarchaeological terms) descriptions of layers by various diggers who worked at the site over several years while it was excavated is doomed to fail. They recorded the site's features based on arbitrarily assigned attributes, such as soil colour/hue and/or consistency, or, worse, based attributions of the stratigraphic units on presumptions about an established cultural stratigraphy of the site. Instead, we could try to reconstruct to the best of our abilities that which is shown in documentary evidence and what makes logical sense.

American archaeologist Alan McPherron, during his visit to Lepenski Vir in the late 1960s, took an excellent colour photograph of the section above building 27 that better than other photographs of the same section from the Lepenski Vir archive[108] shows different layers formed in this particular location that could

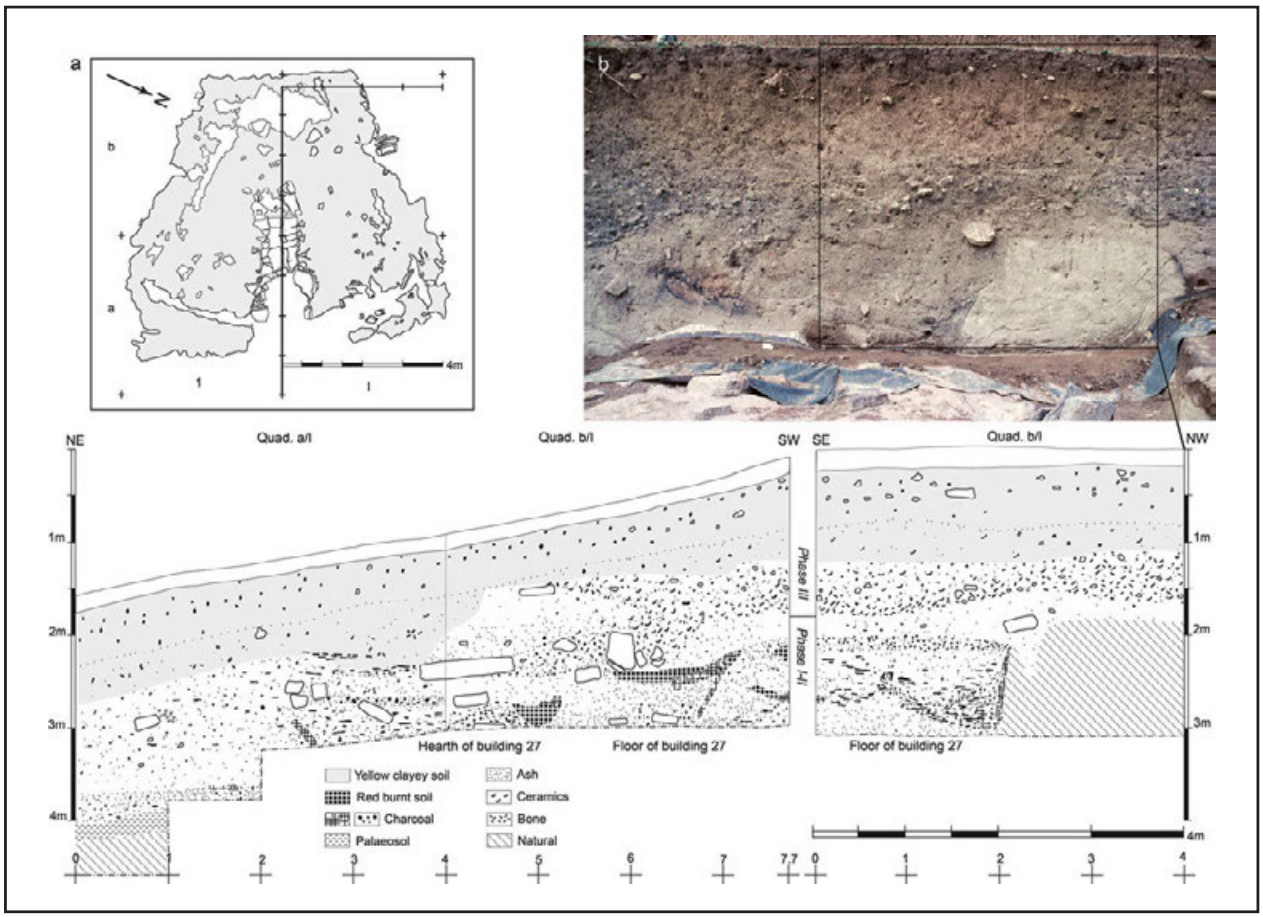


Fig. 13. Section drawing 2 (1967): NE–SW along axis y through quad. a, b/I, 0–8 (7.7 m); section drawing 2': SE–NW parallel with axis x through quad. b/I, 1–4 m (photo: Alan McPherron)

Сл. 13. Цртеж профила 2 (1967): СИ–ЈЗ уз осу у кроз квадрате a, b/I, 0–8 (7,7 m); цртеж профила 2': ЈИ–СЗ паралелан са осом x кроз квадрате b/I, 1–4 m (фото: Ален Мекферон)

be taken as representative of the site's stratigraphy but cannot be taken as necessarily equal to all other locations at the site (Fig. 13). The interpretation of this section is further aided by the existence of a detailed section drawing from 1967 (sections 2 and 2') of the right-hand part of the profile above building 27 through quadrant b/I along line b of the *x* axis of the grid (section 2'). This section is here shown in conjunction with the section that ran along the *y* axis of the grid, i.e. through quadrants a/I and b/I, cross-sectioning the deposits above the floor of building 27 along its longer axis (section 2), approximately through the middle of the structure (Fig. 13). Here, we can clearly see that the cut was made into the natural deposits of the site consisting of pale whitish/yellowish brown calcitic silt and very fine sand[109]. This natural deposit can similarly be observed on the section remnant of the river terrace at the location of Lepenski Vir today (Fig. 12)[110]. The cut is filled by a rather homogenous deposit of darker buff colour that extends above and outside the zone of the cut and runs horizontally away from both of the cut's vertical sides as an occupation layer. This deposit shows a sharp boundary to the underlying natural. The drawing indicates that this fill/layer consisted of ashy deposits mixed with charcoal and several zones of red burnt soil as well as concentrations of charcoal, which, based on the shapes they make, might have related to the burning of various elements of the building's wooden upper construction, which likely burnt in a fire upon the building's abandonment. I suggest this deposit should be linked to the occupation, abandonment, and backfilling (both anthropogenic and colluvial) of the phase I–II trapezoidal buildings that took place in the course of the two centuries or less as estimated on the basis of the current radiocarbon dataset (see above).

There is a slightly diffuse, undulating boundary between this first anthropogenic fill/layer, as visible on this section, and the layer above it that is of a darker hue (perhaps a deposit richer in organic and/or burnt remains) for which the drawing indicates a significant presence of ceramics, animal bones, and charcoal as visible in the section. This deposit is linked to the fully Neolithic occupation of the site associated with phase III, which might have lasted several centuries. On the basis of the radiocarbon chronology, there is no gap between the end of phase I–II and the start of phase III. There is a diffuse, strongly undulating boundary between this layer and the layer of yellow clayey soil found above it. The latter layer seems to be less rich in cultural material than the preceding deposits, with only occasional fragments of ceramics and charcoal shown on the section drawing. A hypothesis can be put forward that this layer represents a hillwash deposit whose accumulation was caused by erosion of devegetated slopes above Lepenski Vir that, for a period of time during and after the abandonment of the Neolithic occupation, had accumulated these colluvial deposits, until the regenerated vegetational/woodland cover on the hillslope above the site, presumably unaffected by human action in the post-Neolithic period, stabilised the downslope erosion. We should probably expect traces of differential colluvial deposition events across the site due to intermittent episodes of overland hillwash processes. Finally, the sequence is capped by the modern-day humus and subhumus layers of brown colour.

A more detailed presentation of further evidence for the proposed scheme regarding formation processes and stratigraphic cultural attribution of particular contexts at Lepenski Vir must be provided elsewhere. In what follows, I will focus on furnishing further evidence for my earlier claim about the existence of retaining walls surrounding the cuts of trapezoidal buildings of phase I–II triggered by Perić and Nikolić's[111] rejection of this interpretation.

Retaining walls and evidence for the upper construction of trapezoidal buildings

I have previously shown that by overlapping the phase I trapezoidal limestone floors and trapezoid-shaped stone structures that Srejović assigned to phase II, one gets a remarkable correspondence between the two types of features, showing that many trapezoid-shaped stone constructions surrounded the limestone floor outlines, or are closely linked to limestone floors as integral parts of these architectural features[112]. For this reason, this occupation period is renamed as phase I–II, with labels for limestone floors attributed to phase I (Arabic numerals) and labels for stone constructions

[107] French 2015.

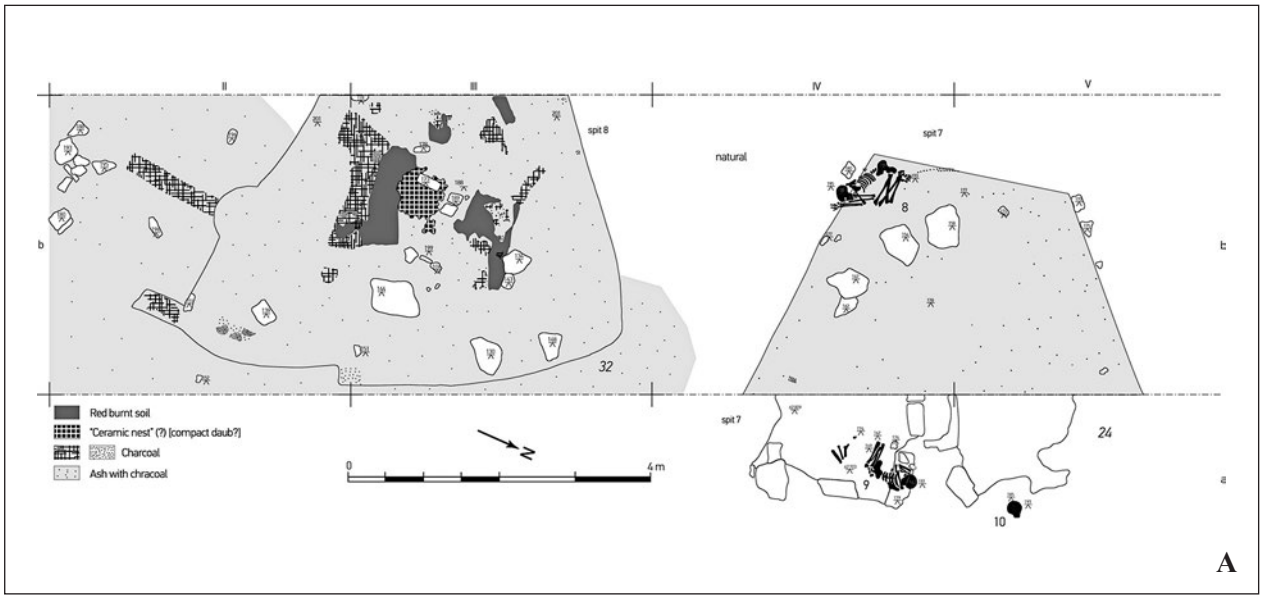
[108] Cf. Borić 2016, Fig. 1.14.

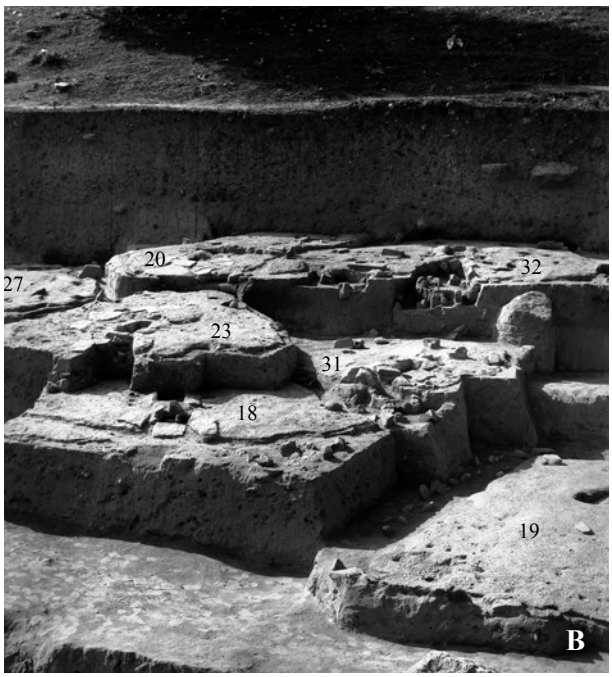
[109] A separation of a "*prahumus*", i.e. palaeosol layer (see footnote 104) above the natural as shown on the section published by Srejović (1972, Fig. 6) is not justified here and neither is such a layer shown on this detailed drawing of this section from 1967 (section 2', plan no. 277).

[110] Borić 2016, Fig. 1.5.

[111] Perić, Nikolić 2016, 135.

[112] Borić 2002; Borić, Dimitrijević 2007/2009.





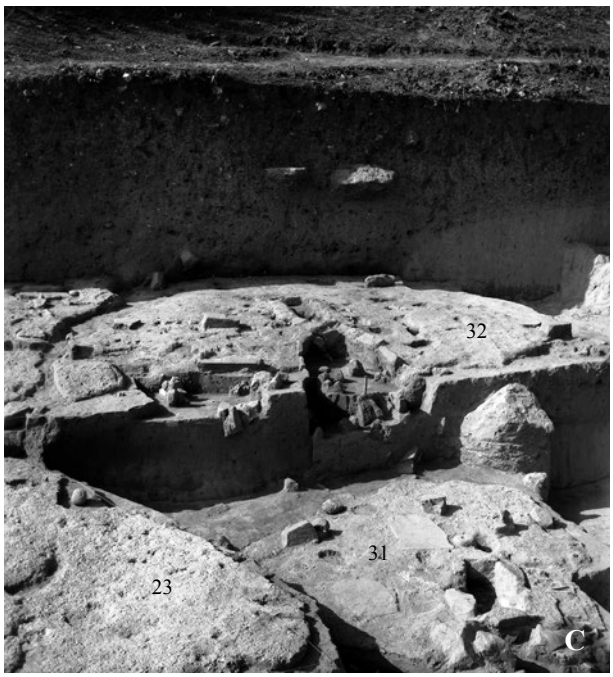


Fig. 14. A) Outlines of the fills of buildings 32 and 24 (phase I–II) above the floor level dug into the natural of the Lepenski Vir terrace at the level of spit 7 in quad. b/IV–V and at the level of spit 8 in quad. b/II–III with the position of burials 8 (AA-58319, OxA-25207), 9 (OxA-25280), and 10 (all phase III) in the fill or over the floor of building 24 (phase I-II) at the level of spit 7 (adapted from detail plans 21–22 [25/07/1967] and 29 [29/07/1967]); B) Section along line b with exposed floors of buildings 27, 20, and 32;
C) section along line b above building 32 (after Borić 2016: Fig. 5.5, 1.13)

Сл. 14. А) изнад нивоа подова обриси испуна грађевина 32 и 24 (фаза I–II), укопаних у стерилни слој лепенсковирске падине на нивоу откопног слоја 7 у кв. b/IV–V и на нивоу откопног слоја 8 у кв. b/ II–III, и позиција гробова 8 (AA-58319, OxA-25207), 9 (OxA-25208) и 10 (сви из фазе III) у испуни или на поду грађевине 24 (фаза I–II) на нивоу 7. откопног слоја (прилагођено по детаљима 21–22 [25. 7. 1967] и 29 [29. 7. 1967]);
B) профил по линији б са откривеним подовима грађевина 27, 20 и 32;
C) профил дуж линије б изнад грађевине 32 (према: Borić 2016, Fig. 5.5, 1.13)

attributed to phase II (Roman numerals) joined into a single architectural unit designation (e.g. building 65/XXXV)[113]. It is suggested that these stone constructions were retaining walls around the cuts of trapezoidal buildings, which, similar to the so-called wind breaks, are a common occurrence in archaeological and ethnographic cases, in particular related to forager dwelling structures worldwide[114]. As Perić and Nikolić have called this revision of the stratigraphy of Lepenski Vir into question, I would like to provide several examples of existing evidence for the reality of stone retaining walls around the cuts of trapezoidal structures. This is particularly true of the upslope area of the site where the terrain is steeper, but there is some evidence that such retaining walls can also be found in the lower parts of the site, closer to the Danube, on presumably flatter terrain[115].

In their critique of the existence of retaining stone walls in association with the cuts of trapezoidal buildings at Lepenski Vir, Perić and Nikolić[116] use the previously discussed section above building 27 and the continuation of the section along the same axis of the grid onto adjacent building 32 (Fig. 14B-C) to claim that such walls would have been visible here had they existed. Yet, the Field Journal of July 27th, 1967, describing the excavation of building 27, states that while the floor of this structure was found in spit 8, rocks indicating the outline of the structure were visible since spit 5.[117] These rocks were drawn (detail plan 30) and subsequently lifted. The excavators also note that "along the edge of the house stone constructions were preserved, possibly for holding the upper construction".[118]

Similarly, for the adjacent structure, building 32, the Field Journal states that six vertically inserted slabs were found along the edge of the floor. In addition, in connection to building 32 and the adjacent trapezoidal structure, building 24, a detail plan of the two buildings at the level of spits 7 and 8, represents a rare case in the field records of Lepenski Vir of clearly visible building cuts shown in plane, before the floors of these buildings were exposed (Fig. 14A). Moreover, the pattern in the distribution of charcoal on the left-hand side of building 32, at its front corner, and further along the same side towards the back seem to furnish evidence for the existence of vertical posts that supported the upper construction of this structure. Perić and Nikolić[119] suggest the existence of an unrecognised Neolithic pit intrusion into the front part of building 32 due to the presence of red burnt soil, ceramics, and a polished stone axe[120] just above the floor of building 32. The existing detail plan, however, indicates that these burning zones were spread around the middle part of this backfilled space, especially in the area just above the building's central hearth[121]. As previously discussed in the case of building 27, red burnt soil and the remains of charcoal likely represent the burning of the upper construction of this building structure upon its abandonment.

Another example comes from the cross-section along the *x* axis of the excavation grid, in the back, narrow area of building 37 (Fig. 2). Here, similar to the previously discussed section above building 27, there is a visible cut on both sides of the building floor (Fig. 15). The photographs clearly show the vertical stacking of rocks along the edge of the trapezoidal floor closer to the sections. Presumably, some of the similar constructive rocks along the side of the floor closer to the front part of the building might already have been removed at the time these photographs were taken. The

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[113] Borić, Dimitrijević 2007/2009.

[114] E. g. for the Natufian culture see Valla 1988; cf. Haklay, Gopher 2015.

[115] For instance, see the photograph taken in August 1967, with visible rocks from a retaining wall on each side of the floors of buildings 21 and 22 (Borić 2016, Fig. 1.10). All subsequent photographs of this building location do not show any such rocks, which were removed soon after the discovery.

[116] Perić, Nikolić 2016, 126.

[117] Similar kinds of statements are found throughout the Field Journals in relation to various buildings at Lepenski Vr and confirm that the excavators of the site clearly observed a direct link between the existence of such stone constructions, which are here interpreted as retaining walls, and the dugout spaces for trapezoidal buildings.

[118] A direct citation from the Field Journal of the July–August excavation season in 1967 in Serbian states the following: "*Ivicom kuće očuvane su kamene konstrukcije verovatno za držanje gornje konstrukcije*" (page 65).

[119] Perić, Nikolić 2016, 124.

[120] Cf. Antonović 2006.

[121] In the description of original detail plan 29, it is stated that a circular zone in the middle part of building 32 was a "ceramic nest" (in Serbian "*keramičko gnezdo*"). It is not clear what is meant by this designation. In the adapted version of this detail plan, I have tentatively referred to it as "compact daub" (Borić 2016, Fig. 5.5), since the depiction on the detail plan more resembles a concentration of daub than ceramics. However, the situation remains unclear as there is no mention of this feature in the Field Journal for the excavation of building 32. It is curious that such a feature is found, presumably *in situ*, directly above the area of the rectangular hearth of the building. It is worth noting here a possibly comparable instance at the site of Padina, where Jovanović reports the existence of a concentration of "burnt earth" resembling daub above the rectangular hearth of trapezoidal building 18 (Jovanović 1969, 30, Table XI.2), which also furnished abundant evidence of *in situ* ceramics in direct association with the building floor and inside its hearth (Jovanović 1987).

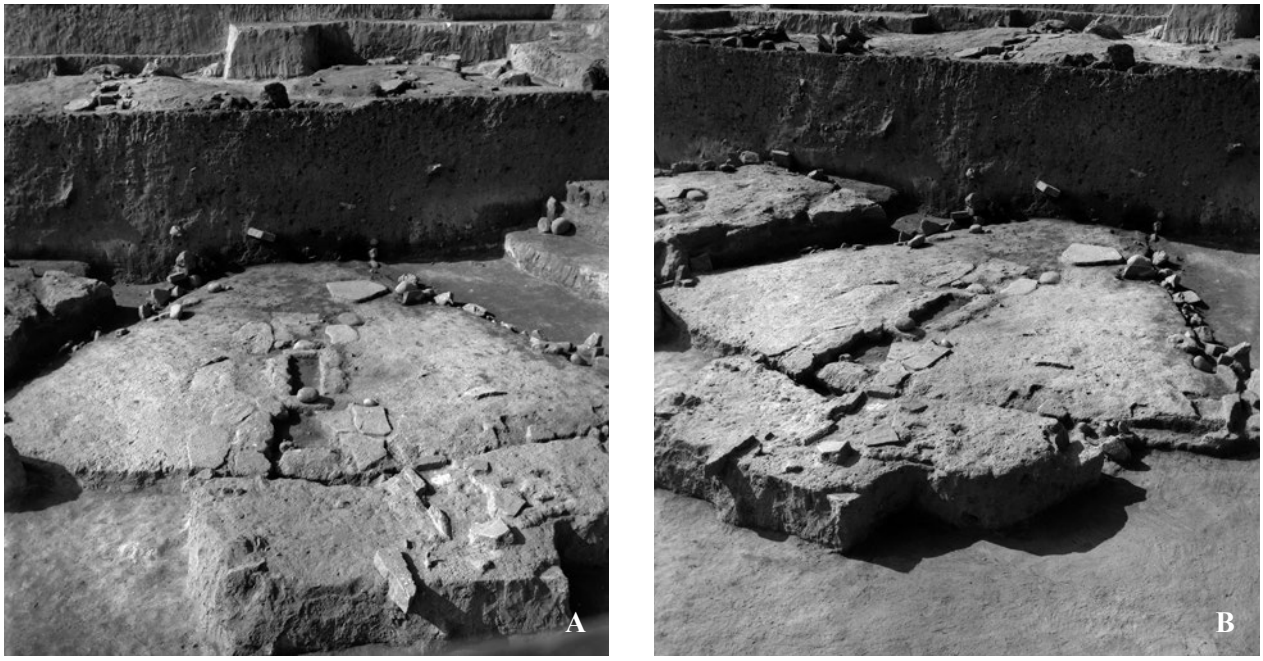

Fig. 15. Section above building 37 along x axis with visible cuts of the dugout and rocks from the retaining wall stacked up in the section on both sides of the floor edge: A) facing southwest; B) facing south (photo: Faculty of Philosophy, Belgrade)

Сл. 15. Профил изнад грађевине 37 дуж x осе са видљивим укопима и поређаним камењем поткорног зида у профилу са обе стране ивице пода: А) гледајући ка југозападу; В) гледајући ка југу (фото: Филозофски факултет, Београд)

Field Journal of the excavation (page 69) of this building in 1967 mentions that stone constructions were found along the edge of the trapezoid sides. One should note that there was around 40 cm of distance between the visible edges of the cuts on the section and the line of rocks that were placed closer to the floor edge of the building on both sides. The Field Journal of July 10th, 1967 mentions that, running along the left side of the building from its deeper corner D, the remains of two burnt rafters were found, presumably from the upper construction of this building[122].

Building 39 is yet another building structure with construction rocks along the sides of the floor, also seen vertically stuck on the edge of the floor on both sides of the profile that cross-sections the narrow back part of this building along the *x* axis of the excavation grid (Fig. 16). While the front part of the building was excavated and exposed during the field season in the summer of 1967, the back, narrow part of this building was excavated during the autumn field season, on October 26th, 1967. At that time, a concentration of rocks were exposed and recorded in relation to this building structure. These rocks can be interpreted as elements of the possibly collapsed retaining wall in the back of the building (Fig. 17) that might also have served to reinforce its upper construction.

Finally, in the way the architectural unit marked building 65/XXXV was excavated and recorded, it probably represents the clearest example for the practice of using retaining walls at Lepenski Vir (Fig. 18). Here, five individuals, burials 54a-e (see Table 1), were found placed over the floor area of the building as extended supine inhumations, heads pointing down-

[122] It is very likely that several existing charcoal dates from this building (Table 1) directly date these burnt beams as the 1967 Field Journal mentions that samples were taken for ^{14}C analysis.

[123] Borić 2016; Borić et al. 2014; Radovanović 1996.

[124] Perić, Nikolić 2016, 102.

[125] The absence of a cross-section through the building along line b is due to an extension of a 1 m cut into the profile of the initial excavation area. It is reported that there were no finds in this extension (Field Journal, August 5th, 1968), which probably suggests that it was made into sterile layers on the outer side of the retaining wall.

stream, i.e. according to the burial norm of the Late Mesolithic period in the Danube Gorges area[123]. The central hearth of the building was removed, with some of the individuals placed directly on the floor (burial 54d-e), while others were interred in the already partly backfilled space of this building (burials 54a-c). Perić and Nikolić[124] suggest that these burials were Neolithic intrusions. Leaving aside for the moment the question of the Mesolithic burial tradition evident here, it is not clear how these authors explain the presence of rocks along the trapezoidal sides, which clearly follow the outline of the building floor, if the people making these Neolithic burial intrusions, to which these rocks are also attributed, were unaware of the existence of the trapezoidal building in this location. Unfortunately, in the way this area was excavated, and in the absence of a cross-section[125] in the back part of the building space, there is no evidence here of cuts that must have been located on the outer sides of the stone rows along the longer sides of the floor. There is also a well-built apsidal

Fig. 16. Section above building 39, with adhering rocks on both sides of the floor edge from a likely retaining wall, facing west (photo: Faculty of Philosophy, Belgrade)

Сл. 16. Профил изнад грађевине 39, са камењем које излази из профила са обе стране ивице пода, а које потиче од вероватног потпорног зида, гледајући ка западу (фото: Филозофски факултет, Београд)

retaining wall on the narrow side of this building at a somewhat higher level than the building floor (the bottom of the stone wall is found about half a metre above the level of the floor[126]), with several massive rocks inserted vertically along with smaller rocks as the substruction[127]. Perić and Nikolić[128] argue that this difference in height between the apsidal wall and the building floor excludes a connection between the two. Contrary to this view, while we do not have enough detailed contextual information from the excavation archive on

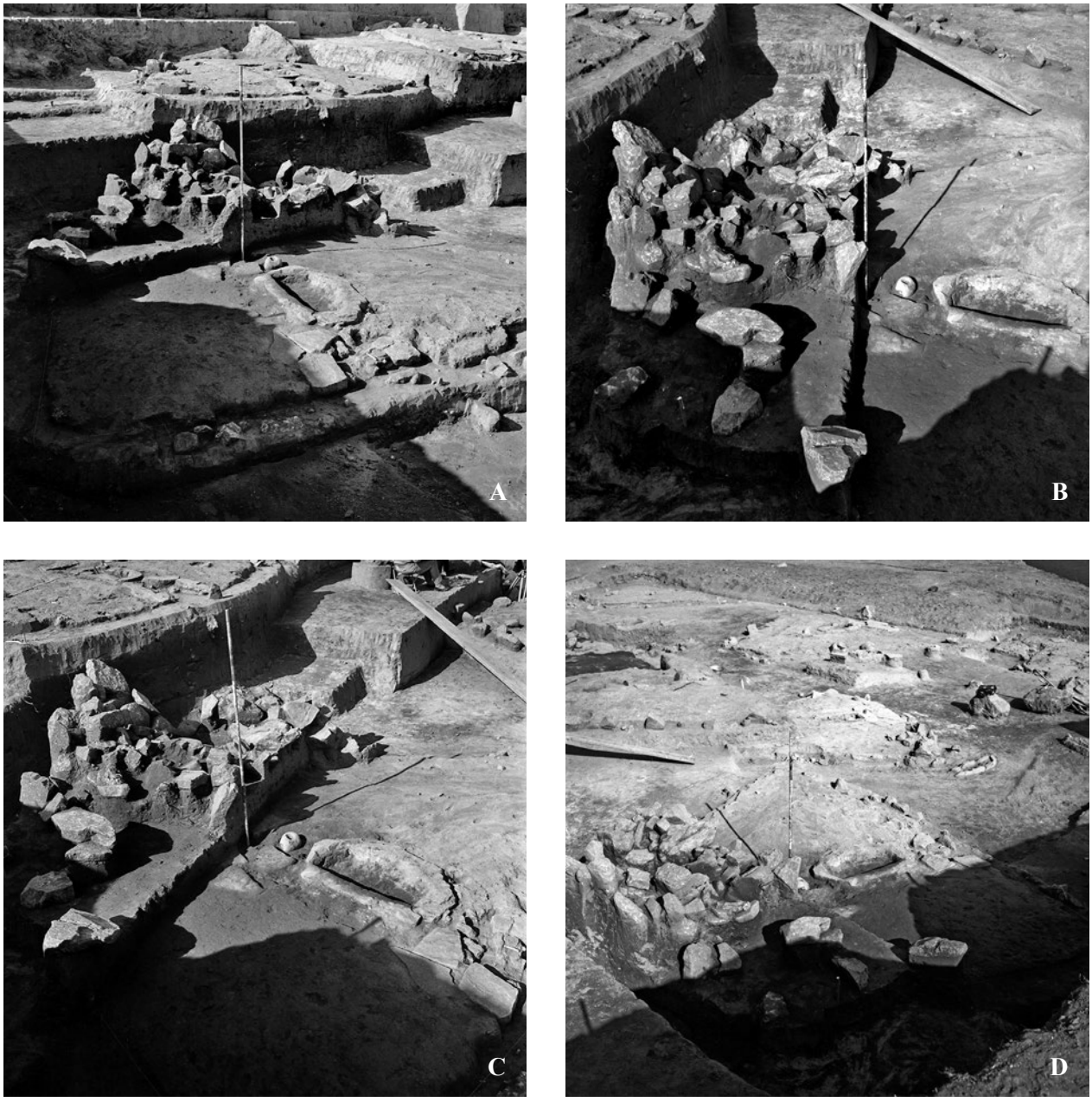

Fig. 17. Construction rocks from a likely retaining wall found collapsed in the back of building 39: A) facing northwest; B) facing north; C) facing northwest; D) facing south (photo: Faculty of Philosophy, Belgrade)

Сл. 17. Конструктивно камење од вероватног срушеног потпорног зида, пронађено у позадинском делу грађевине 39: А) гледајући ка северозападу; В) гледајући ка северу; С) гледајући ка северозападу; D) гледајући ка југу (фото: Филозофски факултет, Београд)

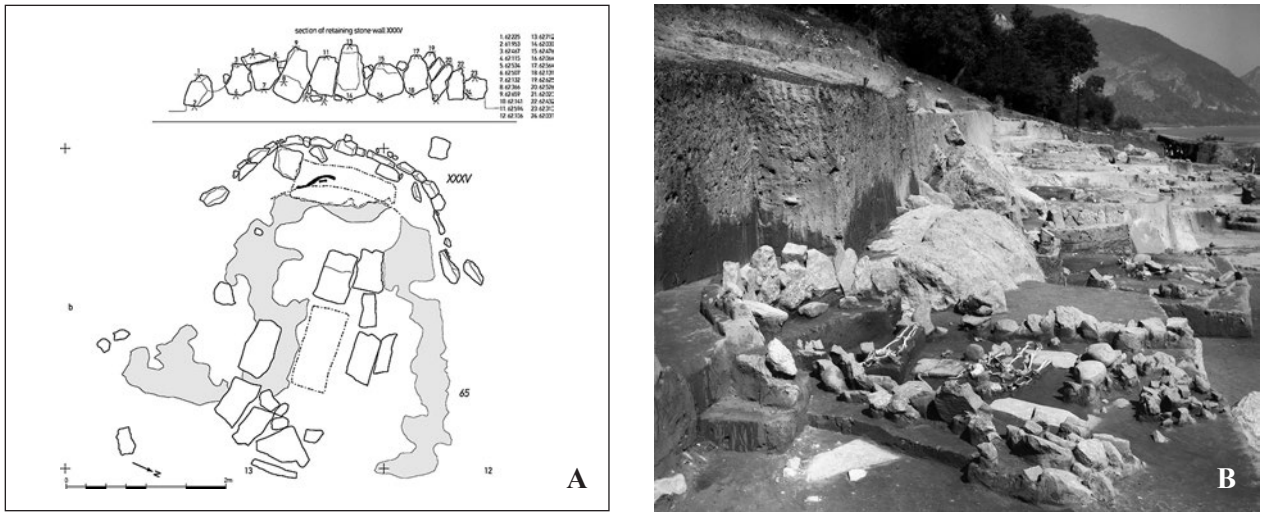

Fig. 18. A) Floor of building 65 after lifting burials; red deer antler branch dark grey-shaded (adapted from detail plan 269, drawn on 10/10/1970); B) looking north (after Borić 2016: Fig. 4.21)

Сл. 18. А) под грађевине 65 након подизања гробова; грана јеленског рога осенчена сиво (прилагођено према детаљу 269, нацртано 10. 10. 1970); В) гледајући ка северу (према: Borić 2016, Fig. 4.21)

whether the back retaining wall was built during the life of the domestic structure or during the time when this building space was partly backfilled and used as a tomb, it does not change the fact that in the way this feature was used, there must have been, within living memory, awareness and recognition of this structure. I continue to argue that this particular case shows a transformation of a presumably domestic building structure during the early days of phase I–II into a tomb that was utilised in the course of the same phase.

In summary, one possible explanation for the occasional absence of more abundant evidence for retaining walls in relation to some building structures at Lepenski Vir has to do with the fact that the excavators of the site more often than not quickly removed rocks found in the zones above certain trapezoidal buildings in the course of their excavations, with the floors of the buildings exposed and only with the lowermost parts of the retaining wall surrounding the trapezoidal outlines left *in situ* (Fig. 4). Some of the removed rocks (presumably larger rocks) were recorded but it is likely that many remained unrecorded. There is also a possibility that these rocks were sometimes reused, in the case of abandoned buildings. Yet, the underlying principle of using rocks as retaining walls along the floors and cuts of trapezoidal buildings and also in fixing the construction elements of the buildings' upper constructions, evident in numerous buildings, should by now be uncontroversial.

Early Mesolithic features and contexts

Perić and Nikolić[129] make another surprising claim that the Proto-Lepenski Vir phase cannot be separated from the phase of occupation related to trapezoidal building structures. It is, however, only a logical consequence of their thinking by which trapezoidal building structures are placed in the duration of the Early/Middle Mesolithic. Let me show why this is erroneous.

Absolute dating of certain burials and contexts was instrumental in our recognition of the Proto-Lepenski Vir phase as a phase that is sporadically preserved and relates to the earliest documented periods in the occupation of the site (Table 1). There are now five directly AMS-dated burials (22, 50, 60, 68, and 69) associated with this phase that spans a long period of time from the mid-tenth to the mid- to late-eighth millennia cal BC (Fig. 11). None of these burials were associated with trapezoidal building structures. In three cases—burials 22, 68, and 69 (Fig. 2)—these human remains were found in association, i.e. close vicinity, of four

[126] Borić 2016, Fig. 4.16, 4.21.

[127] Several ceramic fragments were found while cleaning this construction (Field Journal, August 10th, 1967). The first burial remains within the stone construction were found here already at the level of spit 7.

[128] Perić, Nikolić 2016.

[129] Perić, Nikolić 2016, 138–139.

rectangular stone-lined hearths that, by all the elements of their construction and their proportions, are entirely different from the hearths of Lepenski Vir trapezoidal buildings (Fig. 19). The disarticulated mandible of the individual in burial 22 was in the immediate vicinity of hearth *a*, and is directly AMS-dated to the second half of the eighth millennium cal BC. Articulated primary inhumation burial 69 with flexed limbs ("seated"), directly AMS-dated to the first half of the eighth millennium cal BC, was found in the vicinity of Proto-Lepenski Vir hearth *b*, while slightly farther to the south in the adjacent quadrant a/14, a similar hearth marked as *c* was found. Finally, primary articulated burial 68, directly AMS-dated to the first half of the eighth millennium cal BC, was found in the vicinity of a Proto-Lepenski Vir hearth at the far north-western part of the site (Fig. 2)[130].

Similar to typical Mesolithic hearths found at other contemporaneous sites in the Danube Gorges[131], these Middle Mesolithic Proto-Lepenski Vir hearths are all significantly narrower than Lepenski Vir I–II hearths and were also made from different grey limestone slabs compared to larger/massive stone blocks characterising the hearths of much later Lepenski Vir buildings[132]. In addition, in connection to these Proto-Lepenski Vir hearths, there were never associated additional elements characterising the hearths of trapezoidal buildings, such as ∀-shaped hearth "supports", approach platforms, and ash-places, or flat stone slabs (so-called "tables") inserted into limestone floors.

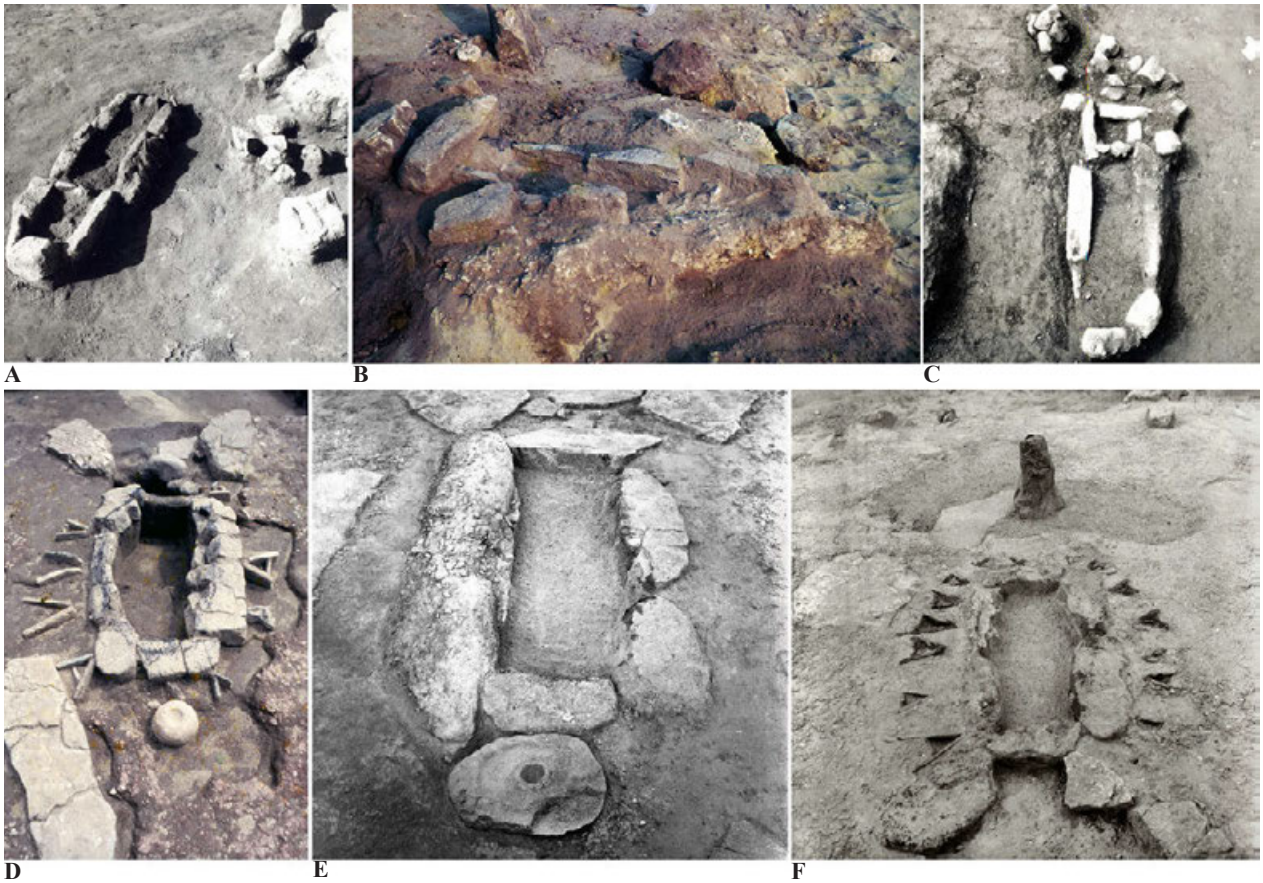

Fig. 19. Comparison of rectangular stone-lined hearths attributed to the Proto-Lepenski Vir phase (A–C) and those found in I–II phase trapezoidal buildings (D–F):
A) hearth a; B) hearth beneath the floor of building 13; C) hearth 68; D) building 24; E) building 54; F) building 19

Сл. 19. Поређење правоугаоних камених огњишта приписаних фази прото-Лепенски Вир (A–C) и оних приписаних фази I–II у оквиру трапезоидних грађевина (D–F):
A) огњиште a; B) огњиште испод пода грађевине 13; C) огњиште 68; D) грађевина 24; E) грађевина 54; F) грађевина 19

Another type of context in which we find preserved remains of this phase, as shown by AMS dating of animal remains, are occupation zones with anthropogenic remains beneath trapezoidal building floors. To-date, such occupation residues have been confirmed for layers beneath the floors of buildings 19, 23, 26', 31, 34, 38, and 47' as well as in several locations outside the area with trapezoidal buildings (Table 1) (Fig. 2). Another Proto-Lepenski Vir hearth was found beneath the floor of building 13 (Fig. 19). The oldest occupation residues are found beneath buildings 38 and 47' and are dated to the second part of the tenth millennium cal BC, corresponding broadly to the direct AMS date on burial 60 (Table 1). Such evidence shows that somewhat different from Srejović's[133] remark that Proto-Lepenski Vir features should be confided to the strip along the riverbank, not more than 15 m away from it, this occupation phase might have used most of the river terrace on which the site is located. The remains of these early occupation episodes at Lepenski Vir must have been damaged by much later construction activities, primarily linked to the occupation of the site during phase I–II.

Forager-farmer admixtures at Lepenski Vir and other sites in the Danube Gorges

In the final section of this paper, I turn to the results of recent aDNA research and other scientific approaches as complementary evidence that support the view of the stratigraphy and absolute dating of Lepenski Vir espoused in the foregoing discussion.

Genome-wide aDNA evidence has become recently available for over 50 individuals from the Mesolithic-Neolithic sites in the Danube Gorges[134]. This evidence shows that most of the analysed individuals dated to the Mesolithic occupation of the region had a specific Eurasian hunter-gatherer ancestry, leaning closer to the so-called Western hunter-gatherers. However, at two sites—Lepenski Vir and Padina—there is now evidence of six individuals consistent with either entirely north-western-Anatolian-Neolithic-related ancestry, or admixtures between these two distinct genomic signatures.

Of 11 newly analysed individuals from Lepenski Vir with genomic data, five exhibit entirely hunter-gatherer ancestry, with two burials assigned to the Proto-Lepenski Vir phase (burials 68 and 126, with a direct AMS date on burial 68, see Table 1) and three burials attributed to phase I–II (burials 27, 27d, and 91, with a direct AMS date on burial 91, see Table 1). Four individuals have entirely north-western-Anatolian-Neolithic-related ancestry, with burials 54e and 82 attributed to phase I–II and burials 17 and 73 attributed to phase III[135], confirmed by direct AMS dates on burials 17 and 54e (Table 1). As expected for individuals with entirely north-western-Anatolian-Neolithic-related ancestry, burials 17 and 73 (Fig. 20) were placed in crouched positions. On the other hand, it was not expected that burial 54e, found in the multiple burial over the floor of building 65/XXXV (Fig. 18A) placed in a typical Mesolithic extended supine burial position parallel to the Danube, head pointing downstream (see above), would also show entirely north-western-Anatolian-Neolithic-related ancestry. However, the non-local origin of individuals in burials 17 and 54e has been corroborated independently based on strontium isotope data[136].

The most intriguing genomic evidence yet comes from two individuals found in burials 61 (Fig. 7A) and 93 (Fig. 21) that exhibit approximately equal proportions of both ancestries and represent direct evidence of admixtures between local foragers and incoming farmers. Both burials 61 (beneath building 40, see above) and 93 (placed over building 72) are directly AMS-dated, confirming their Lepenski Vir I–II phase attribution, and were placed as extended supine inhumations parallel with the Danube, their heads pointing in a downstream direction. These individuals are likely the first generation that resulted from mixing between the two distinct populations. In addition, an individual marked as burial 4, found in a multiple burial location at the site of Padina (Fig. 1), and dated to the same Mesolithic-Neolithic transition phase at the end of the seventh and the beginning of the sixth millennia cal BC[137], also had

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130 Borić 2016.

131 E.g. Borić 2011; Borić et al. 2008; Jovanović 1969, 2008; Radovanović 1996.

132 The dimensions of Proto-Lepenski Vir hearths were 0.8–1.0 m by 0.20–0.25 m with slabs of around 10 cm in thickness. In contrast, hearths of trapezoidal buildings were built from "large and heavy stone blocks with dimensions most often 100 x 50 x 40 cm or 60 x 40 x 35 cm" (Srejović 1972, 53). This is the reason why such hearths were attributed to the Proto-Lepenski Vir phase separated by the excavators in the first place, and were consequently marked by small letters (a, b, c).

133 Srejović 1969, 43; 1972.

134 González-Fortes et al. 2017; Hofmanová 2017; Mathieson et al. 2018.

135 Borić 2016.

136 Borić, Price 2013.

137 Borić 2011, 2016, 259.

Fig. 20. Crouched inhumation in burial 73 belonging to north-western-Anatolian-Neolithic-related ancestry, based on genomic analysis (photo after Borić 2016: Fig. 5.14)
Fig. 21. Close-up of extended supine inhumation in burial 93 (BA-10651) with equal proportions of hunter-gatherer and north-western-Anatolian-Neolithic-related ancestry, on the basis of genomic analysis (photo after Borić 2016: Fig. 4.23H)

Сл. 20. Згрчена инхумација у гробу 73, коју одликује северозападно-анадолско неолитско порекло на основу геномске анализе (фотографија према: Borić 2016, Fig. 5.14)
Сл. 21. Детаљ испружене инхумације у гробу 93 (BA-10651) са подједнаким размерама ловачко-сакупљачког и северозападно-анадолског неолитског порекла на основу геномске анализе (фотографија према: Borić 2016, Fig. 4.23H)

roughly 50 percent of hunter-gatherer-related ancestry and 50 percent of the north-western-Anatolian- Neolithic-related ancestry, as yet another instance of admixtures between these two populations.

This evidence is in strong agreement with the suggested chrono-stratigraphic model for Lepenski Vir that assumes forager-farmer contacts starting during the Mesolithic-Neolithic transition period represented at Lepenski Vir by phase I–II[138], and also observed at other neighbouring sites, such as Vlasac and Padina[139]. Recent evidence for the mixing of forager and farmer lifeways in the Danube Gorges area also comes from the analysis of lipid residues on Early Neolithic ceramics from five sites found in this region that show a very extensive use of ceramics for the preparation and consumption of fish-related foods, a pattern that is dramatically different from broadly contemporaneous sites in the surrounding areas of south-eastern Europe as well as in the rest of Europe, with the exception of certain areas of southern Scandinavia[140]. In the context of all other evidence, this strongly suggests that in the Danube Gorges area, Late Mesolithic forager subsistence practices linked to fishing activities continued to play an important part during the Early Neolithic period[141], with an adaptation of the newly available technology of ceramic production and food preparation to the tradition of fish consumption. New genomic data suggest that this specific use of ceramics, unique to the region, must have stemmed from the merging of the two cultural traditions.

All these strands of data stand in stark contrast to the stratigraphic and chronological understanding of

[138] Borić 2016; Borić, Price 2013.
[139] Borić 2011; Borić et al. 2014.
[140] Cramp et al. 2019.
[141] Cf. Borić, Dimitrijević 2005.

the sequence at Lepenski Vir by Perić and Nikolić who maintain that the Mesolithic occupation of the site is entirely separated from the Neolithic occupation, stating that "[t]he only logical answer would be that such cohabitation between ideologically completely different inhabitants at the same settlement is unimaginable and unlikely"[142]. The best evidence against this view comes from burial 61, which according to Perić and Nikolić was placed beneath the floor of building 40 by a Neolithic intrusion. Yet, aDNA evidence now indicates that it shares two distinct genomic ancestral lines, of which one is linked to the local hunter-gatherers. New genomic data, more than other strands of evidence, most clearly show that foragers and farmers met and interbred at Lepenski Vir and other sites. In the course of this process, it is more than likely that they exchanged cultural traditions, as clearly observable from the mixture of material culture traditions during phase I–II[143]. It is worth noting here that during the Lepenski Vir I–II phase, the Late Mesolithic norm of extended supine burial positions was maintained for all those buried, regardless of their place of origin. This may significantly suggest that the forager culture was dominant during this phase, as underlined by architectural and symbolic expression too. The transformation into a predominantly Neolithic culture tradition took place only with the onset of phase III, when crouched inhumations appear for the first time, and with an abandonment of various aspects of forager cultural tradition, save for the continuing importance of fishing along with the consumption of aquatic resources.

Conclusions

In this article, I have presented extant and new evidence for the previously suggested chrono-stratigraphic model for Lepenski Vir. Some of the presented evidence only recently became available and it now further strengthens the chronological and stratigraphic picture of the site already put forward some ten years ago[144]. These views continue to be refined with further research and the constant influx of new data, but the main outlines of the model remain well established and are supported by the new data. Here, every attempt has also been made to place the chronology and stratigraphy of Lepenski Vir with all its specificities into a regionally contextualised reading by keeping an eye on contemporaneous sequences in the Danube Gorges area and beyond.

In short, the evidence shows that the terrace remnant on which Lepenski Vir was situated became inhabited from the beginning of the Holocene in the second half of the tenth millennium cal BC, based on AMS-dated animal remains, including osseous artefacts, found in a couple of contexts beneath later trapezoidal building floors. Based on one AMS-dated burial (no. 60), the site was also used for the interment of the dead at the end of the tenth/the beginning of the ninth millennium cal BC. These Early Mesolithic occupation episodes are followed by what could now be defined as the Middle Mesolithic occupation of the site from the second half of the ninth millennium cal BC. On the face of the current evidence, this period is better represented and dated than the Early Mesolithic. The AMS-dated contexts attributed to the Middle Mesolithic phase are often sealed by later trapezoidal buildings, but the novelty seems to be rectangular stone-lined hearths with common elements in the constructional style, in three instances linked to the nearby presence of burials, all of which are now securely AMS-dated. Both Early and Middle Mesolithic occupations of the site, which might have been intermittent throughout these periods, could be linked with the Proto-Lepenski Vir phase as originally defined by Srejović but with various modifications based on new evidence. The likely end of this phase is in the second half of the eighth millennium cal BC. No AMS dates can be linked with the ensuing period throughout most of the seventh millennium cal BC, i.e. the duration of the regional Late Mesolithic. It remains unclear why there are no traces of human presence at the site during this long period, when most of the other known sites in the Danube Gorges area were intensely inhabited. A complete removal of hypothetical Late Mesolithic occupation deposits by later inhabitants of Lepenski Vir or by erosional events seems unlikely[145].

Thanks to a large pool of AMS dates, burial events and constructional activities for trapezoidal building structures associated with the start of phase I–II can now be dated precisely in the range *6160–6080 cal BC (95% probability, model 1)*. Trapezoidal building structures were constructed by the cutting of their back, narrow ends into the slope of the site at different heights of the sloping terrace. Rectangular stone-lined hearths, which in their style, dimensions, and proportions differ

142 Perić, Nikolić 2016, 104.
143 Borić et al. 2018.
144 Borić, Dimitrijević 2007/2009.
145 Borić et al. 2018.

significantly from earlier Mesolithic hearths, were placed in the central location of trapezoid-shaped dug-outs and were often elaborated by stone entrance platforms at the front, wide sides of the buildings where one also finds the location of the so-called ash-places. Hearths were also surrounded by ∀-shaped "supports" made of thin limestone plaques and in one case in combination with a human mandible. A reddish-pinkish limestone compound was than plastered across the levelled surface, forming a trapezoidal shape. In many buildings, we find evidence of retaining walls used to retain the surrounding soil deposits into which the buildings were cut, with additional evidence for a patterned placement of postholes, reinforced by rocks, at the corners and along the longer sides of the trapezoidal bases. This is an intense period of occupation of the site that lasted between *120 and 210 years (95% probability, model 1)*. During this period, some of the trapezoidal building structures must have been abandoned for domestic use and backfilled, and sometimes transformed into a tomb for multiple burials. A small sample of individuals analysed for aDNA shows that the inhabitants of the site during this phase comprised people who had both the distinct local, hunter-gatherer-related ancestry and those with entirely Neolithic-north-western-Anatolian-related ancestry, as well as a couple of individuals with evidence of admixtures between these genetically different populations, which corresponds very well with the evidence for the increase in non-local individuals during this phase, based on strontium isotope data. Yet, during this phase, all of the non-local individuals were buried as extended supine burials, i.e. according to the typical Late Mesolithic burial norms. Since there is evidence for the presence of Neolithic people and practices, including technological know-how, at Lepenski Vir during this period, it is very likely that ceramics were available at the site at this time. It remains unclear to what extent ceramics were part of the life of the I–II phase settlement at Lepenski Vir and, apart from occasional comments about the presence of ceramics in association with trapezoidal buildings based on Field Journals, I have left this question open until such time that the complete ceramic assemblage from the site is adequately published with all of the relevant contextual details.

How the transition from using the site during phase I–II to its use in phase III took place is not entirely clear. On the face of the current radiocarbon chronology, there does not seem to be any significant break in the occupation of the site between these two periods. It seems that by the start of phase III, estimated to have begun in *5970–5910 cal BC (95% probability, model 1),* most if not all trapezoidal buildings were abandoned and backfilled. There is clear evidence that the phase III occupants of the site sometimes interred their pits, including burials, into the backfilled areas of trapezoidal building structures. Yet, a number of such intrusions remained rather limited and these in no way compromise the integrity of phase I–II. Available stratigraphic sections show that the use of ceramics must have been widespread during phase III, with all other typical elements of Early Neolithic Starčevo material culture present. Crouched or flexed inhumations represented an exclusive burial norm while there seems to have been a continuing influx of new, non-local people of entirely north-western-Anatolian ancestry. At the same time, some aspects of a forager way of life, such as the staple use of river fish, continued during this phase, despite the introduction of domestic animals. This is especially clear based on recent evidence that ceramic vessels were predominantly used for processing aquatic resources, different from most of the other areas in Europe where ceramic lipid analyses have been applied. The reason for the end of this phase and abandonment of the site in *5870–5480 cal BC (95% probability, model 1)*, probably in *5720–5540 cal BC (68% probability, model 1)*, remains unclear. Evidence from stratigraphic sections showing the presence of a massive deposit described as "yellow clayey soil" covering the remains of the phase III settlement could tentatively suggest that these is a colluvial deposit that might have been triggered by the devegetated nature of the slopes above Lepenski Vir, possibly caused by human activities in the course of phase III.

The outlined view of the stratigraphy and chronology of Lepenski Vir stands in stark contrast to that recently presented by Perić and Nikolić. In this paper, I examined various flawed aspects of their stratigraphic and chronological model for Lepenski Vir that must be refuted based on the presented evidence. What remains initially problematic about their publication is that after almost half a century since the excavations of the site, they present detailed evidence for only two initial excavation seasons, as if this were an interim report. They further selectively used data from later excavation seasons by choosing and picking what fits their argument. This is hardly a way to present evidence from an archaeological site. One of the most problematic aspects of their view of Lepenski Vir is that the interpretation offered completely decontextualises evidence from the

site when compared to the evidence from other sites in the region and beyond. This is particularly clear in their claims that extended supine inhumation burials should not be seen as a typical Mesolithic burial norm or that Proto-Lepenski Vir hearths do not differ from the hearths of the Lepenski Vir I–II phase. Immersed in the outdated frameworks of the culture-historical paradigm, their account of the evidence from Lepenski Vir can hardly do justice to an extraordinary sequence and the wealth of recorded data that can be retrieved from the site's surviving archive.

In the near future, we will continue to receive results of new analysis from the old excavations of Lepenski Vir and other sites in the Danube Gorges. This may change some of the conclusions expressed herein. In order to elucidate further questions of the chronology and stratigraphy of this site we need thorough publications of all currently unpublished elements of the Lepenski Vir archive. In an ideal world and from the perspective of open-access policies, this and other "seasoned" excavation archives should become open and available to all interested researchers, who can then draw conclusions based on the first-hand analysis of recorded data and collected materials.

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ПОНОВО О ХРОНОЛОГИЈИ И СТРАТИГРАФИЈИ ЛЕПЕНСКОГ ВИРА

Кључне речи – Мезолит, неолит, сточари, земљорадници, AMS датовање, ДНК, Лепенски вир, Ђердапска клисура

Иако је прошло више од 50 година од открића Лепенског Вира, не престаје контроверза у вези с тумачењем стратиграфије и са апсолутно-хронолошким датовањем овог, у светским оквирима важног, праисторијског налазишта. Током последњих 20 година понуђено је неколико верзија ревидиране слике стратиграфије и хронологије овог налазишта, утемељених у новом, контекстуалном тумачењу стратиграфских односа најзаступљеније фазе са трапезоидним грађевинама и пронађене материјалне културе, с важним ослонцем на постојеће и новодобијене радиокарбонске датуме. Те ревизије су током последње две деценије додатно поткрепљиване новим датумима и новим анализама материјала. Уз мања или већа одступања у тумачењу постојећих података од стране различитих аутора који су се бавили овим проблемом, успостављен је минимални консензус да фазу са трапезоидним грађевинама треба везати за период прелаза из мезолита у неолит у последњим вековима седмог миленијума пре н. е., будући да представља део континуираног процеса трансформације проузрокованог културним контактом мезолитских домородаца и придошлих земљорадничких група. Понуђено ревидирано гледиште значајно мења иницијално тумачење које је дао први истраживач овог налазишта. Међутим, у скорије време, Перић и Николић понудили су своје тумачење које другачије поставља хронолошке односе на Лепенском Виру, уз ново читање постојећих ^{14}C датума. Ти аутори сматрају да грађевине са трапезоидним подовима нису настале касније од 7500. године пре н.е. и да је постојао наглашен дисконтинуитет између мезолитског и неолитског насељавања Лепенског Вира. Њихово гледиште представља значајно одступање од консензуса који је међу истраживачима успостављен током последњих година и захтева ново разматрање питања хронологије и стратиграфије Лепенског Вира.

У овом раду пружа се нови осврт на стратиграфију и хронологију Лепенског Вира кроз усредсређену анализу неколико кључних контекста с новим ^{14}C AMC (акцелераторна масена спектрометрија) датумима и уз детаљну расправу о тафономским и другим проблемима датовања и њиховом исправном тумачењу по модерним научним стандардима. Коначно, ова хронолошка слика упоређена је с недавно добијеним геномским анализама древне ДНК на људским остацима са Лепенског Вира и с неколико других мезолитско-неолитских налазишта у Ђердапу.

Table 1. *Radiocarbon measurements on charcoal, animal and human bones from Lepenski Vir. Ages are corrected for those dates that have $\delta^{15}N$ values >+9.5‰ (affected by the aquatic reservoir effect) as suggested by Cook et al.[1]. The $\delta^{15}N$ values used to estimate percentage of aquatic diet.*
Method 1: A weighted mean age offset for a 100% fish-based diet estimated as 540±70 radiocarbon years.
Method 2: $\delta^{15}N$ values >13.0 = 100% reservoir correction applied (440±45 years); $\delta^{15}N$ values <13.0 = 50% reservoir correction applied (220±23 years).
Dates are calibrated with OxCal v. 4.3.2[2]. Dark gray shading: charcoal samples; light gray shading: human bone samples; no shading: animal bone samples.

Laboratory code	Sample material and reference	Sample association	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	$\delta^{34}S$ (‰)	C:N	% protein (fish?) signal	Radiocarbon measurement corrected for average freshwater fish offset (Cook *et al.* 2011) BP	Calibrated date (95% confidence) cal BC or cal AD	*Posterior density estimate for Model 1 (95% probability unless otherwise stated) cal BC*	Source
Proto-Lepenski Vir Contexts (Early-Middle Mesolithic phases)												
OxA-32864	*Pinus sylvestris* (S. no. 7)	Quad. c/I-II (hearth) (22/08/1968)	12,335±50	–24.2	–	–	–	–	–	12,730–12,140	*10,020–7440 (poor agreement 7.1%)*	Borić et al. 2018
OxA-32863	*Pinus sylvestris* (S. no. 6)	Quad. A/3, LV horizon II, beneath rock (18/10/1967)	10,075±45	–24.3	–	–	–	–	–	10,000–9400	*9870–9320*	Borić et al. 2018
OxA-26552[3]	Red deer antler mattock (S. no. 33)	building 38, underneath the building's floor	10,035±50	–19.3	6.3	–	3.2	–	–	9852–9338	*9780–9320*	Borić et al. 2018
OxA-25092	Human right or left femur	Burial 60, primary, adult male (?), extended perpendicular to the Danube	9970±45	–19.1	15.0	5.9	3.2	78%	9549±71 (method 1) 9530±64 (method 2)	9209–8721 (1) 9176–8657 (2)	*9230–8700 (94.7%)* or *8680–8650 (0.7%)*	Bonsall et al. 2015
OxA-16072	LV12, red deer right M_2	Beneath the floor of building 47' (1315a) (09/10/1970)	9850±50	–20.2	7.8	–	3.2	–	–	9440–9241	*9450–9230*	Borić, Dimitrijević 2007/2009
OxA-16004	LV10, red deer metatarsus	Between the floors of building 47 and 47', on the floor of Building 47' (1314a) (09/10/1970)	9730±50	–20.3	6.0	–	3.4	–	–	9294–8928	*9310–9120 (87.0%)* or *9010–8910 (8.0%)* or *8890–8870 (0.8%)*	Borić, Dimitrijević 2007/2009
OxA-16076	LV30, red deer antler	Building 54, floor (October 1967)	9750±45	–19.6	6.1	–	3.2	–	–	9297–9152	*9310–9140 (94.1%)* or *8980–8940 (1.3%)*	Borić, Dimitrijević 2007/2009
BA-10651	Human rib	Burial 50, primary, adult male, extended supine with flexed lower limbs at the knees (raised), perpendicular to the Danube	9455±38	–19.5	14.2	4.8	–	69%	9082±62 (method 1) 9015±59 (method 2)	8532–8208 (1) 8340–7961 (2)	*8550–8190 (93.8%)* or *8110–8090 (0.4%)* or *8080–8060 (0.1%)* or *8040–7990 (1.0%)*	Borić, Price 2013
OxA-25215	Human left femur	Burial 69, adult male, seating w/crossed legs	9089±38	–19.3	14.6	–	3.2	73%	8695±64 (method 1) 8649±59 (method 2)	7940–7591 (1) 7933–7573 (2)	*7970–7580*	Bonsall et al. 2015

[1] Cook et al. 2002.
[2] Bronk Ramsey 1995, 2001.
[3] Low pretreatment yield of collagen: 590 mg was treated and 4.14 mg recovered, a yield of 0.7% wt. collagen, and below the Oxford Laboratory's minimum threshold.

Laboratory code	Sample material and reference	Sample association	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	$\delta^{34}S$ (‰)	C:N	% protein (fish?) signal	Radiocarbon measurement corrected for average freshwater fish offset (Cook *et al.* 2011) BP	Calibrated date (95% confidence) cal BC or cal AD	*Posterior density estimate for Model 1 (95% probability unless otherwise stated) cal BC*	Source
UBA-29842	Human petrous bone	Burial 68, possible adult female, supine, flexed limbs, next to hearth 68	9092±59	–19.7	14.6	6.8	?	73%	8698±78 (method 1) 8652±74 (method 2)	8167–7580 (1) 7940–7571 (2)	*8180–8110 (2.6%)* or *8090–8070 (0.1%)* or *8060–8040 (0.5%)* or *8000–7570 (92.2%)*	AMS date: Hofmanová 2017; isotope values: Nehlich et al. 2010
OxA-26551	Red deer antler intermediate piece/tool (BB-23) (S. no. 20)	Quad. A/11, spit 6 (801)	8910±45	–21.2	9.7	–	3.1	–	–	8251–7941	*8270–7910 (93.3%)* or *7900–7830 (2.1%)*	Borić et al. 2018
OxA-26553	Red deer, pointed tool on a proximal end of a metapodial (BB-106) (S. no. 25)	Quad. C/XV, spit 19 (1058b) (23/08/1969)	8840±45	–22.8	6.8	–	3.2	–	–	8208–7760	*8220–7750*	Borić et al. 2018
OxA-24771	Red deer antler diffused-end tool (punch) (S. no. 32)	Building 19, beneath the building's floor	8871±38	–21.1	5.5	–	3.1	–	–	8224–7837	*8230–7820*	Borić et al. 2018
OxA-16071	LV6, red deer modified antler	Building 26', floor (bb-1303a) (31/08/1970)	8855±40	–21.4	6.2	–	3.2	–	–	8218–7794	*8230–7780*	Borić, Dimitrijević 2007/2009
OxA-8610	Long bone of a large-size ungulate	Building 23, beneath the floor (1299c)	8770±60	–21.6	4.7	–	3.3	–	–	8200–7600	*8200–8110 (7.2%)* or *8100–8030 (2.6%)* or *8010–7600 (85.6%)*	Whittle et al. 2002
AA-57781	Human mandible	Burial 22, old adult, in association with hearth "a"	8814±60	–20.0	14.4	–	–	71%	8431±78 (method 1) 8374±75 (method 2)	7596–7317 (1) 7580–7191 (2)	*7600–7320*	Borić, Price 2013
OxA-16074	LV22, shed red deer antler	Occupation zone around hearth "a" (268/1) (02/10/1967)	8645±40	–20.3	5.9	–	3.2	–	–	7740–7587	*7760–7580*	Borić, Dimitrijević 2007/2009
OxA-26549	Wild boar tusk pointed–edged tool/burin (BB-187)	Space between buildings 40 and 41 [zone around hearth "a"] (02/10/1967)	8659±45	–22.0	7.7	–	3.2	–	–	7754–7596 Weighted mean: 8685±32 X2-Test: df=1 T=0.6 (5% 3.8)	*7790–7590*	Borić et al. 2018
OxA-26550			8710±45	–22.0	8.1	–	3.2	–	–			Borić et al. 2018
OxA-24813	LV34, red deer bone	Beneath building 34 (1307/5)	8640±40	–22.1	5.2	–	3.1	–	–	7740–7580	*7840–7540 (94.7%)* or *7420–7290 (0.7%)*	Borić et al. 2018

OxA-24812	Brown bear, humerus, from a partially articulated skeleton with butchering cutmarks (BB-30/7)	Building 31, beneath the floor	8410±39	–19.7	6.8	–	3.1	–	–	7574–7359	*7580–7360*	Borić et al. 2018
OxA-26548	Wild boar tusk pointed–edged tool/burin (BB-112) (S. no. 47)	Quad. b/13, stone construction (1028b) (16/08/1968)	8265±45	–21.1	9.8	–	3.3	–	–	7476–7143	*7520–7170*	Borić et al. 2018
Lepenski Vir I-II contexts (Mesolithic-Neolithic Transition phase)												
Building 37												
Bln-649	LV5/67, charcoal (*Quercus* sp.), large timber beam	Building 37, floor	6800±100	–	–	–	–	–	–	5882–5638 Weighted mean: 6860±64 X2-Test: df=2 T=0.6 (5% 6.0)	*6100–5940 (poor agreement 6.3%)*	Quitta 1975
Bln-678			6900±100	–	–	–	–	–	–			
BM-379			6900±150	–	–	–	–	–	–			
OxA-32886	Charcoal, *Quercus* sp. (S. no. 9)	Wooden beam from building 37 (June 1967)	7156±36	–25.3	–	–	–	–	–	6074–6000 Weighted mean: 7174±26 X2-Test: df=1 T=0.5 (5% 3.8)	*6080–6000*	Borić et al. 2018
OxA-32887			7191±35	–24.3	–	–	–	–	–			Borić et al. 2018
OxA-16082	LV20, bone tool (inv. 673)	Building 37, floor	7138±37	–20.6	5.9	–	3.2	–	–	6071–5922	*6070–5980*	Borić, Dimitrijević 2007/2009
Building 62												
KN-405	Charcoal (possibly *Quercus* sp.)	Building 62, from a timber beam over the hearth of building 62	7430±160	–	–	–	–	–	–	6595–6006	*6140–5980*	Quitta 1975
OxA-32865	Charcoal, *Cornus* sp.	Building 62, in front of the hearth, toward side C-D (charcoal 5) (29/07/1968)	7176±36	–25.4	–	–	–	–	–	6110–5980	*6090–5990*	Borić et al. 2018
Buildings 20, 33 and 32												
P-1598	Charcoal	Building 32, hearth of the building	6814±69	–	–	–	–	–	–	5872–5571	*6080–5940 (poor agreement 3.9%)*	Quitta 1975
OxA-15998	LV1, roe deer metacarpus	Between the floors of buildings 20 and 33, on the floor of building 20 in corner D (1082) (30/08/1968)	7280±45	–22.1	7.9	–	3.2	–	–	6231–6056	*6140–6030*	Borić, Dimitrijević 2007/2009
OxA-8725	Fish vertebra	Between the floors of buildings 20 and 33, on the floor of building 20 in corner D	7600±90	–16.9	9.7	–	3.3	–	7380±93 (method 2)	6420–6060 (2)	*6140–6020*	Whittle et al. 2002
OxA-15999	LV2, red deer right proximal metatarsus	Building 32, from the floor (1090/4) (1968)	7111±40	–20.8	5.4	–	3.4	–	–	6061–5902	*6070–5950*	Borić, Dimitrijević 2007/2009

Laboratory code	Sample material and reference	Sample association	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	$\delta^{34}S$ (‰)	C:N	% protein (fish?) signal	Radiocarbon measurement corrected for average freshwater fish offset (Cook *et al.* 2011) BP	Calibrated date (95% confidence) cal BC or cal AD	*Posterior density estimate for Model 1 (95% probability unless otherwise stated) cal BC*	Source
Buildings 26 and 26'												
OxA-16000	LV4, red deer skull	Building 26, floor, quad. A/VI (143) (22/07/1967)	7070±40	–21.5	6.7	–	3.4	–	–	6023–5849	*6030–5940*	Borić, Dimitrijević 2007/2009
OxA-16001	LV5, red deer vertebra	Between the floors of buildings 26 and 26', spit 1 below the floor of building 26 (1320a) (29/08/1970)	7235±40	–20.6	5.5	–	3.3	–	–	6200–6002 Weighted mean: 7198±29 X2-Test: df=1 T=1.8 (5% 3.8)	*6100–6000*	Borić, Dimitrijević 2007/2009
OxA-16002			7160±40	–20.1	6.4	–	3.2	–	–			Borić, Dimitrijević 2007/2009
Buildings 47 and 47' and Burial 122												
UCLA-1407	Charcoal from a timber beam	Building 47, timber beam found lying along the left side	6970±60	–	–	–	–	–	–	5983–5736	*6010–5940*	Quitta 1975
OxA-16005	LV11, human skull fragment	Burial 122, disarticulated 15–18 year-old (M^3 erupting) skull found between the floors of buildings 47 and 47' (09/10/1970)	7190±45	–19.5	9.5	–	3.3	17%	7098±47 (method 1)	6102–5996 Weighted mean: 7190±30 X2-Test: df=1 T=0.0 (5% 3.8)	*6090–6000*	Borić, Dimitrijević 2007/2009
OxA-16006			7190±40	–19.3	9.3	–	3.3	15%	7109±41 (method 1)			
Buildings 51, 57/XLIV and Burial 19(3)												
OxA-16008	LV17, unfused human humerus	Burial 19(3), disarticulated remains of a 10-year-old child, over the floor of building 57/XLIV	7205±40	–18.1	10.2	9.9	3.3	21%	7092±42 (method 1) 6985±46 (method 2)	6050–5892 (1) 5982–5756 (2)	*6050–5940*	Borić, Dimitrijević 2007/2009
OxA-16081	LV15, bone tool (inv. 689)	Stone construction above the floor of building 57/XLIV (05/10/1967)	7219±37	–21.3	6.3	–	3.2	–	–	6210–6012	*6100–6000*	Borić, Dimitrijević 2007/2009
OxA-16073	LV16, roe deer right M_2,	Floor of building 57/XLIV (558/1) (04/07/1968)	7125±40	–21.5	6.5	–	3.2	–	–	6068–5913	*6070–5970*	Borić, Dimitrijević 2007/2009
OxA-8618	Large-size ungulate long bone	Floor of the rear area of building 51 (1313,a,c) beneath building 57/XLIV	7200±60	–21.2	3.9	–	3.3	–	–	6220–5920	*6130–6030*	Whittle et al. 2002
Bln-652	LV8/67, charcoal (*Ulmus* sp.)	Timber beam found on the floor of building 51, along its left side	6620±100	–	–	–	–	–	–	5720–5376	*6120–5950 (poor agreement 5.4%)*	Quitta 1975
Building 34 and Burial 26												
Bln-650	LV6/67, charcoal (*Quercus* sp.)	Timber beam found on the floor of building 34 beneath the floor of building 43	6820±100	–	–	–	–	–	–	5973–5556	*6020–5940 (poor agreement 15.3%)*	Quitta 1975

AA-57782	Human mandible	Burial 26, adult male, extended inhumation, parallel to the Danube, head downstream direction, interred through the floor of building 34	7332±50	–26.5	11.5	6.6	–	39%	7122±57 (method 1) 7112±55 (method 2)	6016–5896 Weighted mean: 7077±32 X2-Test: df=1 T=0.9 (5% 3.8)	*6030–5940*	Borić, Price 2013
OxA-25206	Human right tibia		7161±34	–20.3	9.7	–	3.2	19%	7058±37 (method 1) 6941±41 (method 2)			Bonsall et al. 2015
OxA-16009	LV19, red deer mandible	Floor of building 34 (517, 483) (18/10/1967)	7165±40	–22.3	7.9	–	3.1	–	–	6100–5925	*6090–5980*	Borić, Dimitrijević 2007/2009
Building 24 and Burials 94 and 100												
OxA-34519	Human unfused long bone epiphysis	Burial 100, primary disturbed, c. 8 years old, extended supine, articulated beneath the floor of building 24 (26/08/1970)	7695±40	–18.0	14.0	8.9	–	67%	7333±62 (method 1) 7255±60 (method 2)	6362–6065 (1) 6231–6016 (2)	*6140–6060*	Borić et al. 2018
OxA-16010	LV25, human short bone	Burial 94, primary, neonate, in the rear of building 24 found beneath the floor level (15/10/1970)	7520±40	–18.1	19.5	11.5	3.2	100%	6980±81 (method 1) 7080±60 (method 2)	6008–5722 (1) 6066–5833 (2)	*6050–5940*	Borić, Dimitrijević 2007/2009
OxA-X-2176-18	LV24, red deer right $M_{1/2}$	Area around the hearth of building 24 (1300a) (02/09/1970)	7285±45	–21.5	7.0	–	3.2	–	–	6231–6060	*6130–6020*	Borić, Dimitrijević 2007/2009
Building 65/XXXV and Burial 54c, 54d, and 54e												
OxA-25210	Human left femur	Burial 54e, adult female (?), extended parallel to the Danube, head downstream direction	7474±35	–19.4	13.3	5.93	3.2	59%	7155±54 (method 1) 7034±57 (method 2)	6205–5907 (1) 6018–5783 (2)	*6100–5970*	Bonsall et al. 2015
OxA-25209	Human left femur	Burial 54c, adult female, extended parallel to the Danube, head downstream direction	7461±35	–19.0	12.8	8.0	3.2	54%	7169±52 (method 1) 7241±42 (method 2)	6208–5922 (1) 6216–6026 (2)	*6100–5980*	Bonsall et al. 2015
AA-57783	Human skull fragment	Burial 54d, of old adult female placed over the floor of building 65, partly disturbed	7494±51	–20.0	15.1	8.8	–	79%	7067±55 (method 1) 7054±68 (method 2)	6088–5918 Weighted mean: 7149±43 X-Test fails at 5% X2-Test: df=1 T=5.361 (5% 3.8)	*6100–5960*	Borić, Price 2013
OxA-25213	Human left femur		7717±35	–18.1	15.4	–	3.2	83%	7269±68 (method 1) 7277±57 (method 2)			Bonsall et al. 2015
OxA-X-2176-19	LV26, red deer metacarpus	Rear area of the floor of building 65/XXXV (1329a) (30/09/1970)	7314±40	–20.7	6.5	–	3.2	–	–	6240–6070	*6140–6050*	Borić, Dimitrijević 2007/2009
Buildings 21 and 22 and Burials 7/I-a and 7/II-b												
OxA-16537	LV9, red deer skull	Structured deposition of red deer skull with antlers in burial 7, interred through the floor of building 21 (524) (20/10/1967)	6924±37	–21.9	7.7	–	3.4	–	–	5887–5730	*6050–5940 (poor agreement 5.8%)*	Borić, Dimitrijević 2007/2009
OxA-32933	Aurochs skull	Structured deposition of aurochs skull in burial 7, interred through the floor of Building 21 (20/10/1967)	7133±37	–21.0	11.9	–	3.2	–	–	6068–5920	*6060–5970*	Borić et al. 2018

Laboratory code	Sample material and reference	Sample association	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	$\delta^{34}S$ (‰)	C:N	% protein (fish?) signal	Radiocarbon measurement corrected for average freshwater fish offset (Cook *et al.* 2011) BP	Calibrated date (95% confidence) cal BC or cal AD	*Posterior density estimate for Model 1 (95% probability unless otherwise stated) cal BC*	Source
AA-57779	Human rib	Burial 7/I-a, articulated male adult burial interred through the floor of building 21	7368±74	–18.9	11.5	10.9	–	39%	7157±79 (method 1) 7148±78 (method 2)	6208–5992 Weighted mean: 7197±44 X2-Test: df=2 T=0.4 (5% 6.0)	*6070–5980*	Borić, Price 2013
OxA-25204	Human right femur		7710±35	–18.3	16.1	–	3.2	90%	7224±72 (method 1) 7270±57 (method 2)			Bonsall et al. 2015
OxA-25205			7689±37	–18.1	16.1	–	3.2	90%	7203±73 (method 1) 7249±58 (method 2)			Bonsall et al. 2015
AA-57780	Human skull fragment	Burial 7/II-b, disarticulated adult human skull placed on the left shoulder of burial 7/I-a	7512±71	–20.0	16.0	–	–	89%	7031±95 (method 1) 7072±84 (method 2)	6066–5726 (1) 6080–5746 (2)	*6060–5940*	Borić, Price 2013
OxA-16075	LV28, red deer antler	Structured deposition of red deer skull with antlers on the floor of building 22 (261) (August 1967)	7157±39	–21.9	6.2	–	3.2	–	–	6086–5927	*6100–6010*	Borić, Dimitrijević 2007/2009
Building 54												
Z-115	Charcoal	Timber beam in building's corner A	6984±94	–	–	–	–	–	–	6031–5676	*6070–5940*	Quitta 1975
Bln-653	LV9/67, charcoal (*Quercus* sp.)	Timber beam in corner A underneath a stone	7040±100	–	–	–	–	–	–	6085–5720	*6080–5940*	Quitta 1975
Bln-738	LV12/68, charcoal (*Quercus* sp.)	From the building's hearth	7225±100	–	–	–	–	–	–	6355–5898	*6120–5970*	Quitta 1975
KN-407	Charcoal	Possibly from the building's hearth	7280±160	–	–	–	–	–	–	6452–5846	*6120–5960*	Quitta 1975
OxA-26547	Wild boar tusk pointed–edged tool/burin (BB-209) (S. no. 29)	Building 54, underneath the building's floor (1317bc)	7396±40	–22.7	9.6	–	3.2	–	–	6393–6116	*6150–6060 (poor agreement 9.5%)*	Borić et al. 2018
Building 27												
KN-406	LV1, Charcoal	Probably from the building's hearth	7210±200	–	–	–	–	–	–	6452–5724	*6130–5950*	Quitta 1975
OxA-16077	LV31, red deer D_4	Building floor – section above the rear part of the building (1304a) (03/09/1970)	7225±40	–24.4	8.7	–	3.2	–	–	6210–6017	*6120–6010*	Borić, Dimitrijević 2007/2009
Buildings 35 and 36 – between two floors												
OxA-16003	LV8, pig phalanx III	Between the floors of Buildings 35 and 36, in the hearth of building 36 (1036) (23/08/1968)	7170±40	–20.3	7.0	–	3.3	–	–	6198–5928	*6090–5980*	Borić, Dimitrijević 2007/2009

Bln-740a Bln-740b	LV13/68, charcoal (*Quercus* sp.)	From timber beam lying on the floor of building 36 beneath the floor of building 35	7310±100 7360±100	– –	– –	– –	– –	– –	– –	6376–6060 Weighted mean: 7335±71 X2-Test: df=1 T=0.1 (5% 3.8)	*6140–6020*	Quitta 1975
Building 4												
OxA-16084	Bone tool (inv. 349), large mammal bone	Building 4, from the building's floor	7285±37	–21.2	6.9	–	3.2	–	–	6226–6068	*6130–6020*	Borić, Dimitrijević 2007/2009
OxA-27901	Fish hook (inv. 350, 10/07/1967), large mammal bone	Building 4 (block B), from the building's floor	7207±35	–20.0	9.8	–	3.2	–	–	6206–6006	*6110–6000*	Borić et al. 2018
OxA-26554	Bone tool – tapered base (BB-193), dog bone based on isotope values and ZooMS	Building 4, beneath the floor	7710±40	–18.0	12.0	–	3.2	46%	7462±44 (method 1) 7490±46 (method 2)	6421–6241 (1) 6436–6250 (2)	*6140–6060 (poor agreement 4.2%)*	Borić et al. 2018
Building 40												
OxA-25211	Human right femur	Burial 61, beneath the floor of building 40, child 2-6 years old, primary extended parallel with the Danube, head downstream	7670±35	–19.0	16.1	–	3.2	90%	7184±72 (method 1) 7230±57 (method 2)	6223–5916 (1) 6220–6010 (2)	*6120–5980*	Bonsall et al. 2015
OxA-34968	Human mandible, right condylar process	Burial 21, disarticulated mandible embedded in the floor of building 40 next to its hearth along with a stone plaque to form ∀-shaped support	7193±39	–20.1	9.9	–	3.2	21%	7080±42 (method 1) 6973±45 (method 2)	6050–5880 (1) 5990–5740 (2)	*6030–5940*	Borić et al. 2018
Only one measurement per building												
Bln-576	LV2/66, charcoal (*Quercus* sp.)	Building 16**,** A thin layer of charcoal on the floor	6820±100	–	–	–	–	–	–	5972–5556	*6090–5940 (poor agreement 14.1%)*	Quitta 1975
Bln-575	LV1/66, charcoal (*Quercus* sp.)	Building 1, floor, SE area of the building, between two stone slabs	6860±100	–	–	–	–	–	–	5982–5574	*6070–5930 (poor agreement 27.5%)*	Quitta 1975
Bln-647	LV3/67, charcoal (*Quercus* sp.)	Building 9, Timber beam in the area covered by the floor of building 8	6845±100	–	–	–	–	–	–	5979–5566	*6070–5930 (poor agreement 22.8%)*	Quitta 1975
OxA-16078	Red deer skull (S. LV32)	Building 28, from the building's floor (273) (03/10/1967)	7191±40	–21.4	8.2	–	3.2	–	–	6205–5990	*6100–5990*	Borić, Dimitrijević 2007/2009
OxA-16083	Bone tool (inv. 125), medium size ungulate (LV33)	Building 5, from the building's floor (12/08/1965)	7059±36	–20.7	6.0	–	3.2	–	–	6014–5850	*6020–5940*	Borić, Dimitrijević 2007/2009

Laboratory code	Sample material and reference	Sample association	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	$\delta^{34}S$ (‰)	C:N	% protein (fish?) signal	Radiocarbon measurement corrected for average freshwater fish offset (Cook *et al.* 2011) BP	Calibrated date (95% confidence) cal BC or cal AD	*Posterior density estimate for Model 1 (95% probability unless otherwise stated) cal BC*	Source
OxA-25214	Human left femur	Burial 45b in the pile of disarticulated bones on the floor of building 61/XXXIV, associated with a robust male disarticulated skull	7759±33	–18.9	15.8	–	3.2	87%	7289±69 (method 1) 7319±56 (method 2)	6351–6015 (1) 6356–6056 (2)	*6140–6010*	Bonsall et al. 2015
Phase I-II contexts outside of trapezoidal buildings												
OxA-25090	Human right femur	Burial 14 in burial pit, quad. A/VIII, primary, adult female (?), extended parallel with the Danube, head downstream, one red deer antler tool	7701±37	–18.9	15.9	9.9	3.2	88%	7226±72 (method 1) 7261±58 (method 2)	6236–5985 (1) 6231–6021 (2)	*6130–5980*	Bonsall et al. 2015
BA-10653	Human skull fragment	Burial 93, primary, adult female (?), extended supine, parallel with the Danube head downstream; discoid beads and antler (phase I-II)	7550±70	–18.5	15.1	10.8	–	79%	7123±89 (method 1) 7110±83 (method 2)	6214–5812 (1) 6208–5801 (2)	*6110–5950*	Borić, Price 2013
OxA-25089	Human tibia	Burial 89a, primary, subadult?, extended parallel with the Danube partly disturbed burial with an aurochs skull above the head, next to section *f*; found above burial 91	7521±36	–18.4	15.9	–	3.2	88%	7046±71 (method 1) 7081±58 (method 2)	6049–5768 (1) 6061–5842 (2)	*6050–5940*	Bonsall et al. 2015
UBA-29841	Human petrous bone	Burial 91, male (?), primary, adult, extended supine, parallel with the Danube head downstream; found beneath burial 89a	7608±49	–20.4 or –18.4	12.9 or 15.0	8.9	?	54% or 78%	7316±62 (method 1) or 7187±73 (method 1) 7388±54 (method 2) or 7168±67 (method 2)	6360–6051 (1) or 6225–5916 (1) 6395–6098 (2) or 6215–5911 (2)	*6120–5980*	AMS date: Hofmanová 2017; isotope values: Borić 2016
OxA-5830	Human right humerus	Burial 44, adult, disarticulated human remains	7590±90	–18.9	15.3	–	–	81%	7153±106 (method 1) 7150±101 (method 2)	6236–5796 (1) 6232–5810 (2)	*6120–5950*	Bonsall et al. 1997
OxA-5827	Human left humerus	Burial 31a, male (?), disarticulated human bones in Pit 2 in quad. a/VII	7770±90	–18.7	15.7	–	–	85%	7311±108 (method 1) 7230±101 (method 2)	6406–6002 (1) 6359–5904 (2)	*6140–5990*	Bonsall et al. 1997
OxA-25091	Human scapula	Burial 79a, adult male (?), disarticulated pile of cranial and postcranial bones (individuals 79a-c) in quad. e/4, spits 11–13	7605±38	–18.7	16.1	–	3.2	90%	7119±74 (method 1) 7165±59 (method 2)	6206–5840 (1) 6210–5916 (2)	*6100–5940*	Bonsall et al. 2015
Phase III (Early Neolithic)												
Bln-654	LV10/67, charcoal (*Quercus* sp.)	Building IX, i.e. occupation zone above the infill of building 37	6630±100	–	–	–	–	–	–	5724–5379	*5920–5550 (poor agreement 53.3%)*	Quitta 1975
Bln-655	LV11/67, Charcoal (*Quercus* sp.)	Building XXXII, occupation zone above the infill of building 48	6560±100	–	–	–	–	–	–	5658–5325	*5940–5540 (poor agreement 39.7%)*	Quitta 1975

OxA-16007	LV13, bone tool (inv. 336)	Stone construction above the level of building 8 (spit 7) (08/07/1966)	7050±40	–21.1	5.2	–	3.3	–	–	6009–5846	*5960–5830*	Borić, Dimitrijević 2007/2009
OxA-16212	LV37, domestic goat proximal metacarpus	Domed oven in quad. d/3, spit 6 (831a) (26/07/1968)	7041±35	–19.8	6.8	–	3.2	–	–	6000–5845	*5960–5840*	Borić, Dimitrijević 2007/2009
OxA-16253	LV38, Domestic goat mandible	Quad. C/XVI, spit 3 (16/08/1968)	7008±38	–20.7	7.1	–	3.2	–	–	5988–5799	*5960–5790*	Borić, Dimitrijević 2007/2009
OxA-16213	LV39, domestic cattle proximal metatarsus	Quad. c/I, spit 7 (unit 905a) (01/08/1968)	7043±37	–21.5	8.3	–	3.2	–	–	6002–5845	*5960–5840*	Borić, Dimitrijević 2007/2009
OxA-16079	LV35, domestic pig scapula	Pit 1, quad. a/VII, spit 9 (665) (12/07/1968)	7037±39	–20.2	9.3	–	3.2	–	–	6005–5841	*5960–5810*	Borić, Dimitrijević 2007/2009
OxA-16211	LV36, domestic cattle horncore	Pit 3, quad. a/VIII, spit 9 (674) (15/07/1968)	7021±36	–21.1	6.7	–	3.2	–	–	5996–5811	*5960–5810*	Borić, Dimitrijević 2007/2009
OxA-16538	LV14, unfused epiphysis of a medium-sized mammal (inv. 552)	Placed with crouched primary adult burial 5 (11/07/1966)	7136±37	–21.4	6.0	–	3.3	–	–	6070–5922	*5960–5730 (poor agreement 21.2%)*	Borić, Dimitrijević 2007/2009
AA-58319	Human skull fragment	Burial 8, primary, old adult female, crouched position, right side, over the floor of building 24 (bag 263)	6825±51	–21.2	10.2	5.1	–	25%	6690 ±54 (method 1) 6605±56 (method 2)	5844–5712 Weighted mean: 6887±32 X-Test fails at 5% X2-Test: df=1 T=19.248 (5% 3.8)	*5920–5740 (poor agreement 41.7%)*	Borić, Price 2013
OxA-25207	Human left femur		7097±36	–19.9	9.9		3.2	21%	6984±39 (method 1) 6877±43 (method 2)			Bonsall et al. 2015
OxA-25208	Human left femur	Burial 9, primary, old adult female, crouched position, right side, over the floor of building 24	7120±34	–19.6	11.8	–	3.2	42%	6893±45 (method 1) 6900±41 (method 2)	5888–5676 (1) 5882–5716 (2)	*5900–5700*	Bonsall et al. 2015
OxA-5828	Human left femur	Burial 32, primary, adult female (?) in crouched position, right side	7270±90	–19.6	11.9	7	–	44%	7032±95 (method 1) 7050±93 (method 2)	6066–5727 (1) 6076–5731 (2)	*5960–5730*	Bonsall et al. 1997
OxA-5831	Human femur or left tibia (?)	Burial 88, primary, adult female (?) in flexed position, right side, stone construction	7130±90	–20.2	10.5	6.13	–	28%	6979±92 (method 1) 6910±93 (method 2)	6025–5676 (1) 5984–5646 (2)	*5950–5720*	Bonsall et al. 1997
OxA-5829	Human long bone (?)	Burial 35, adult female (?), disarticulated bones	6910±90	–19.7	11.2	4.34	–	35%	6721±93 (method 1) 6690±93 (method 2)	5787–5482 (1) 5748–5475 (2)	*5910–5570*	Bonsall et al. 1997
BA-10652	Human skull fragment	Burial 73, primary, adult male (?), right crouched	7265±30	–19.5	12.8	8.8	–	54%	6973±48 (method 1) 7045±38 (method 2)	5981–5742 (1) 6004–5846 (2)	*5930–5740*	Borić, Price 2013
AA-58320	Human skull fragment	Burial 17, primary, cranial fragment of possible young adult female, partly disturbed crouched inhumation	7007±48	–20.0	10.9	–	–	33%	6829±53 (method 1) 6787±53 (method 2)	5836–5632 (1) 5777–5616 (2)	*5890–5640*	Borić, Price 2013

Laboratory code	Sample material and reference	Sample association	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	$\delta^{34}S$ (‰)	C:N	% protein (fish?) signal	Radiocarbon measurement corrected for average freshwater fish offset (Cook *et al.* 2011) BP	Calibrated date (95% confidence) cal BC or cal AD	*Posterior density estimate for Model 1 (95% probability unless otherwise stated) cal BC*	Source
Post-Neolithic burials												
OxA-25093	Human right femur	Burial 2, primary, adult female (?), flexed	5337±32	–19.9	10.4	–	3.2	27%	5191±37 (method 1)	4220–3946 (1) 4313–4050 (no correction)	–	Bonsall et al. 2015
OxA-25217	Human left ulna	Burial 18, adult, disarticulated remains	1825±25	–18.6	10.6	–	3.2	29%	1668±32 (method 1)	AD 257–506 (1) AD 125–251 (no correction)	–	Bonsall et al. 2015
OxA-25212	Human left fibula	Burial "4", adult, mixed bones?	421±23	–18.5	9.5	–	3.2	17%	329±26 (method 1)	AD 1482–1643 (1) AD 1432–1610 (no correction)	–	Bonsall et al. 2015
OxA-25216	Human left femur	Burial 29, primary, adult male, extended supine	426±23	–18.6	9.6	–	3.2	18%	329±26 (method 1)	AD 1482–1643 (1) AD 1430–1607 (no correction)	–	Bonsall et al. 2015
OxA-25218	Human right humerus	Burial 30, primary, adult male, extended supine	427±23	–18.7	10.4	–	3.2	27%	281±30 (method 1)	AD 1497–1794 (1) AD 1430–1487 (no correction)	–	Bonsall et al. 2015
OxA-25219	Human right femur or right tibia	Burial 62, primary, adult male, extended supine	389±23	–18.8	9.3	–	3.2	15%	308±25 (method 1)	AD 1492–1648 (1) 1442–1621 (no correction)	–	Bonsall et al. 2015

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INSIGHT INTO THE REGIONAL DISTRIBUTION AND GEOGRAPHIC SETTING OF THE VINČA AND BUBANJ–SĂLCUŢA–KRIVODOL SETTLEMENTS IN THE CENTRAL BALKANS AND ITS IMPLICATIONS

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Abstract – The paper presents the results of research on the regional distribution and geographic setting of the 5th millennium BCE settlements in the Central Balkans. The research encompasses two successive archaeological cultures in the area between the Danube Valley and the upper course of the Južna Morava River and compares the regional distribution of the settlements and their topographic and pedological aspects. It has been concluded that the relocation occured on a regional level, meaning the abandonment or a reduced population of the regions which were densely populated during the Vinča culture. The emphasised dichotomy in the topographic type of the settlements with more or less equally distributed settlements compared to the altitude and an increased focus on soils unsuitable for cultivation suggest the utilisation of a wider range of local resources and a greater degree of mutual connections between the BSK settlements. The observed trends are interpreted in correlation with the previous knowledge on economic strategies of the population of the Central Balkans.

Key words – Vinča culture, Bubanj–Sălcuţa–Krivodol cultural complex, Central Balkans, regional settlement distribution, geographic setting, Late Neolithic/Early Eneolithic economy

Several papers have recently analysed and compared settlement patterns of the Vinča culture and Bubanj–Sălcuţa–Krivodol (henceforth BSK) cultural complex in the territories of the Morava Valley and eastern Serbia.[1] These studies have demonstrated that after the disintegration of the Late Neolithic (henceforth LN) settlement pattern in the Velika and Južna Morava Valley new locations were settled. Some of those sites were settled during the Early and Middle Neolithic but most of them were settled during the Early Eneolithic (henceforth EE) period for the first time. Furthermore, a large degree of continuity in the settling of sites after the new settlement pattern was established can be observed.[2]

The results presented in this paper were obtained as a consequence of the author's PhD thesis, which primarily sought to systematise a large amout of archaeological and geographical data on the 5th millennium BCE settlement sites in the Central Balkans.[3] Therefore, the aim of this paper is to investigate the regional settlement distribution and geographic setting in two successive periods in order to recognise the existing trends in the settlements systems and economies.

[1] Kapuran, Bulatović, Milanović 2018; Milanović, in press.
[2] Kapuran, Bulatović, Milanović 2018.
[3] Милановић 2017.

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Distribution, position and the economy of the Vinča culture settlements

The Vinča culture was widespread in the areas which gravitate towards the middle course of the Danube and the lower course of the Sava River and their tributaries, of which the valleys of Tisa, Drina and Morava are the most important. Such an area encompasses a number of present-day countries (Serbia, Montenegro, North Macedonia, Bulgaria, Romania and Hungary).[4] The periodisation of F. Holste, which was later supplemented by V. Milojčić,[5] and consists of the phases Vinča A–D, is the most common, as well as the periodisation proposed by M. Garašanin,[6] which divides the development of the Vinča culture into an earlier Vinča period and later Vinča period, meaning the phases Vinča–Tordoš I–II, the Gradac phase, and the phases Vinča Pločnik I–II.[7] The radiometric measurements from the sites in the regions of present-day Serbia indicate that the development of the Vinča culture incorporated a period between 5400/5300 and 4600/4500 BCE.[8]

It had previously been noted that a total of three types of Vinča culture settlements can be distinguished based on the geomorphological, hydrological and topographic characteristics of the terrain. The first type includes the settlements in the vicinity of large rivers, the second type includes settlements which were further away from the large rivers and the third type includes settlements which were established on steep, dominant and barely accessible hills or rocks, which could be easily defended.[9] The first two types are recorded on river terraces and gentle slopes, but also in the lowlands, erected on elevated terraces which were protected from flooding. The third type of settlements (the so-called hillfort/Gradina type), chronologically corresponds to the later phases of the Vinča culture (Vinča–Pločnik, i.e. Vinča C–D), and stands in correlation with a period of the spread of knowledge of metal, the disturbance of social relationships, greater perturbation and the outset of a shift in socio-economic relationships.[10]

The regional LN settlement patterns in the Central Balkans have not been thoroughly examined. The only exceptions are the studies conducted in central Serbia (region of northern Šumadija),[11] where the existence of nucleated LN settlements, the hierarchy of settlements and the differences in their functions have been registered,[12] and more recently, when the LN and EE settlement patterns in the Morava and eastern Serbia regions were analysed.[13] Based on the examples from the site in Opovo (region of Banat) for the Late Vinča (Vinča C–D) population,[14] for the Bronze Age population in the region of Šumadija,[15] and for the EE population in the central Balkans,[16] it had been assumed that the settling of the peripheral areas occured due to the process of the socio-economic transformation of the Neolithic societies, meaning the intensification of production and utilisation of resources.

In his study on Vinča culture, J. Chapman correlates the different population density of certain regions with the different potential of the settlement environment and distinguishes three topographic regions: lowland valleys, hill-country and uplands.[17] By erecting the settlements in high altitude areas and the exchange centres in the peripheries of the supply areas, direct control of resources was established.[18] Significant changes are noted at the transition from the early to the late phase of Vinča culture (phases III and IV according to Chapman), followed by the disappearance of large settlements (such as Selevac) and the dispersion of the population to what were peripheral areas up to that point, which subsequently facilitated the utilisation of the plough in the previous phase.[19] The settlements in those peripheral areas, away from main river watercourses, were characterised by a higher diversity

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[4] Глишић 1968; Garašanin 1979; Гарашанин 1984; Chapman 1981; Brukner 2003; Трипковић 2013.

[5] Milojčić 1949.

[6] Garašanin 1979.

[7] The periodisation of the Vinča culture is based on the stratigraphy of the eponymous site Belo Brdo in Vinča. For detailed overwiev refer to: Garašanin 1979, 149–153. For a more recent overwievs on the periodisation and chronology refer to: Chapman 1981; Schier 1995; 1996; Jovanović 1994; 2006; Borić 2009.

[8] Schier 1996; Borić 2009; Orton 2012; Tasić et al. 2015.

[9] Гарашанин 1973, 161.

[10] Гарашанин 1973, 72; see also: Трипковић 2013; Borić et al. 2018.

[11] Chapman 1990. A number of papers dealing with the individual aspects of the Vinča culture settlement patterns were published recently: Jerinić 1988; Ристић-Опачић 2005; Перић 2010; Arsić 2011; Милановић 2013; Милановић, Милојевић 2013; Obradović, Bajčev 2016; Kapuran, Bulatović, Milanović 2018.

[12] Chapman 1981; 1990.

[13] Милановић 2017.

[14] Tringham et al. 1985; 1992; Tringham 1992.

[15] Bankoff, Greenfield 1984.

[16] Милановић 2017.

[17] Chapman 1981, 50.

[18] Chapman 1981, 115.

[19] Chapman 1990, 40.

in the selection of both position and the surrounding resources. The introduction of the plough enabled the cultivation of larger parcels of land, an increase in population and the further expansion of the settlements towards the forested areas, as well as the cultivation of hard soil types such as *chernozem* and *vertisol*.[20]

R. Tringham considered the growth of population as a key factor in the disintegration of the Vinča culture, as the population reached the level of the carrying capacity of settlement's territory, which caused competition and inequality between households. Finally, such changes led to the abandonment of the LN settlements and the formation of smaller settlements in "marginal soils" during the late phase of the Vinča culture (Vinča D).[21]

The shortcoming of the models suggested by Chapman[22] and Tringham[23] relates to the chronology of the settling of large and long lasting sites such as Selevac, which, based on radiometric measurements, existed during the final phases of the Vinča culture as well,[24] and also relates to the duration of most of the other large settlements of the Vinča culture.[25] The latest research of the pedological capacities of the Neolithic settlements in the upper course of the Velika Morava River indicates that the affinity towards easily cultivated and fertile forest soils (*eutric cambisol*) existed during the Early/Middle and LN, and that no intensive utilisation of heavy types of soil (*vertisol*) has been recorded during the LN.[26]

Analysis of the economic potentials and utilised resources in certain micro-regions has given an insight into the economic strategies of the communities of the Vinča culture.[27] It is considered that during the LN the importance of the cultivation of cereals increased together with large cattle herding, while the recorded economic strategies indicate a mixed economy, which depended on the ecological potentials of the environment and the manner in which the people selected to organise production.[28]

Distribution, position and the economy of the BSK cultural complex settlements

The BSK cultural complex is a phenomenon spread over the western, mountainous regions of Bulgaria (from the Danube in the north to the area of Blagoevgrad in the south, and from the Bulgarian border with Serbia to the Isker and Vit valleys to the east) and in Romania (in Oltenia to the Olt River, smaller regions in western Muntenia and in north-eastern Banat). In eastern Serbia, the sites were registered from the Djerdap Gorge in the north to the state border to the south, with its western border lying approximately on the Južna Morava River. The sites on the left bank of the Zapadna Morava River (Poljna near Blagotin) and in the confluence area of the Zapadna, Južna and Velika Morava rivers (Panjevački Rit near Jagodina, Jazbine near Makrešani and Ciglarska Peć near Stalać) were also registered. It was noted that the influences of the BSK cultural complex spread to western Serbia as well (Družetić–Bodnjik near Koceljevo). Further, towards the south and west, settlements of this cultural complex were found in Kosovo, the Skopje Valley, Pelagonia, Aegean Greece and Albania. BSK bordered the settlements of the Kodžadermen–Gumelniţa–Karanovo VI (KGK VI) cultural complex in the east and the Tiszapolgár culture in the north.[29] The existing periodisations are based on the analysis of stylistic characteristics of pottery and the stratigraphic characteristics of the most important sites.[30] New radiometric measurements[31] fit well into previous insights on the absolute chronology of the BSK cultural complex.[32] According to the available radiometric measurements in western Bulgaria and Romania, L. Nikolova positioned the duration of the BSK cultural complex to a period between 4400 and 3800 BCE.[33]

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[20] Chapman 1990, 43.

[21] Tringham, Krstić 1990, 567–615; Tringham 1992. New absolute dates from the site near Opovo have indicated that the settlement had existed prior to the Vinča D period (Vinča C2–D1), meaning between 4860 and 4780 BCE, see: Orton 2012, 21, Fig 6. Such a dating does not disrupt the model that was suggested by R. Tringham, but it was pointed out that such a type of settlement (Opovo) could be interpreted in other ways, e.g. a settlement specialised in hunting, see: Borić 2015, 164.

[22] Chapman 1990.

[23] Tringham 1992.

[24] Cf. Orton 2012, Fig. 7.

[25] Cf. Borić 2009; Порчић 2010, 357; Orton 2012, 7.

[26] Obradović, Bajčev 2016, 73.

[27] Chapman 1981; Greenfield 1986; Bökönyi 1988; Tringham et al. 1985; 1992; Legge 1990; McLaren, Hubbard 1990; Russel 1993; 1998; Borojević 2006; Filipović, Tasić 2012; Filipović, Obradović 2013; Bulatović 2018; Filipović et al. 2019.

[28] Chapman 1981; Russel 1993; 1998; Borojević 2006; Orton 2008; 2010; 2012.

[29] Radu 2002; Nikolova 1999; Milanović 2012.

[30] Гарашанин 1973; Georgieva 1990; Nikolova 1999; Чохаджиев 2007.

[31] Bulatović, Vander Linden 2017; Bulatović, Vander Linden, Gori 2018.

[32] Boyadziev 1995; Nikolova 1999; Todorova 2003; Lazarovici 2006.

[33] Nikolova 1999; see also: Todorova 2003, 276–295.

B. Nikolov mentions more than 200 sites of the BSK cultural complex in the territories of the northwestern and the middle part of western Bulgaria,[34] while S. Čohadziev registered 53 sites in the Struma Valley.[35] Čohadziev notices the different disposition of sites in micro-regions compared to the previous period. The settlements on barely accessible and naturally fortified elevations are dominant, yet cave settlements, as well as settlements positioned on low river terraces, are recorded as well.[36] The settlements are equally spatialy distributed, smaller than in the previous period and no particular concentration of sites in any of the micro-regions was noticed.[37]

Based on the position of the BSK sites, N. Tasić noted several types of settlements. Aside from the naturally fortified settlements located on strategic positions (hillforts/Gradina type), lowland settlements, cave settlements and pile-dwelling settlements are registered as well.[38] The existence of different economic strategies of the communities which inhabited those settlements and the four basic economic components were pointed out (animal husbandry-nomadic, arable farming, mining-metallurgical and hunting-fishing). Also, some of the basic economic components were dominant in certain types of settlements,[39] which suggested the existence of settlements with a specialised economy.

Obvious trends in plant cultivation are not noticeable due to the small amount of data from the EE sites. New research at the site of Bubanj near Niš suggests that there was continuity in the spectrum of grown crops during the LN/EE transition and that the einkorn and emmer varients prevailed as the basic types of cereals, while the cultivation of other sorts of cereals and vegetables varied in the Central Balkans.[40] A significant shift in the representation of animal species compared to the settlements of the Vinča culture suggested the appearance of a new type of animal husbandry.[41] It was based primarily on the breeding of ovicaprines, but both cattle and pig were also very important in the EE, which suggests the existence of more versatile strategies of animal husbandry compared to the LN.[42]

Goals and methods

The basic goals of the paper are the analysis and comparison of the settlement distribution in certain regions of the Central Balkans, as well as the determination of the topographic and pedological characteristics of the settlement environments in two successive periods. Furthermore, a step forward has been made in terms of registering the existing trends and their interpretation in the scope of the current knowledge regarding the economic strategies of the population of the Central Balkans.

The research is based on a sample comprised of 144 sites, i.e. 142 settlements (Map 1–2 and Appendix). The mapping of the sites demonstrated that smaller or larger concentrations of sites are noticed in the following regions: 1. the lower course of the Velika Morava River and the course of Mlava River, 2. the upper course of the Velika Morava River and the lower course of the Zapadna Morava River, 3. the lower, 4. the middle, 5. and the upper course of the Južna Morava River and 6. eastern Serbia.

The regional distribution and geographic settings of the settlements were compared using the Geographic Informational System (GIS) (Global Mapper v15.1 and ArcMap 10.1). Territory within a 5 km radius from the site (the so-called catchment zone) has been observed, which is a common method in the spatial analysis of prehistoric settlements of farming communities.[43] The following parameters were examined: topography, site altitude and soil types in the vicinity of and in the wider area around the settlement.

In terms of a wider spatial plan, it was necessary to note the concentrations of the sites in certain micro-regions and regions. The distribution of approximately synchronous sites in six regions enabled an overall insight into the variability in population densities of different regions in both the periods. Nevertheless, those results should be taken under consideration with caution for at least two reasons. Primarily, those sites which could not be precisely located were not taken into consideration, which particularly refers to the LN sites in the middle course of the Velika Morava River (e.g. the vicinity of Svilajnac) and in the middle course of the Južna Morava River and its hinterland. The other

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[34] Николов 1975.

[35] Чохаджиев 2007, 60.

[36] Чохаджиев 2007, 60.

[37] Чохаджиев 2007, 60–61 and map 4.

[38] Tasić 1979; 1995.

[39] Tasić 1979; 1995.

[40] Filipović, in press.

[41] Bulatović 2018.

[42] Ostergaard 2005; Bulatović 2010; Булатовић 2012; Bulatović 2018.

[43] Cf. Higgs,Vita-Finzi 1972; Barker 1975; Dennell, Webley 1975; Clarke 1977; Renfrew, Bahn 2000.

reason relates to the small areas of the EE sites, which makes them barely detectable. Their precise location will be crucial in terms of a better understanding of the settlement patterns in the researched regions in the future.

Data on the sites' positions, respectively the latitude and longitude, were acquired using three basic methods. The first method involved those situations when sufficient data exists in literature, and therefore the positions of the sites were acquired from the existing topographic descriptions or the published plans of the sites.[44] The second method involved the collection of data by means of archaeological prospection, by going out into the field and locating the sites with a hand-held GPS device.[45] The third, less precise method, was applied in cases when the necessary data was lacking, and therefore the position of the site was reconstructed on the basis of the description of the location and the recognition of toponyms according to which the site is named on high-resolution topographical maps (1:25 000).[46]

Topographic features are focused on determining the altitude and form of relief of the sites.[47] The primary division relates to the flat settlements, settlements on slopes, settlements on plateaus of the elevations, settlements on plateaus of the dominant elevations (Gradina type) and settlements in caves. When determining a topographic type of a settlement, an attempt was made to differentiate sites on plateaus with lower elevations in relation to those on higher (dominant) elevations, the main criteria being the elevation of the site in relation to the surrounding terrain. A limit value of 20 m of elevation is taken, so that sites with values lower than 20 m were categorised into the first group, and those with higher values were categorised to the second.

Economic activities are closely related to the pedological features of the area. Hence, it is very important to determine the percentile representation of soil types around the settlement on a contemporary pedological map of Serbia.[48] Considering that the development of soil is a dynamic process and that the formation of pedological types depends on various factors, it is not completely clear how much the modern pedological cover matches the distribution of soil types in the past. However, most pedologists consider that *eutric cambisol* and *vertisol*, which are the most common soil types in the examined micro-regions of the Central Balkans, were formed by the end of the Pleistocene or the beginning of the Holocene (Boreal), while the alluvial types of soil were formed in large and small river valleys by cyclic sedimentation processes over a long period of time.[49]

It was assumed that alluvial types of soil were used for gardens (*fluvisol and humofluvisol*), along with forest types such as *eutric cambisol* and *luvisol* and *colluvial* types of soil in cases where they were registered in the immediate vicinity of the settlement (within a 1 km radius). If such soil types were documented in a wider area around the settlement (radius over 1 km) then they were marked as fields.

The favourable water-air regime and the high ecological value of the developed alluvial soils suited the cultivation of spring-grown crops.[50] The mentioned forest pedological types fall into the category of fertile and moderately fertile, easy to cultivate due to their mechanic composition and physical-chemical properties, and suited to the cultivation of winter-grown crops.[51] Deep, less skeletal *colluvium* is also convenient for cultivation.[52] In this sense, it was very important to determine the diversity and the prevalence of these types of soils in the immediate vicinity of the settlements.[53]

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[44] Bearing mark 1 in the tables with topographic characteristics of the settlements in the Appendix.

[45] Bearing mark 2. Such data from a number of sites in the lower course of the Južna Morava River originates from the projects of the Institute of Archaeology: *Archaeological prospection of the Aleksinac municipality* (2014–2016) and *Archaeological prospection of the lower course of the Južna Morava River* (2017–2018), refer to: Милановић, Милојевић 2013; 2016; Милојевић, Милановић 2016; Милојевић, Трајковић-Филиповић 2017. Likewise, certain locations in the middle and upper course of the Južna Morava River and the course of the Nišava River were prospected in the period between 2011 and 2016, refer to: Milanović, in press.

[46] Bearing mark 3.

[47] Topographic maps of the SFRY Military-Geographic Institute (ratio 1:25 000) were used.

[48] Information provided by the Institute of Soil Science in Belgrade, in the form of circular cut-outs from the pedological map of Serbia within a 5 km radius and the percentile representation of soil types.

[49] Antić, Jović, Avdalović 1980; Ćirić 1986.

[50] Antić, Jović, Avdalović 1980, 472–477; Ćirić 1986, 247–249; cf. Sherrat 1980.

[51] Antić, Jović, Avdalović 1980, 376–380, 416–423; Ćirić 1986, 211–214, 225–228; cf. Sherrat 1980.

[52] Ćirić 1986, 190–192.

[53] E.g., if the settlement had been located beside *fluvisol*, *eutric cambisol, luvisol* and *colluvium*, its residents would have had four different pedological types available for arable farming, which enabled a cultivation of different crops and increasing the chance of successful and better harvests.

Soil types and their distance from the settlement	Reconstruction of the representation of areas suitable for different economic activities
Fuvisol and humofluvisol within a 1 km radius	Gardens, forests and pastures
Eutric cambisol and luvisol within a 1 km radius	Gardens, forests and pastures in places
Fuvisol and humofluvisol within a 5 km radius	Fields, forests and pastures
Eutric cambisol and luvisol within a 5 km radius	Fields, forests and pastures in places
Vertisol and chernozem within a 5 km radius	Pastures, forests in places
Pseudogley, distric cambisol, calcocambisol, calcomelanosol and rendzina within a 5 km radius	Forests and pastures
Ranker, lithosol and regosol within a 5 km radius	Pastures and forests
Humogley and eugley within a 5 km radius	Swamps and forests
Arenosol and regosol on sand within a 5 km radius	Sands and pastures
Colluvium within a 1 km radius	Gardens, fields, forests and secondary depositions of stones
Colluvium within a 5 km radius	Fields, forests and secondary depositions of stones

Table 1. Reconstruction of the representation of areas suitable for gardens, fields, forests, pastures, swamps, sands and secondary stone deposits based on the representation of soil types and their proximity to settlements

Табела 1. Реконструкција заступљености површина погодних за баште, поља, шуме, пашњаке, мочваре, пешчаре и секундарна лежишта камена на основу заступљености земљишних типова и њихове близине насељима

Vertisol and *chernozem* were considered the optimal soil types for pastures,[54] followed by the undeveloped and less developed alluvium (*fluvisol and* especially *humofluvisol*),[55] *ranker*, *lithosol*, *regosol*[56] and *arenosol*[57] and to a lesser extent *pseudogley*, *distric cambisol*, *calcocambisol*, *calcomelanosol* and *rendzina*, which are particularly suitable for forest biocenosis.[58] It is important to register settlements that were, to a greater extent, oriented toward *vertisol* and *chernozem*, which were unfavourable for cultivation due to their physical-chemical properties during both the Neolithic and Eneolithic.[59] Such areas are mostly distinguished by low, grassy vegetation of an open type, that is, a biocenosis of meadows, which are particularly suitable for grazing.

The soil capacity analysis, as suggested, provided significant potentials for the reconstruction of economic activities and places of social focus in the surroundings of the settlements. Based on the vegetation that characterises certain pedological types, a reconstruction of the economic activities in the settlements was conducted (Tab. 1).[60] It was particularly important to determine which pedological types were represented within a 1 km radius of sites, which made it possible to identify settlements focused on a mixed economy, and those focused predominantly on arable farming or animal husbandry. Such analysis enabled the testing of the applicability of the intense farming model, in which the early farmers were skilled and maintained a high level of productivity. The farming was based on the formation of smaller parcels/gardens by intense cultivation, fertilisation and the creation of long-term farming conditions.[61] The model implies the integration of arable farming and animal husbandry, with the cattle grazing taking place in the vicinity of parcels intended for cultivation. That process enabled the fertilisation of gardens and a significant growth in yield, which was particularly important in terms of the cultivation of forest soils. Therefore, the basic parameters were the focus of settlement towards soil types in the immediate vicinity (within a 1 km radius) and the percentile

[54] Antić, Jović, Avdalović 1980, 337–349, 352–362; Ćirić 1986, 204–210.

[55] Antić, Jović, Avdalović 1980, 472–477; Ćirić 1986, 247–249.

[56] Antić, Jović, Avdalović 1980, 331–336; Ćirić 1986, 183–188, 197–200.

[57] Ćirić 1986, 188–190.

[58] Antić, Jović, Avdalović 1980, 320–331, 388–392, 396–408; Ćirić 1986, 194–197, 200–204, 215–221, 235–240.

[59] Contrary to that see: Chapman 1990, 43; Filipović et al. 2019, 1954–1955.

[60] For more detailed characteristics of pedological types refer to: Милановић 2017, 32–39, 70–73, with cited literature.

[61] Cf. Jones 2005; Bogaard 2004; 2005.

[62] The site is not taken into account in this paper.

representation of soil types around the settlement (within a 5 km radius), all of which enabled the classification of eight groups of settlements (Tab. 2).

Regional distribution of the LN and EE settlements

The most densely populated regions during the LN are those gravitating towards the course of the Velika Morava and Južna Morava rivers (Map 1; Tab. 3). A sparse settling of eastern Serbia is noted for this period, in contrast to the later period when the mentioned region is the most densely populated (Map 2; Tab. 3). On the other hand, the upper course of the Velika Morava River was sparsely settled during the EE according to existing data, and no sites were yet registered in the lower course of the Velika Morava River. The Paraćin and Ćuprija micro-regions in the upper course of the Velika Morava River were densely settled during the LN (39–43), and not a single site is registered in the Jagodina micro-region, while during the EE, only one site is located in the last mentioned area (Jagodina) (1), and no sites were registered in the first-mentioned areas (Paraćin and Ćuprija). In Šumadija, which was densely settled during the LN, only one EE location near Blagotin (2) is registered so far, and on the right bank of the lower course of the Južna Morava River, where dense settling was registered during the LN (44–51), no EE settlements are registered. Only at the site of Jazbine near Aleksinac, on the left bank of the lower course of the Južna Morava River, is there a possibility of the existence of an EE settlement, based on scarce surface finds.[62] Therefore, continuity in the settling is noted in the Južna Morava Valley, especially in the upper and middle course, in the Nišava Valley, in eastern Serbia and in the confluence zone of the Južna and Zapadna Morava rivers.

Groups	
1	Oriented towards fertile forest types of soil
2	Oriented towards fertile forest types of soil and alluvium to a lesser extent
3	Oriented towards fertile forest types of soil and alluvium to a greater extent
4	Oriented towards alluvium, fertile forest soils and soils unsuitable for cultivation
5	Oriented towards alluvium
6	Oriented towards fertile forest soils and soils unsuitable for cultivation
7	Oriented towards alluvium and soils unsuitable for cultivation
8	Oriented towards soil types unsuitable for cultivation

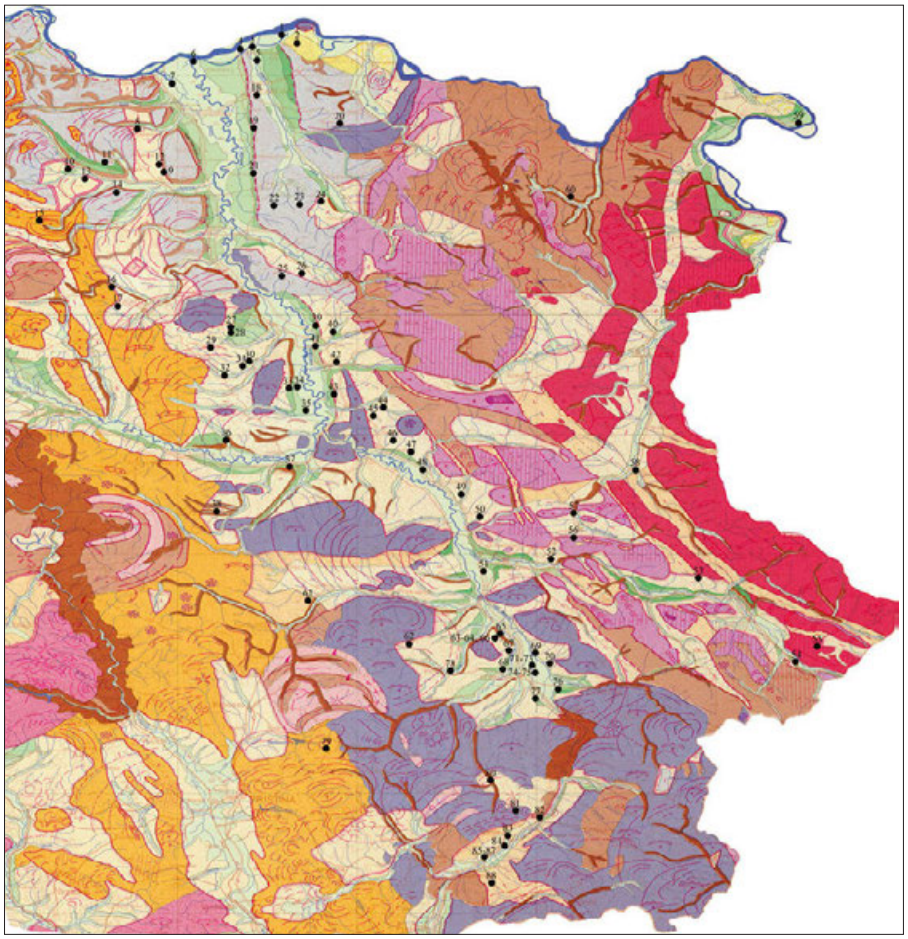
Table 2. The groups of settlements distinguished according to pedological analysis

Табела 2. Групе насеља издвојене према педолошкој анализи

№	Region	Total no. of LN sites	Sites	Total no. of EE sites	Sites
1	The lower course of the Velika Morava River and the course of Mlava River	24	1–24	0	
2	The upper course of the Velika Morava River and the lower course of the Zapadna Morava River	22	25–45	4	1–4
3	The lower course of the Južna Morava River and the course of Nišava River	10	46–55	7	5–12
4	Eastern Serbia	4	56–60	32	13–43
5	The middle course of the Južna Morava River	19	61–79	6	44–49
6	The upper course of the Južna Morava River	9	80–88	5	50–54
	Total	88		54	

Table 3. The number of LN and EE sites in the researched regions

Табела 3. Број касноенеолитских и раноенеолитских насеља у истраживаним регијама



Map 1. Regional distribution of LN sites, extracted from the geomorphological map, Зеремски 1990, slightly modified

Карта 1. Регионална дистрибуција каснонеолитских локалитета, исечак са геоморфолошке карте: Зеремски 1990, незнатно модификовано

The LN settlement distribution in altitudinal zones

The settling of various landscapes during the LN ranges between altitudes of 50 and 946 m (Fig. 1). Based on the altitude, the group of sites between 201 and 300 m is the most numerous (40%), with a significant number of locations falling within the span between 50 and 100 m (9%), 101 and 200 m (25%), and 301 and 400 m (14%) (88% in total). In general, settlements are most often recorded in the area with altitudes between 101 and 400 m (61 settlements or 79%). The lowest altitudes (50–80 m) are characteristic of the locations positioned within the alluvial landscape of the Danube River (1, 3–6 and 59), while the highest locations (880 and 946 m) are situated in the mountainous hinterland of the fifth and sixth regions (79 and 81). The upland sites already existed during the early

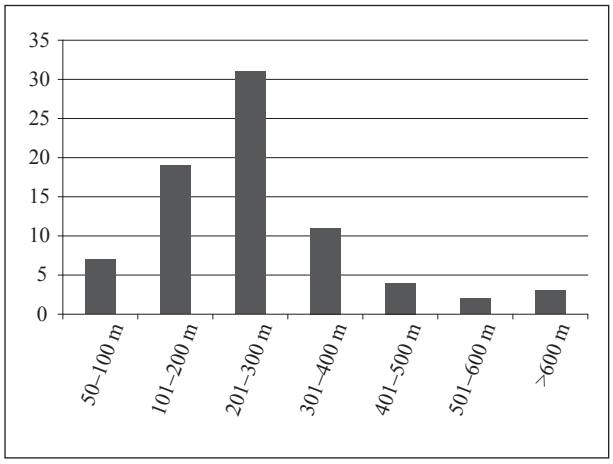


Fig. 1. The altitudes and number of LN settlements

Сл. 1. Надморске висине и број каснонеолитских насеља

Map 2. Regional distribution of EE sites, extracted from the geomorphological map, Зеремски 1990, slightly modified

Карта 2. Регионална дистрибуција раноенеолитских локалитета, исечак са геоморфолошке карте: Зеремски 1990, незнатно модификовано

Vinča and became more developed during the late Vinča, although the exact chronology has not been definitively determined in most cases, since either no archaeological research or only small-scale research has been conducted.

The EE settlement distribution in altitudinal zones

The settling of various landscapes during the EE ranges between altitudes of 45 and 690 m (Fig. 2). Similar to the LN, the most numerous group of settlement sites falls between the altitudes of 201 and 300 m (24.5%), with a significant number of locations falling within the span between 40 and 100 m (20.5%), 101 and 200 m (18.4%), 301 and 400 m (18.4%), and 401 and 500 m (14.3%). In general, the EE sites are rather equally distributed in the landscape with altitudes between

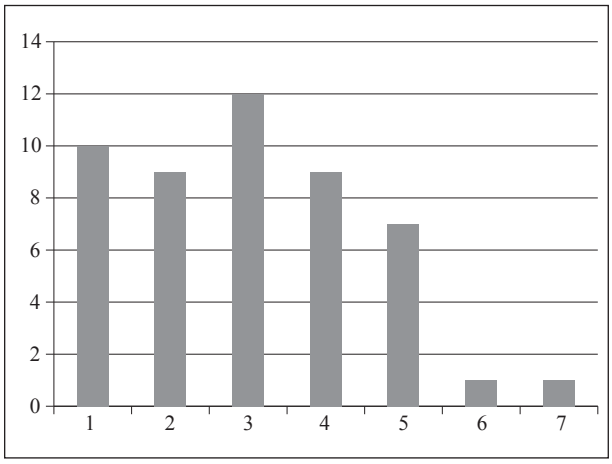


Fig. 2. The altitudes and number of EE settlements

Сл. 2. Надморске висине и број раноенеолитских насеља

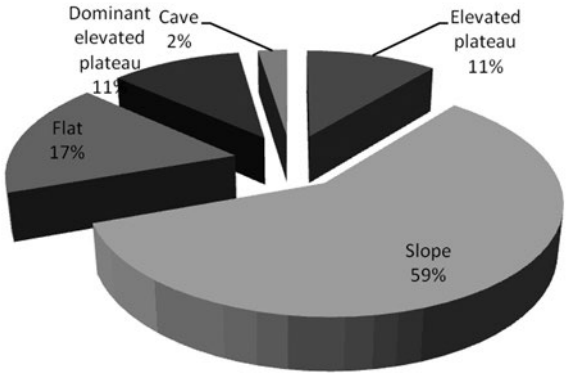


Fig. 3. Topography of LN settlements

Сл. 3. Топографија касноенеолитских насеља

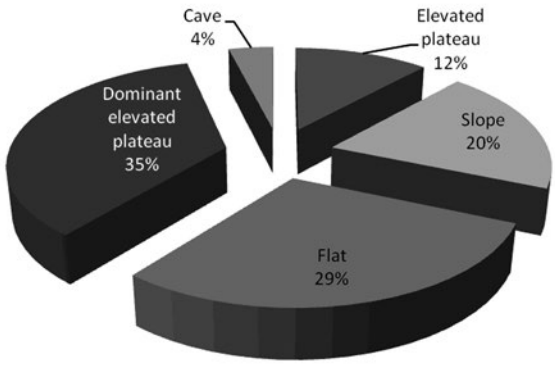


Fig. 4. Topography of EE settlements

Сл. 4. Топографија раноенеолитских насеља

40 and 500 m (47 settlements or 96% in total), compared to the LN sites. The lowest altitudes (40–70 m) are characteristic of the locations positioned within the alluvial landscape of the Danube River (28, 33–35, 37–40 and 43), and the highest altitude (690 m) is characteristic of a location in the mountainous hinterland of the sixth region (51).

Topography of the LN settlements[63]

The settlements positioned on the plateaus of the elevations are registered in the lowland alluvial landscapes of the first and second regions (11%) (Fig. 3). Those settlements were mostly located in marshy wetlands, and some are characterised by a significant number of Vinča settlement horizons (Selište near Kostolac, Orašje near Dubravica and Stublina near Supska) (4, 6 and 39). The positions on gentle slopes are dominant, as those were favoured locations for the establishment of settlements (59%), and remain unregistered solely in the confluence area of the Velika Morava and Mlava rivers and Danube River. The flat settlements (17%) remain unregistered solely in the third and sixth region, although many locations on gentle slopes in those regions are similar to the mentioned type of settlements. Such settlements are particularly numerous in lowland alluvial landscapes of the first, second and fifth regions. The settling of dominant elevations (11%) is unregistered in the third and fourth regions, and limited to certain micro-regions in the remaining regions. The most prominent characteristic of those settlements is the visual control of the surroundings (i.e. a viewshed). They are registered in the early Vinča, and became even more numerous during the late Vinča, although the exact chronology has not been definitively determined in most cases. The settling of caves is unconfirmed, but certain activities in Prekonoška pećina (56) and the plateau in front of a cave near Petrlaš (55) have been registered based on sparse surface pottery finds.

Topography of the EE settlements

Settlements positioned on the plateaus of dominant elevations (35%) and flat settlements (29%) were predominant during the EE, with a distinct minority of settlements in caves (4%) (near Zlot and Mokranje) (24 and 32) (Fig. 4). Settlements positioned on dominant plateaus of elevations are significantly more numerous and are registered in all of the regions. The flat settlements are far more represented during the EE, and quite often in the Danube region of eastern Serbia. Locations on slopes are rarely settled (20%), although, similar to the previous period, those are registered in all of the regions, while settlements positioned on the plateaus of elevations (12%) are almost equally represented as during the LN and registered in the second, third and fourth regions.

Pedology of the LN settlements

Forty-eight different combinations of soil types in the immediate vicinity (within a 1 km radius) of settlements were recorded in the LN (sample comprised of 87 settlements). As much as 97% of the settlements targeted at least one of the soil types suitable for culti-

[63] The Appendix presents topographic characteristics, altitudes and the method in which the sites were registered.

Group	Total no. of settl.	Activities	Settlements	Regions
1	10	Predominantly arable farming, animal husbandry to a lesser extent	9, 11, 14, 20, 22–23, 25–26, 28 and 33	1 and 2
2	4	Predominantly arable farming, animal husbandry to a lesser extent	8, 10 and 12–13	1
3	8	Predominantly arable farming, animal husbandry to a greater extent	19, 34–35, 37, 39, 41, 65 and 68	1, 2 and 5
4	18	Arable farming and animal husbandry	7, 16, 21, 40, 49, 52, 54, 59, 61–64, 66–67, 69–70 and 76–77	1, 2, 3, 4 and 5
5	8	Arable farming and animal husbandry	6, 51, 71–75 and 78	1, 3 and 5
6	11	Animal husbandry, arable farming to a greater or lesser extent	2, 15, 17, 24, 27, 45–46, 50, 55, 79 and 81	1, 2, 3, 5 and 6
7	25	Predominantly animal husbandry, arable farming to a greater or lesser extent	1, 3–5, 18, 30-32, 36, 38, 42–44, 47–48, 57–58, 80, 82–88	1, 2, 3, 4 and 6
8	3	Predominantly animal husbandry and/or other activities	29, 53 and 56	2, 3 and 4

Table 4. The LN groups of settlements, their total number, the reconstruction of activities based on the pedological analysis, the settlements and regions in which they were registered

Табела 4. Групе локалитета у касном неолиту, њихов укупан број, реконструисане активности на основу педолошке анализе, насеља и регије у којима су констатовани

vation (Tab. 6). An orientation towards alluvial soil types is recorded at 72% of sites, and to fertile forest soil types at 59%. The majority of the sites in the immediate vicinity are characterised by the representation of soil types suitable for animal husbandry (55%).

Differences and similarities in the reconstructed economic activities based on the pedological analysis have enabled the classification of eight groups of settlements (groups 1–8) according to their soil potentials (Tab. 4).

The first group of settlements is oriented towards fertile and moderately fertile forest soils, which are easy to cultivate (over 43% of fertile forest soil types within a 5 km radius), and some of them are distinguished by the proximity of the *colluvial* soil, which could also be cultivated. The inhabitants of these settlements were primarily oriented towards arable farming and forest-related activities, and would have engaged in pig breeding in forests and small herds of cattle, sheep, and goats on surrounding glades.

The second group of settlements was oriented towards smaller areas of *alluvium* and highly represented forest soil types suitable for cultivation (*alluvium* between 3 and 20% and fertile forest soils over 60%). Considering the presence of two or three pedological types suitable for cultivation, the environment of these settlements was especially suitable for arable farming and, to a lesser extent, for animal husbandry.

The settlements which were, to a considerable extent, oriented towards *alluvial* and forest soils suitable for cultivation (altogether over 65%) are classified into the third group. Most of these settlements are characterised by a significant availability of different soil types suitable for arable farming, which could be manifested by the cultivation of various crops and different cultivation regimes. Due to the significant presence of alluvial vegetation in the vicinity of these settlements, conditions were also suitable for livestock breeding.

The fourth group consists of settlements whose environment provided almost equal conditions for arable farming and animal husbandry. The group consists of settlements oriented towards *alluvium*, fertile forests soil types (over 29% of *alluvium* and fertile forests soil types) with a lower (1–20%) or higher representation of soils unsuitable for cultivation (20–68%). Therefore, this group is characterised by potentials for the most diversified strategies in agriculture.

The fifth group consists of settlements which were situated on *alluvial* soil types. Therefore, they had favourable conditions for a mixed economy.

The settlements which were, to a greater or lesser extent, oriented towards fertile forest soils (over 15%)

Group	Total no. of settl.	Activities	Settlements	Regions
2	2	Predominantly arable farming, animal husbandry to a lesser extent	36 and 42	4
3	3	Predominantly arable farming, animal husbandry to a greater extent	3-4 and 38	2 and 4
4	12	Arable farming and animal husbandry	13-14, 27, 39-41, 44, 47-50 and 53	4, 5 and 6
5	3	Arable farming and animal husbandry	5, 37 and 45	3, 4 and 5
6	2	Animal husbandry, arable farming to a greater or lesser extent	7 and 35	3 and 4
7	19	Predominantly animal husbandry, arable farming to a greater or lesser extent	8, 10-12, 15-17, 19-21, 24, 28, 30-33, 46, 52 and 54	3, 4, 5 and 6
8	12	Predominantly animal husbandry and/or other activities	1-2, 9, 18, 22-23, 25-26, 29, 34, 43 and 51	2, 3, 4 and 6

Table 5. The EE groups of settlements, their total number, the reconstruction of activities based on the pedological analysis, the settlements and regions in which they were registered

Табела 5. Групе локалитета у раном енеолиту, њихов укупан број, реконструисане активности на основу педолошке анализе, насеља и регије у којима су констатовани

and soils unsuitable for cultivation (mostly towards *vertisol* and, to a lesser extent, towards *rankers*, *rendzinas, calcomelanosol* or *arenosol*) are classified into the sixth group. Hence, they were particularly suitable for animal husbandry and arable farming, to a greater or lesser extent.

The seventh, and most numerous, group consists of settlements that had particularly favourable conditions for animal herding but also for arable farming. The settlements were directed towards smaller (7–20%) or larger areas of *alluvium* (20–48%) and soil types unsuitable for cultivation (mostly *vertisol* and *chernozem*, *rankers*, *rendzinas*, *humogley*, *eugley* and/or *calcomelanosol*, to a lesser extent) (over 13%, and mostly over 40%).

The eighth group includes the site near the village of Cikot (29), whose chronology has not been precisely defined (LN or EE), the site between the villages of Osmakovo and Vranište (53), in the hinterland of the Nišava River, and the site in Prekonoška pećina (56), which was probably not a permanent settlement. These sites were directed towards meadow and forest biocenoses and did not have favourable conditions for arable farming.

Pedology of the EE settlements

Forty-one different combinations of soil types in the immediate vicinity of the settlements were recorded in the EE (sample comprised of 53 settlements). The orientation towards soil types suitable for cultivation was lower than in the case of the LN settlements and amounted to 77% (Tab. 6). The orientation towards the alluvial soil types was recorded at 74% of sites, and to fertile forest soil types at 36%. A significant number of settlements in the immediate vicinity are characterised by the representation of soil types suitable for animal herding (53%).

According to soil potentials, a total of seven groups (groups 2–8) of settlements can be distinguished (Tab. 5).

Settlements which could be classified into the first group, oriented only to fertile and moderately fertile forest soil types (*eutric cambisol* and *luvisol*), have not been recorded. Only two settlements (7 and 35) oriented towards such soil types are noticed, but those are classified into the sixth group, due to the high representation of meadow biocenoses in the immediate vicinity (over 53% within a 5 km radius).

The second group of settlements is directed towards smaller areas of *alluvium* and forest soil types suitable for cultivation (*alluvium* between 3 and 9%, fertile forest soils over 26%). Therefore, the environment of these settlements was particularly suitable for arable farming and, to a lesser extent, animal husbandry.

The settlements which were, to a considerable extent, oriented towards alluvial and forest soils suitable for cultivation (altogether over 57%) are classified into the third group. Due to the significant presence of

meadow vegetation in the vicinity of these settlements, there were also suitable conditions for animal herding.

The fourth group consists of settlements whose environment provided almost equal conditions for arable farming and animal husbandry. The group consists of settlements oriented towards *alluvium*, fertile forests soil types with a lower or higher representation of soils unsuitable for cultivation (over 16% of *alluvium* and fertile forests soil types, mostly over 30%, and over 11% of soils unsuitable for cultivation, mostly over 20%).

The fifth group consists of settlements which were situated on *alluvial* soil types, which had favourable conditions for a mixed economy.

The settlements which were oriented towards fertile forest soils (over 16%) and soils unsuitable for cultivation (*vertisol* and *calcomelanosol*, i.e. *vertisol* and *arenosol*) are classified into the sixth group. Therefore, those were particularly suitable for animal husbandry and arable farming, to a greater or lesser extent.

The seventh, and most numerous, group consists of settlements that had particularly favourable conditions for animal herding but also for arable farming. The settlements were directed towards smaller (3–10%) or larger areas of *alluvium* (10–30%) and soil types unsuitable for cultivation (mostly *vertisol* and *rankers*, *rendzinas*, *calcomelanosol*, *humogley*, *eugley, arenosol, distric cambisol, calcocambisol* and/or *pseudogley* to a lesser extent) (over 17%, and mostly over 50%).

The settlements which were oriented towards soils particularly suitable for animal herding and other activities are classified into the eighth group. Five settlements (out of twelve) (2, 18, 22, 29 and 34) were directed only towards vertisol (within a 1 km radius), and two settlements towards *vertisol* and *calcomelanosol*, i.e. *vertisol* and *rankers* (23 and 51). Their environment was particularly suitable for animal husbandry. Only one settlement (1) was oriented solely towards swamp vegetation (*humogely* and *eugley*). The sites near Bor in eastern Serbia had very good conditions for stockbreeding and forest-related activities, but smaller areas of fertile forest soils (1.7%) at slightly greater distances (1.3 and 1.6 km) could be cultivated. In addition, two sites (9 and 43) were directed towards forests and meadows, and smaller areas of colluvial soil types on one of them (9) could be cultivated, although such a possibility is unlikely.

Discussion

Analysis of the regional distribution of settlements during the two successive periods demonstrates that the entire settling strategy during the second half of the 5th millennium BCE was focused on the copper-rich region of eastern Serbia. The same region was quite sparsely settled during the LN, which is similar to the trends recorded in the southern parts of the Balkan Peninsula.[64] It has been noted that the locations which were inhabited during the LN were evidently avoided and that new locations were selected for settling, even in those regions where a continuity of settling is registered. In all of the researched regions, only the site of Gradac near Zlokućani yielded data on settling in both periods, whereby the EE settlement was established on a previously uninhabited part of the site.

It can be concluded that BSK settlements are fewer (53 compared to 87 Vinča settlements), more dispersed and archaeologically less detectable, so the decline in the population seems very possible, as already indicated.[65] Single-layered sites and the relocation of settlements within the micro-region are dominant, which suggests that the concept of long-term inhabitancy of the same location had lost its significance.[66] The reasons behind that probably originate from a different economic focus of the EE settlements, although the quite realistic possibility that the LN locations were intentionally avoided due to certain norms and/or beliefs should also be taken into consideration.

Lowland valleys, hill-country and uplands were settled during both periods. The largest number of LN sites was established at altitudes between 50 and 400 m, with the dominant group of locations established at altitudes between 201 and 300 m. The settling of the mountainous hinterland of the fifth and sixth regions probably started during the early Vinča, yet it is more definitively confirmed during the late Vinča. During the EE, the largest number of sites was established at altitudes between 40 and 500 m, yet with relatively equally distributed sites in comparison to the altitudes (Fig. 5). The low altitude locations in the alluvial landscape along

[64] Cf. Demoule, Perlès 1993, 407.

[65] Borić 2015; Милановић 2017.

[66] Милановић 2017, 307. A similar conclusions regarding the LN settlements histories in the central Balkans have been highlighted by B. Tripković (2013, 246–247), and a similar processes have been observed in Greece (Demoule, Perlès 1993) and in the Carpathian Basin (Parkinson, Yerkes, Gyucha 2004; Link 2006; Parkinson et al. 2010).

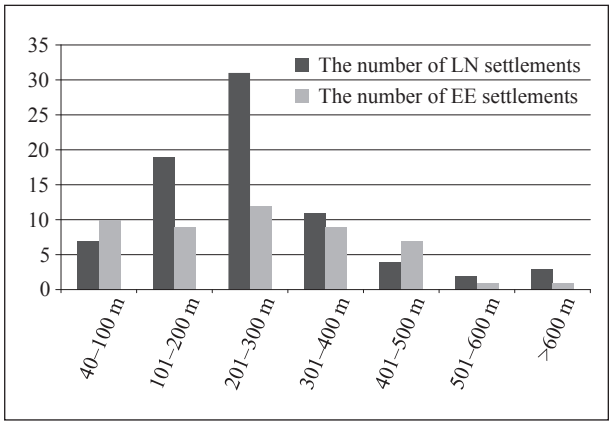


Fig. 5. Comparison of the altitude of LN and EE settlements

Сл. 5. Поређење надморских висина насеља у касном неолиту и раном енеолиту

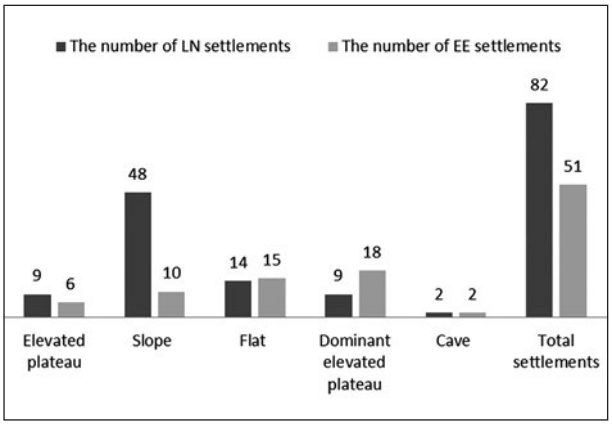


Fig. 6. Comparison of the topographic characteristics of LN and EE settlements

Сл. 6. Поређење топографских одлика насеља у касном неолиту и раном енеолиту

the Danube River were inhabited during both periods, and there was a noticeable increase in the number of such sites in the EE. Bearing in mind that the sites of the BSK cultural complex in Bulgaria are registered at altitudes of up to 1,270 m,[67] it is expected that settlements in high mountainous landscapes are to be found in the territory of Serbia as well.

The choice of settlement position during the EE was somewhat more equalised compared to the LN, and the increased representations of flat settlements and settlements positioned on dominant elevations are quite particular (Fig. 6). Different affinities towards the selection of settling locations during the EE are registered: flat positions, elevated plateaus or slopes in the lowlands or in the contact zone of lowlands and hill-country, on the dominant and naturally protected plateaus of elevations (hill-forts i.e. Gradina type) or in hidden caves in the hill-country or in the contact zone of hill-country and uplands. The necessity for safe locations, the tendency towards visual domination over the landscape and the control of communications (including the confluences and gorges) and local resources are reflected in the settlement pattern in which the dominant elevated plateaus, which were naturally and/or artificially protected, prevail.

It can be concluded that the LN settlements were mostly established in the immediate vicinity of main watercourses, meaning the vicinity of alluvial types of soils. During that period, settlements were also established in the micro-regions distant from the main watercourses and were focused towards fertile forest types of soil suitable for cultivation. Those two types also encompass the settlements established on dominant elevations (Gradina type), which, according to the division by M. Garašanin, represent a distinct, third type of LN settlements.[68] Furthermore, this research has shown that only certain EE hill-fort settlements were established in the *hinterlands* and focused solely towards types of soil suitable for pastures.

Based on soil potentials, a total of eight groups of settlements were distinguished.

The first group of settlements, oriented only towards fertile forest soils suitable for cultivation, is represented by 11% in the LN, while similar settlements were not noted in the EE (Tab. 4–5). Also, the second and third groups, into which settlements predominantly oriented towards soils suitable for cultivation are classified, are more frequent in the LN (14% versus 9%). The fourth and fifth groups, characterised by equally good conditions for both activities, are fairly uniform in both periods (30% versus 28%). The sixth group, directed towards animal husbandry and cultivation of fertile forest soil types, is significantly more represented in the LN (13% versus 4%). The seventh group, which is mainly

[67] Чохаджиев 2007, 38.

[68] Cf. Гарашанин 1973, 72. Only one hill-fort settlement, away from watercourses and focused towards those types of soils which were not suitable for cultivation, has been recorded (Čuka near Cikote in the second region), although it remains unclear whether the location should be ascribed to the LN or EE.

oriented towards animal herding and cultivation of alluvial soil types, is more frequent in the EE (29% versus 36%). It is particularly important that the eighth group of settlements, which did not have favourable conditions for cultivation, is far more represented in the EE (3% versus 23%).

Furthermore, the LN settlements of a predominantly agricultural character (groups 1–3) were concentrated in the hinterland of the lower and upper course of the Velika Morava River, along the right bank of the upper course of the Velika Morava River and in the middle course of the Južna Morava River. The settlements in which livestock farming played a more important role (groups 6–8) are represented in all the regions, and such settlements were particularly numerous in the zone of the confluence of the Mlava and Danube rivers, in the hinterland of the lower and upper course of the Velika Morava, on the right bank of the upper course of the Velika Morava and the lower course of the Južna Morava, in the hinterland of the Nišava River and in the upper course of the Južna Morava. The EE settlements of predominantly agricultural character (groups 2 and 3) are represented in eastern Serbia (the Danube region) and in the zone of the confluence of the Zapadna and Južna Morava rivers. The settlements in which animal herding played a more important role (groups 6–8) are represented in all the regions, and those were particularly numerous in eastern Serbia, in the Nišava Valley and in the upper course of the Južna Morava River.

Soil capacity analysis has showed that a significant level of continuity was represented during the EE, although certain novelties are noticed. The continuity relates to the settlements' focus towards those types of soils which allowed a mixed economy. A greater diversity of soil types surrounding the EE settlements has been noted, i.e. slightly smaller number of soil type combinations in a significantly smaller sample (Tab. 6). The main difference between these two periods is that almost all of the LN settlements were directed towards at least one of the soil types suitable for arable farming, although in the EE the number of such settlements is significant as well. A lack of the first group, as well as a reduced representation of the second and third groups and a significant increase in the number of the eighth group of settlements has been noted (Tab. 4–5). All of the aforementioned strongly suggests the reduced importance of arable farming and the increased role of animal herding. Furthermore, a lack of settlements orientated towards solely fertile forest soils (the first group), a shortage of settlements directed towards fertile forest and other soil types (the second, third and sixth groups), as well as a significant representation of settlements directed towards alluvium and fertile forest soil types (the fourth group), indicates certain shifts in terms of arable farming strategies. These changes relate primarily to the continuation of previously established strategies in the cultivation of moist fertile alluvial soil types and, in particular, a combination of alluvial and forest cultivation, while avoiding relying only on the cultivation of forests soil types. This suggests a tendency to reduce the risk of an unsuccessful harvest by relying on the cultivation of two or three different soil types. This

Data on LN and EE settlements and soils around the settlements/Period	LN	EE
Total sites	87	53
The numb. of combinations of soil types within a 1 km radius of the settlements	48	41
The percentile representation of the settlements oriented towards soils suitable for cultivation	97%	77%
The percentile representation of the settlements oriented towards alluvium	72%	74%
The percentile representation of the settlements oriented towards fertile forest types	59%	36%
The percentile representation of the settlements oriented towards soils suitable for pastures (vertisol, chernozem and ranker)	55%	53%

Table 6. Comparison of data on LN and EE settlements and soils within a 1 km radius of the territory

Табела 6. Поређење података о насељима из касног неолита и раног енеолита и земљиштима унутар територије полупречника 1 км

conclusion does not support the model according to which dry farming (i.e. rainfall dependent) was created a significant amount of time after the development of horticulture on alluvial soils in temperate Europe,[69] because certain long-lasting Vinča settlements (for example 9, 15 and 24) were directed only towards fertile forest soils.[70]

It is indicative that numerous long lasting Vinča settlements, as well as BSK settlements, were directed towards alluvial soils and heavy soil types suitable for pastures (group 7) (Tab. 4–5, Tab. 6), which points to the great importance of animal husbandry in agriculture.[71] Furthermore, EE settlements distant from fluvial deposits and fertile forest soils (group 8) indicate the settling of the peripheral areas and communities that were oriented towards animal husbandry, hunting and the procurement of raw materials for stone tools, copper minerals etc., which could subsequently be exchanged for farming products.[72]

It has been proved that the intense farming model was suitable for both periods, according to the analysis of soil potentials, as suggested. It can be concluded that settlements focused on animal husbandry existed during the LN and EE, but such a practice is less noticeable during the LN. It follows that arable farming and animal husbandry in the LN villages were more integrated in the everyday life of the community, which was a common practice in the researched regions.

Finally, groups of LN settlements in the neighbouring micro-regions and regions, which can be considered complementary in terms of soil capacity, are noted (compare 39 and 41 with 42 and 43, as well as 8–14 with 1–5, 15, 17–18, or 28 with 29–32). The same pattern is even more evident in the EE (compare 3–4 with 1–2) and especially indicative when the utilisation of resources of different ecological zones is considered, i.e. the geographic setting of the settlements within one micro-region and between neighbouring micro-regions. For instance, the site of Bubanj in the village of Novo Selo near Niš (5) is situated on an elevated plateau in a wide alluvial plain (altitude of 198 m, elevation of 15 m). The neighbouring site of Velika Humska Čuka (7) (the distance between the two sites is 8.7 km and the sites are characterised by a mutual visual communication) is positioned far from the alluvial formations, situated near a smaller area of a fertile forest, pedological cover suitable for cultivation, significant areas with meadow and forest vegetation and deposits of quality flint (Kremenac flint mine) and copper.[73] The site is located deep in the *hinterlands*, on a plateau of a dominant hill (altitude of 455 m, elevation over 100 m). A similar pattern was noted in the region of eastern Serbia, where two groups of settlements in neighbouring micro-regions, which can be considered as economically complementary and cooperative, were observed. The first group of settlements, whose environment was particularly suitable for arable farming, was formed in a wide plain of the Danube River (38–42), at altitudes between 40 and 50 m, within significant areas of alluvial and fertile forest soil types. The settlements of the second group were recorded north and south of Negotin (28–35), featuring very good conditions for livestock herding (sites 29 and 34 are especially striking since those are oriented solely to the vertisol soil type). These settlements were formed in different ecological zones, in the plains of the Timok (28) and the Danube rivers (33–35), at altitudes between 50 and 70 m, and in the hilly region south of Negotin (29–32), on dominant elevated plateaus at, altitudes between 90 and 220 m.

Conclusion

This research indicates the regional and micro-regional relocation of settlements, i.e. the colonisation of more marginal environments and a drop in population levels from the mid-5th millennium BCE onwards in the Central Balkans. The EE settlements were more equally distributed in terms of the altitude and topography, characterised by an emphasised dichotomy in terms of topography (flat/hill-fort sites) and an orientation towards a wider range of local resources, i.e. a diversity of soil types is recorded, which suggests a greater interconnection between the EE settlements. New strategies were introduced in arable farming, which was reflected in the tendency to settle contact zones of alluvial and hilly landscapes that were characterised by fertile farming land (alluvium and fertile forest types). The agriculturally marginal highlands became extensively settled and more pastoral in nature.[74] The increase in the number of settlements focused on soils unsuitable for cultivation confirms the earlier assumptions regarding the increased significance of animal

[69] Cf. Sherrat 1980, 314–319, Fig 2.
[70] Cf. Obradović, Bajčev 2016.
[71] Милановић 2018.
[72] Cf. Sherratt 1997.
[73] Милановић 2017; Milanović, in press.
[74] Cf. Sherrat 1981; Greenfield 2010.

husbandry and the existence of economically specialised and cooperative settlements during the EE.[75] In that period, all of the topographic types of settlements within the group of settlements primarily focused on soils unsuitable for cultivation have been recorded. Therefore, this research has indicated that the settlements of the BSK cultural complex (and not the late Vinča settlements) in the peripheral areas, distant from main watercourses, are characterised by a more versatile selection of the location of settlements and the surrounding resources.[76] Accordingly, the settling of the peripheral areas during the EE occured due to the process of socio-economic transformation of the Neolithic societies, meaning the intensification of production and utilisation of resources and innovations in metallurgy, arable farming and animal husbandry. Furthermore, a high level of control over communications and local resources, integration, specialisation, complementary and cooperative functions in the economies of neighbouring settlements in certain micro-regions, as well as a groups of settlements in neighbouring micro-regions have been recorded.

Translated by Ognjen Mladenović

[75] Cf. Tasić 1979; 1995.

[76] Contrary to Chapman 1990 and Tringham 1992.

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Резиме: ДРАГАН Р. МИЛАНОВИЋ, Археолошки институт, Београд

УВИД У РЕГИОНАЛНУ ДИСТРИБУЦИЈУ И ГЕОГРАФСКИ ПОЛОЖАЈ ВИНЧАНСКИХ И БУБАЊ–САЛКУЦА–КРИВОДОЛ НАСЕЉА НА ЦЕНТРАЛНОМ БАЛКАНУ И ЊЕГОВЕ ИМПЛИКАЦИЈЕ

Кључне речи – винчанска култура, Бубањ–Салкуца–Криводол културни комплекс, централни Балкан, регионална дистрибуција насеља, географски положај насеља, каснонеолитска/раноенеолитска економија

У раду су представљени резултати истраживања регионалне дистрибуције и географског положаја насеља из 5. миленијума пре н. е. на централном Балкану. У обзир је узето 144 локалитета, тј. 142 насеља која припадају винчанској култури и Бубањ–Салкуца–Криводол (БСК) културном комплексу на простору од Подунавља до горњег тока Јужне Мораве. Њихово мапирање помоћу Географског информационог система (ГИС) показало је да се мање или веће концентрације насеља могу уочити у шест регија данашње Србије. Посматрана је територија полупречника 5 km од локалитета и испитивани су: регионална дистрибуција насеља, надморске висине, топографске одлике и земљишни типови у непосредној близини и у ширем ареалу око насеља.

Анализа регионалне дистрибуције насеља у два сукцесивна периода показала је да је читава стратегија насељавања у другој половини 5. миленијума пре н. е. била усмерена ка бакром богатој регији источне Србије, која је у касном неолиту била ретко насељена, што је веома слично тренду констатованом у јужним областима Балканског полуострва. Може се закључити да су БСК насеља мање бројна, раштркана и археолошки слабије видљива, те је популациони пад, као што је раније сугерисано, у раном енеолиту врло могућ.

Раноенеолитска насеља су равномерније распоређена према надморским висинама и топографији, одликује их наглашена дихотомија у топографији (насеље на равном / насеље на платоу доминантног узвишења), а евидентирана је усмереност ка ширем дијапазону локалних ресурса, што је сугерисало већу међусобну повезаност између насеља у раном енеолиту. Нове стратегије се уводе у земљорадњу, што се огледа у насељавању контакт зоне између алувијалног и брдовитог предела, а одликују их два или више плодних земљишних типова. Насељавају се раније периферне области погодне за развој пасторалне економије. Пораст броја насеља усмерених ка земљиштима непогодним за култивацију потврђује раније претпоставке о увећаном значају сточарства и постојању економски специјализованих и кооперативних насеља у раном енеолиту. Ово истраживање је указало на то да се насеља БСК културног комплекса (а не она из касних фаза винчанске културе) у тим маргиналним областима, удаљеним од главних водотокова, одликују разноврснијим избором за положај насеља и околним ресурсима. Према томе, насељавање периферних области током раног енеолита јавља се услед процеса друштвено-економске трансформације неолитских друштава, што подразумева интензификацију производње и коришћења ресурса, као и иновације у металургији, земљорадњи и сточарству. Штавише, уочен је висок ниво контроле над комуникацијама и локалним ресурсима – интеграција, специјализација, комплементарне и кооперативне функције у економији суседних насеља у одређеним микрорегијама и група насеља у суседним микрорегијама.

Appendix.
Topographic characteristics, altitudes and methods by which the sites were registered

Прилог.
Топографске одлике, надморске висине и метод којим су налазишта евидентирана

	LN Site	Topography/Altitude (m)	Method
1.	Hrastova Humka, Kličevac	Elevated plateau/68–69	1
2.	Ladne Vode, Rečica	Dominant elevated plateau/324	1
3.	Čair, Kostolac	Elevated plateau/70–80	3
4.	Selište, Kostolac	Elevated plateau/72	3
5.	Lugovi, Drmno	Flat site/74–78	3
6.	Orašje, Dubravica	Elevated plateau/72	1
7.	Lipe, Smederevo	?/71	3
8.	Staro Selo, Selevac	Slope site/130–180	1
9.	Medvednjak, Grčac	Slopes and elevated plateaus/160–200	3
10.	Jablanica, Medjulužje	Slopes and elevated plateaus/250–300	3
11.	Ive, Kusadak	?/?	3
12.	Krnjevski Put, Grčac	?/?	3
13.	Kućerine, Jagnjilo	?/?	3
14.	Šiljakovac, Ratari	?/?	3
15.	Dizaljka, Lipovac	Slopes and elevated plateaus/300	2
16.	Rajac, Donje Grbice	Slope site/250	1
17.	Divostin	Slope site/303–313	1
18.	Minine Vode, Požarevac	Slope site/150	3
19.	Poljana, Požarevac	Slope site/?	1
20.	Staričino, Kobilje	Slope site/?	3
21.	Centar Sela, Simićevo	Slope site/100	1
22.	Konjušica, Viteževo	Slope site/190	3
23.	Zbegovište-Selište, Oreškovica	Dominant elevated plateau/209–211	3
24.	Belovode, Veliko Laole	Slope site/190	1
25.	Čair, Dobre Vode	Slope site/250	3
26.	Buljićka Bara, Veliki Popović	Elevated plateau/207	3
27.	Jaruge, Lozovik	Slope site/?	3
28.	Crkvine, Lozovik	Slope site/?	3
29.	Čuka, Cikot	Dominant elevated plateau/356	3
30.	Batal Njive, Medojevac	Flat site/170	3
31.	Gradina, Loćika	Elevated plateau/195–200	3
32.	Ciganski potok, Tečić	?/?	3
33.	Livade and Sastavci, Svojnovo	Slope sites/145–157	3
34.	An, Svojnovo	Flat site/127	3
35.	Selište, Varvarin	Flat site/140	3
36.	Šljivik, Stragari	Elevated plateau/190–200	1
37.	Lazarev Grad, Kruševac	Elevated plateau/161	1
38.	Vitkovo, Aleksandrovac	Slope and flat site/300–320	2
39.	Stublina, Supska	Elevated plateau, slope and flat site/?	1
40.	Kraljevo Polje, Ivankovac	Slope site/150	1
41.	Briketnica, Ćuprija	Flat site/120–125	1
42.	Motel-Slatina, Paraćin	Slope site/160–190	2
43.	Slatina-Turska Česma, Drenovac	Slope and flat site/140–150	2
44.	Lukićki Breg, Vitoševac	Slope site/230–260	2
45.	Šetka, Ražanj	Slope site/230–258	2
46.	Crnokalačka Bara, Rujište	Slope and flat site/278–288	2
47.	Srednje Polje, Bradarac	Slope site/203–210	2
48.	Drugo Okno, Aleksinac	Slope site/203–224	2
49.	Neine Njive, Katun	Slope site/199–236	2
50.	Dubrava, Velepolje	Slope site/206–207	2
51.	Mustajbegovo Polje, Pasipoljana	Flat site/186	2
52.	Radačje, Malča	Slope site/280–310	2
53.	Stranje, Osmakovo-Vranište	Slope site/460–500	2
54.	Obrenovac, Srećkovo	Slope site/430–460	1
55.	Petrlaška Pećina, Dimitrovgrad	Plateau in front of the cave/?	2
56.	Prekonoška Pećina, Prekonoga	Cave/700	1
57.	Timakum Majus, Niševac	Flat site/355	2
58.	Dubrava 1, Knjaževac	Slope site/230–240	1
59.	Zbradila, Korbovo	Flat site/50	1
60.	Rudna Glava	Slope site (copper mine)	1
61.	Šanac, Pločnik	Slope site/300	2
62.	Kremen, Mačina	Slope site/350–400	1
63.	Kućište, Čekmin	Slope site/207	1
64.	Sastanci, Čekmin	Slope site/206	1
65.	Selište, Čekmin	Slope site/209	1
66.	Ševarike, Čekmin	Slope site/206–207	1
67.	Na Kamen, Priboj	Slope site/250	1
68.	Selište, Vinarce	Slope site/223–234	1
69.	Gradac, Zlokućane	Dominant elevated plateau/264	2
70.	Prkljivica, Gornja Slatina	Slope site/270	1
71.	Izvor, Bobište	Flat site/222	1
72.	Putište, Bobište	Flat site/223	1
73.	Sastanci, Bobište	Flat site/223	2
74.	Selište, Bratmilovce	Flat site/225	1
75.	Božja Bara, Mrštane	Flat site/224–225	1
76.	Vranja Noga, Gornji Guberevac	Dominant elevated plateau/300–320	1
77.	Progon, Mala Grabovnica	Dominant elevated plateau/260–270	1
78.	Jezero, Bojnik	Flat site/240	1
79.	Redžov Vis, Tulare	Dominant elevated plateau/946	1
80.	Semensko Drvo, Golemo Selo	Dominant elevated plateau/520	1
81.	Goleme Livade, Tesovište	Slope site/880	1
82.	Dva Brata, Ranutovac	Dominant elevated plateau/420–425	2
83.	Rašina Okućnica, Vranje	Slope site/412	2
84.	Donje Vranje, Vranje	Slope site/383	2
85.	Gumnište, Donji Pavlovac	Slope site/390	2
86.	Čukar, Donji Pavlovac	Slope site/390	2
87.	Kovačke Njive, Donji Pavlovac	Slope site/392	2
88.	Kačamačke Njive-Slatina, Klinovac	Slope site/520	1
Total sites			89
Total settlements			87

	EE Site	Topography/Altitude (m)	Method
1.	Panjevački Rit, Jagodina	Flat site/115	1
2.	Blagotin, Poljna	Slope site/?	1
3.	Ciglarska Peć, Stalać	?	1
4.	Jazbine, Makrešane	Dominant elevated plateau/166	1
5.	Bubanj, Novo Selo	Elevated plateau/198	2
6.	Kremenac, Rujnik	Slope site (flint mine)	3
7.	Velika Humska Čuka, Hum	Dominant elevated plateau/455	2
8.	Kod Železničkog Mosta, Prosek	Flat site /215	2
9.	Gradac, Ostrovica	Elevated plateau/285	2
10.	Gradac, Begov Most	Slope site/320–340	2
11.	Pirotska Tvrđava, Pirot	Elevated plateau/380	2
12.	Strošena Češma, Dimitrovgrad	Slope site/440–460	3
13.	Rosulja-Višnjar, Rgošte	Flat site/220	1
14.	Čuka, Rgošte	Dominant elevated plateau/284	1
15.	Bolvan, Rgošte	Dominant elevated plateau/362	1
16.	Škodrino Polje, Jelašnica	Flat site/205-210	2
17.	Vrelo, Čitluk	Dominant elevated plateau/400	2
18.	Piskavica and Šumlatica, Lasovo	Elevated plateau (necropolis?) and slope settlement/400-430	1
19.	Banjska Stena, Gamzigradska Banja	Dominant elevated plateau/180	1
20.	Beligovo, Gamzigradska Banja	Elevated plateau/189	1
21.	Imanje Z. Brzanović, Gamzigrad	Slope site/180	1
22.	Petronj 2, Gamzigrad	Dominant elevated plateau/340	1
23.	Imanje Petrujkića, Donja Stopanja	Flat site/350	1
24.	Lazareva Pećina, Zlot	Cave site/291	1
25.	Kučajna, Bor	Slope site/380	1
26.	Kmpije, Bor	Elevated plateau/390	1
27.	Čoka Lu Balaš, Krivelj	Dominant elevated plateau/520	1
28.	Železnička Stanica, Tamnič	?/60-70	1
29.	Grabar-Svračar, Smedovac	Dominant elevated plateau/210	1
30.	Vrkalj-Ćetaće, Kovilovo	Dominant elevated plateau/146	1
31.	Kapu Djaluluj, Veljkovo	Dominant elevated plateau/94	1
32.	Kamenolom and Potkapina, Mokranje	Dominant elevated plateau/170 and cave/135-150	1
33.	Metriž, Srbovo	Flat site/70	1
34.	Ideće, Prahovo	Flat site/52	1
35.	Fabrika Superfosfata, Prahovo	Flat site/50	1
36.	Duge Livade, Šarkamen	Flat site/252	1
37.	Brzi Prun, Grabovnica	Flat site/40	3
38.	Donja Strana, Velesnica	Flat site/45-50	3
39.	Korbovo, Vajuga	Flat site/45	1
40.	Pesak, Vajuga	Flat site/45	1
41.	Pontes, Kostol	Elevated plateau/?	1
42.	Veliki Gradac, Donji Milanovac	?	1
43.	Lepenski Vir, Boljetin	Slope site (necropolis and settlement?)/60-70	1
44.	Gradac, Zlokućane	Dominant elevated plateau/264	2
45.	Donje Polje, Bratmilovce	Flat site/223	1
46.	Iza Hotela Grozd, Vlasotince	Flat site/250	1
47.	Kale, Grdelica	Dominant elevated plateau/361	2
48.	Rujkovac, Medvedja	Slope site/?	1
49.	Dački Rid, Donja Slatina	Dominant elevated plateau/261	1
50.	Kameni Plato, Priboj Vranjski	Dominant elevated plateau/380	1
51.	Antin Čukar, Vranje	Dominant elevated plateau/690	2
52.	Bare, Lučane	Slope site/440	1
53.	Gradište, Končulj	Dominant elevated plateau/475	1
54.	Porta Manastira Sv. Prohor Pčinjski	Slope site/440	2
Total sites			56
Total settlements			53

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Original research article

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HAMMERING THE PAST: THE EXPERIMENTAL (RE)CONSTRUCTION AND USAGE OF PREHISTORIC MINING HAMMERSTONES FROM THE PRLJUŠA–MALI ŠTURAC SITE, RUDNIK MOUNTAIN

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Abstract – The locality of Prljuša–Mali Šturac on Rudnik Mountain is one of the richest prehistoric mining sites in Europe, taking into account the number of recorded, collected and analysed mining hammerstones. The reasonably estimated number of these tools of 2,000 and more clearly depicts the intensity of prehistoric mining activities at this locality as well as the conspicuousness of the mining potential which this mountain possessed. During the archaeological research conducted so far, 688 hammerstones have been collected and analysed (of which 478 are from recent excavation campaigns), thus producing results based on which hypotheses were made regarding their manufacture and use. Consequently, in the summer of 2017, an experimental (re)construction was undertaken on three basic types of these tools, as a complementary segment to a set of functional and typological analyses. The goal of the experimental research was to enable and gather as much as possible data that would serve as a comparative filter for testing previously set hypotheses and research questions related to the manufacture and usage modes of this category of mining tools. The mining hammerstones made for the purpose of this experiment proved to be extensively efficient in practice. The obtained results enabled a more complete understanding of the prehistoric mining technology on this site, but also raised some new questions.

Key words – Prljuša–Mali Šturac, copper mining technology, experimental (re)construction, mining hammerstones, production and use

INTRODUCTION AND ARCHAEOLOGICAL BACKGROUND

The Rudnik Mountain is famous for its richness of the ore malachite (carbonate copper ore) *inter alia*, whose deposits have been recognised and exploited from prehistory to the present day. Archaeological remains and written sources clearly indicate traces of mining activities during the Roman and especially the medieval period when the mountain represented a significant mining centre.[1] Explorations of this site conducted in the 1980s provided initial data on prehistoric mining activities on Rudnik.[2]

The site of Prljuša is located on a very steep slope of Mali Šturac, the lowest peak of Rudnik Mountain in Central Serbia, near the town of Gornji Milanovac. The site is ellipsoidal, and covers a surface of 2.5 ha,

[1] Јовановић П. 2007.

[2] Jovanović B. 1988.

The explorations at Mali Šturac have been conducted thanks to financial support of the Ministry of Culture and Information of the Republic of Serbia. This paper represents an integral part of research on the project: *Archaeology of Serbia – cultural identity, integration factors, technological processes and the role of the Central Balkans in the development of European prehistory* (No. 177020), financed by the Ministry of Education, Science and Technological Development. I would like to express my gratitude to Dragana Antonović for valuable suggestions during this research.

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ranging from 882 m ASL at the bottom to 994,41 m ASL at the top of the slope (Fig. 1a–b).[3] It was discovered in 1980 and subsequently explored to a lesser extent from 1981 to 1989.[4] The research was renewed in 2011 and the coordinator of the field excavations, which have been continually performed to the present day, is the Archaeological Institute of Belgrade in cooperation with the *Museum of Rudnik* and *Takovo* Region in

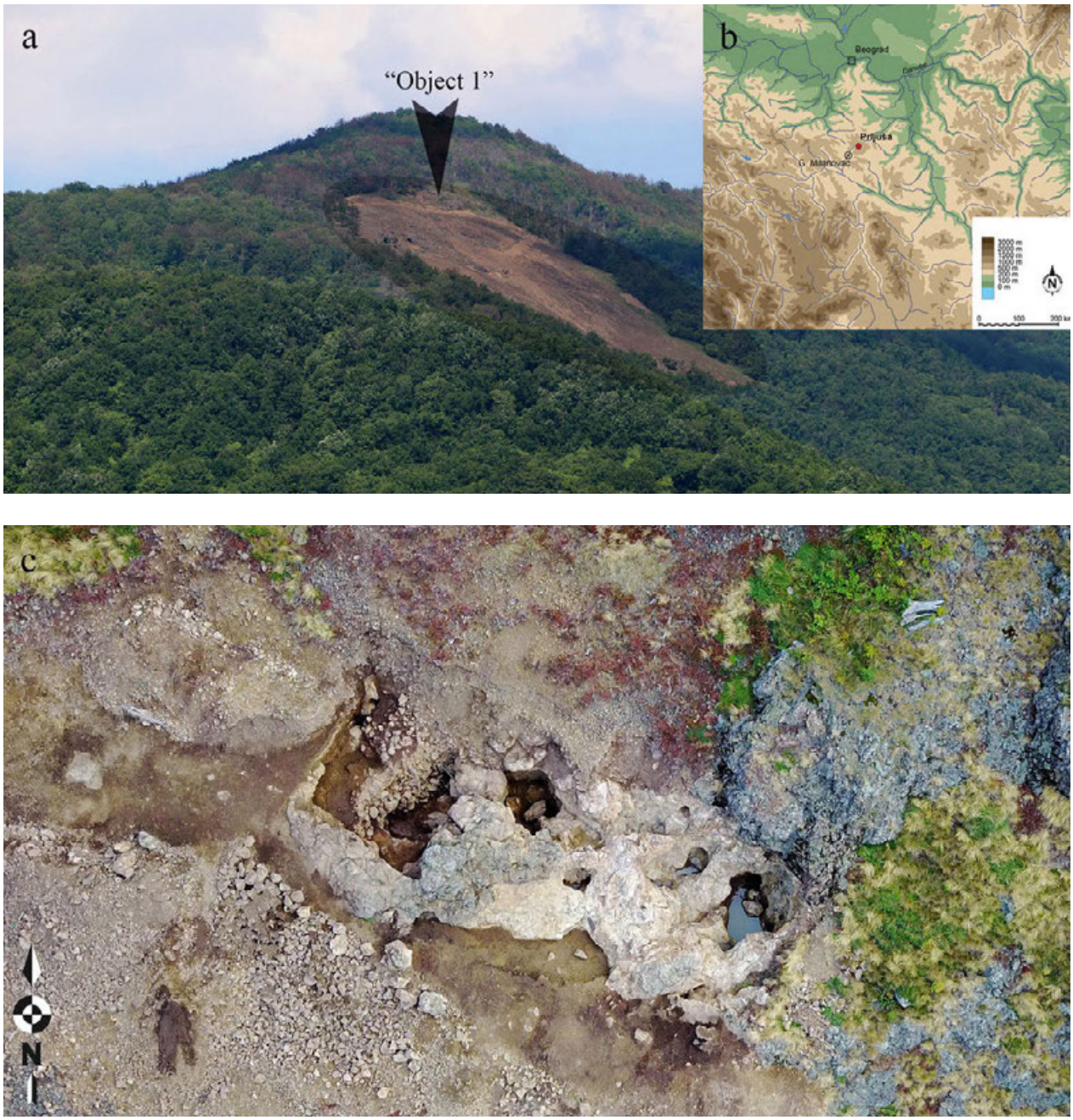

Fig. 1. a) Lower peak of Rudnik mountain – Mali Šturac with the slope of Prljuša, where remains of copper ore exploitation were found; b) geographic position of the site on the map of Serbia; c) orthophotography of the investigated segment of Object 1 on the top of the slope of Prljuša (Project documentation)

Сл. 1. а) нижи врх Рудника – Мали Штурац са падином названом Прљуша, на којој су пронађени остаци експлоатације бакарне руде; b) географска позиција локалитета на карти Србије; с) ортофотографија истраженог дела Објекта 1 на врху падине Прљуше (пројектна документација)

Gornji Milanovac, with the project „*Prospection of Mali Šturac, research of prehistoric mining*" headed by D. Antonović, PhD.[5] Recent site explorations uncovered numerous material remains that testify to the exploitation of malachite during the Eneolithic as well as later through the Bronze Age.[6] Over 15 objects (mining shafts) were discovered, which constitute the structure of this site, of which, during new excavations, Shafts 4 and 6 were systematically explored, while the impressive Object 1[7] (Fig. 1c), which represents the best-investigated unit to date, and a genuine example of the combined surface and underground exploitation of copper ore at the site, is still being explored.[8]

The method of ore exploitation at this site is closely linked to the geological basis of Prljuša, or more precisely, the volcanic activities that produced diatreme and the formation of very hard sedimentary (various types of sandstone), contact-metamorphic (hornfels and scarn) and igneous rocks such as: quartzlatite, latite, dacite etc. through which the ore penetrated and deposited.[9] At some locations mineralisation of malachite formed at the surface (Shafts 4, 5 and 6), while bigger ore deposits were deeper in the bedrock (Object 1 and Objects 10–15). Such a situation influenced the application of both surface and underground exploitation of the copper ore at Prljuša. The mining technology itself, whose roots go much deeper into prehistory, when the exploitation of flint and other rocks suitable for making stone tools was carried out, was advanced and applied to metallic raw materials. Surface mineralisation of malachite was clearly visible to prehistoric miners with its intensive green colour, hence the exploitation started from there. The use of fire to first weaken the rocks and then the crushing with hammerstones was a wide-spread practice in prehistoric mining technology and, as such, was also used in the case of Prljuša.[10] Traces of burning in the form of soot were recorded in almost every explored shaft, on vertical walls and preserved parts of ceilings. In order to follow the ore vein, the rock was broken with hammerstones of various sizes, which represented the basic set of tools. We can assume the use of other tools such as wooden stakes, wedges, shovels, antler tools[11] etc such as the tools preserved in prehistoric mines in Great Britain etc. However, in Prljuša, these tools were not preserved due to the low Ph value of the soil and the decomposition process. Traces of mining activities and ore extraction are clearly visible in the mineralisation zones in each of the explored mining shafts. The quantity of mining hammerstones which were discovered at the site is very impressive, more than 700 and it is estimated that over 2,000 of these tools are scattered over the site surface. The discovered hammerstones were found in all excavation layers, and were of different sizes, shapes and degrees of wear.[12] The mining hammerstones from Prljuša, their possible appearance as a complete tool, method of use and functionality represents the main research focus of this paper. Based on the analysis of the hammerstones[13], the very structure of the mining shafts at Prljuša and the traces of work on their walls and ceilings, a reconstruction of the mining technology using a set of mining hammerstones was carried out.

OBJECTIVES

The research of the environment of Prljuša at Mali Šturac, the very structure of the site and its geological basis, as well as the archaeological material collected there during the new research produced a large amount of data that enabled the creation of a general picture of the mining technology at this site.[14] Out of this situation a desire was born to expand this knowledge by examining some particularly specific problems. In this case, a tendency towards the specificum refers to the issue of mining hammerstones, i.e. the operational sequence: from the raw material procurement and tool production to the use, damage and discarding of these tools. Hence, the primary goal of this research was to gather and enable „active" data and information, which was unable to be gained from an insight into „passive"

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[3] Antonović, Dimić 2017.

[4] Jovanović B. 1988, 8–11.

[5] Antonović, Vukadinović 2010; Antonović, Vukadinović 2012a; 2012b; Antonović et al. 2014a; Antonović, Dimić 2017; Antonović 2017; Antonović et al. 2018.

[6] *Cf.* Antonović with further references.

[7] „Object 1" is a label for several mining shafts of different shape, size and depths connected by passages located on the very top of the slope. (For more details *see* Antonović, Dimić 2017; Antonović et al. 2018 with other references).

[8] Antonović, Dimić 2017; Antonović et al. 2018.

[9] Antonović, Dimić 2017.

[10] O'Brien 2013, 443–444; O'Brien 2015, 204; Antonović, Dimić 2017.

[11] Jovanović 1978; Vitezović, Antonović 2017.

[12] *Cf.* Antonović 2013; Antonović, Dimić 2017.

[13] Antonović, Dimić not published (article in process)

[14] Jovanović 1988; Богосављевић 1988; Antonović, Vukadinović 2010; Antonović, Vukadinović 2012a; 2012b; Antonović 2013; Antonović *et al*. 2014a; Antonović, Dimić 2017; Antonović 2017; Antonović et al. 2018.

archaeological material, through the performance of archaeological experiments, which would at least partially complete the knowledge about mining hammerstones from the Prljuša–Mali Šturac site.

MATERIALS AND METHODOLOGICAL FRAMEWORK

Within this paper, a study was carried out consisting of three research steps: archaeological data, experimentation, and analysis and results.

The primary step of gathering more data, with regard to the basic variables of the experiment, was to gain an insight into the archaeological material (mining hammerstones) and their analysis. Additionally, the existing literature has been thoroughly studied, relating both to the explorations of this site as a whole[15], and to the mining hammerstones as a separate element[16]. The literature concerning the exploitation of ores and stone tools from other sites, both in Serbia and worldwide, has also been studied.[17]

During previous archaeological research, over 700 hammerstones were discovered, while 688 of them were analysed. According to the 1981 and 1987 research seasons, 210 hammerstones were collected and analysed (in front of the access to platforms of Shaft 5–45 pieces; in front of Shaft 6–70 pieces), while the rest were discovered on the surface on other parts of the slope.[18] The author of this paper did not have an opportunity to personally investigate the hammerstones from the previous explorations, so the information about them was collected from available literature.[19] During the recent explorations performed from 2011 to 2017, the total number of collected hammerstones exceeded 478.[20] All of these hammerstones (2011–2017) were thoroughly analysed by D. Antonović and the author, and the obtained data served as the basis for creating an experiment.[21]

The functional-typological analyses of the mining hammerstones implied the observation and recording of several elements: petrographic determination,[22] the general shape of the tool and its dimensions (massiveness), traces of use and its intensity, and the observation of supporting morphological elements such as the groove or dent with the aim of securing the best possible attachment or better grip. In this context, the observation of traces of use did not require the use of optical instruments such as a microscope since the traces were clearly visible to the naked eye. When needed, geological magnifying glasses with a magnification of 7× and 20× were used. Classification of the mining hammerstones from Prljuša was not created as before, based on the shape only[23], since it was determined through analysis that a hammerstones in their shape possess extraordinary variability, thus such a classification is not applicable and does not lead to any useful conclusion.[24] Consequently, during the analysis of the mining hammerstones discovered in the 2011–2017 campaigns, a comparison of the aforementioned parameters was performed. Such a study resulted in classification into three basic types[25] (Table 1) (Fig. 2), which were tested by the experiment.

1) ***Hafted hammerstones*** *(type of hammerstone which is attached to a wooden handle).*
2) ***Pendulum type – hammerstones*** *(type of massive hammerstone which is suspended by some kind of rope from a trestle or beam).*
3) ***Hand-held hammerstones*** *(handstones) (for punching, grinding and pulverizing).*

The archaeological experiment was formulated according to Reynolds cyclic system.[26] According to Coles, this experiment could be defined as imitative.[27] The first experiment in this direction was conducted by J. Pickin and S. Timberlake in 1988.[28] Afterward, a

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[15] *Ibid.*

[16] Богосављевић 1988; Bogosavljević 1990; Антоновић 2013.

[17] Jovanović 1978; Derikonjić et al. 2015; Craddock et al. 2002; Fuller 2004; Ottaway, Roberts 2008; Stollner et al. 2011; Figueroa et al. 2013; O'Brien 2013; Timberlake, Craddock 2013.

[18] Богосављевић 1988, 37; Bogosavljević 1990.

[19] *Ibid.* 1988, 1990. Thus, it has been determined that the hammerstones from the previous explorations are no different from those gathered during the new campaigns.

[20] According to research seasons: 2011 – 48, 2012 – 19, 2013 – 82, 2014 – 75, 2015 – 169, 2016 – 50, and 2017 – 27 hammerstones.

[21] Analysis along with basic contextual data on the artefacts has included: petrographic determination of the rock that the artefacts were made of, definition of techniques used in their production, measurement of dimensions and weight of artefacts, detailed description, photo-documentation and functional-typological provisions. (An article about a comprehensive study of mining hammerstones from a recent exploration of Prljuša is in process)

[22] Антоновић 2013: 63. A macroscopic petrographic determination of reference rock samples that artefacts are made of was performed by V. Cvetković and K. Šarić at Faculty of Mining and Geology in Belgrade.

[23] *See* Богосављевић 1988; Bogosavljević 1990: 37.

[24] Antonović 2013.

[25] Dimić, Antonović 2018; Antonović Dimić unpublished (an article about this classification is in process)

[26] Reynolds 1999 (Hypothetical-deductive approach).

[27] Coles 1966–67: 1; Coles 1973; Ascher, 1961.

Hafted hammerstones *(Type of hammerstone which is attached to a wooden handle).*	**Pendulum type – hammerstones** *(Type of massive hammerstone which is suspended to a some kind of rope).*	**Hand-held hammerstones** *(for punching, grinding, pulverizing).*
– Dominant type of hammerstones (more than 80%). – They were found in front of each shaft, inside of each shaft, and scattered across the site. – **Weight**: from few hundred grams up to 7–8 and 9 kg (more of the 70% are damaged). – **Shape:** ***very variable***, pear-shaped and egg-shaped are slightly more represented. – **Production technology:** pecking and knapping. – **The groove**: over the entire circumference of a tool, over half of the circumference, only on the lateral edges, and a small number of diagonally cross-shaped grooves were recorded. In cases when the groove was made over the entire circumference of the tool, it is most often very meticulous. – **Traces of use**: on distal end or more often on both ends. Majority of these tools are heavily damaged on the working poll. – **Trace characterisation:** negatives of macroflakes; smaller and bigger dents (mostly shallow, under 3 mm, dens and spread in the arrangement); slightly flattened or rounded working surface.	– They were found in mining shafts usually close to a niche or passage from one shaft to another. – **Weight:** 10–20 kg (just the bigger one of 19,8 kg has been completely preserved). – **Shape:** elongated-irregular rectangular, egg-shaped and pear-shaped forms are dominant. – **Production technology:** pecking and knapping, (in some cases none, used in the natural form). – **The groove:** over the entire circumference of a tool, over half of the circumference, only on the lateral edges, in some cases over a half of the circumference and proximal end. – **Traces of use**: in most cases on one poll, but there are a few double sided hammers. Most of these tools are heavily damaged on the working surface. – **Other traces:** negatives of macroflakes; one-step and multistage breakages; smaller and bigger dents (combined deep and shallow, isolated or spread); slightly flattened or rounded working surface.	– They were found during the excavation of each shaft. – **Weight:** from 500 g up to 1.5 kg. – **Shape:** ball-shaped dominant, **always ergonomic.** The size, weights and the shape of these tools are perfect for holding in hand. – **Production technology:** in most cases they were used in natural form, pecking was used only for the groove production and minor modification. – **The groove**: if it exists, the groove always appears in a place that corresponds to the thumb or thumb and forefinger combined. – **Traces of use**: just at one poll or across the whole circumference of the tool with lateral sides intact. Most of these tools are completely preserved and without major damages. – **Other traces**: smaller dents (dens and spread, very shallow); negatives of microflakes, slightly flattened; rounded or ground working surface.

Table 1. Main characteristics of the three basic mining hammerstone types

Табела 1. Главне карактеристике три основна типа рударских камених батова са Прљуше

more detailed experiment was conducted by B. Craddock at the site of Alderley Edge in 1997, which was based on the reconstruction of the hammerstones according to the well-known analogy from the site of Chuquicamata.[29]

The experiment was designed considering two basic, integral segments and several substages with the goal of investigation of all phases in the „life" of the mining hammerstones:

1. (Re)constructon of mining hammerstones;
   – *Raw material procurement*
   – *Hammerstones head production*
   – *Hafting to a wooden handle and binding*
2. Their experimental usage
   – Fire-setting and use of hammerstones
   – Their reparation
   – Fragmentation and discarding

During the experiment, every stage of the process was carefully documented. The documentation includes photo-documentation, video-documentation, personal observations and experiences related to different elements of the process, measuring time during performance of certain activities, and recording all the details that can be used in the future as reference data.[30] The archaeological experiment was entirely conducted at the Prljuša–Mali Šturac site on Rudnik Mountain.

[28] Pickin, Timberlake 1988.

[29] Timberlake, Craddock 2013.

[30] Photo and video documentation was carried out using the following cameras: Nikon 3100 (*NIKKOR VR AF-S DX 18–55 mm f/3.5–5.6 G*) and Canon EOS 7D MARK II (*EFS 18–135 mm ISM 0.39 mm/1.3 ft.*).

Fig. 2. Examples of three main types of hammerstones from Prljuša: a) hand-held hammerstone (C 7/2015); b) hafted hammerstone (C181/2015); c) pendulum-type hammerstone (C49/2014) (photo V. Dimić)

Сл. 2. Примери три основна типа рударских батова са Прљуше: а) ручни бат/ударач (Ц 7/2015); b) бат који се припаја за држаљу (Ц181/2015); с) масивни бат клатно (Ц49/2014) (фото: В. Димић)

EXPERIMENTAL (RE)CONSTRUCTION AND USAGE

Raw material procurement

The macroscopic analysis of raw materials used for production of the mining hammerstones at Prljuša provided an insight into the usage of rocks that constitute the geological basis of Rudnik Mountain.[31] The following rocks were in use: metamorphosed sandstone, conglomerates, flysch sandstone with alevrolite, quartz sandstone, ignimbrite, quartz latite and latite as

[31] Антоновић 2013: 63.

Fig. 3. Raw materials are collected for the production of three or more hammerstones (photo V. Dimić)

Сл. 3. Сировине одговарајућег облика прикупљене за израду батова (фото: В. Димић)

well as dacite.[32] The most numerous hammerstones (over 80%) are those made of very hard rocks – metamorphosed sandstone, quartz sandstone, quartzlatite, latite and dacite, while those made of flysch sandstone with alevrolite, breccia, ignimbrite etc. were identified in far fewer numbers.

The analysis of the mining hammerstones from Prljuša has shown that various rock pieces of a rounded form were used as the basic raw materials for tool production, which could be turned into an efficient tool with less effort and intervention. To date, the main hypothesis regarding the raw material procurement from the riverbed of Jasenica[33] has been based on the assumption that "the river by the strength of its erosion produces various forms of pebbles as the ideal raw material for the hammerstones production".[34] In order to test this hypothesis, a thorough, 2 km-long terrain survey along the riverbed was organised. Even though

[32] The use of dacites was confirmed by X-Ray diffraction analysis. See Bogosavljević 1988: 23–24.

[33] Flows at the foot of the mountain.

[34] Богосављевић 1988: 24.

the idea seemed entirely reasonable, the situation we found was quite different. It was determined that the river breaks through slate, i.e. a rock that could neither have been used for the mining hammerstones production, nor was recorded in the archaeological material. During the investigation of the riverbed, we noticed only pieces of slate of various sizes. This clearly confirmed that the raw material for the hammerstone production had not been collected from this location. On the other hand, based on the survey of the closest surroundings of Prljuša, immediately above the site, along the path that leads to the top – Mali and Srednji Šturac, we noticed scattered accumulations of stones of suitable shape and identical macroscopic features as the raw materials used for the manufacture of hammerstones from Prljuša.

The following raw materials have been recorded: pieces of dacite rocks of egg-shaped form which we found freely or trapped in the bedrock mass and rounded pieces of latit and quartzlatite, most commonly with a single end or edge that needed to be processed. There were other raw materials (metamorphosed sandstone) of various slightly flattened shapes too, however, we focused on the rounded ones. Both raw materials were the part of the geological basis of Mali Šturac, and they had both been detached from the bedrock through various geological processes and erosion from higher ground. On the surface of the raw material ferrous cortex was visible, caused by atmospheric conditions and precipitation of ferrous hydroxide. Most of the raw materials are located in the vicinity of Object 1, along the road partly cut into the hill and passing immediately by the site and heading to the peak of Mali Šturac.

Raw material procurement was not time-consuming, as a result of the large quantity of available material. During our investigation it took twenty minutes to collect thirteen pieces of suitable raw material.[35] All the collected raw materials consisted of dacite, latite and quartz latite of a naturally rounded form that enabled their processing with less effort (Fig. 3) (*see* Table 2).

Hammerstones head production

Since the analysis of the archaeological material determined the existence of three basic types of hammerstones, the next step was to conduct their re(construction), whereby the first segment was the hammerstone head production. According to the analysis of production traces on the hammerstones from Prljuša, the usage of two techniques of raw material reduction was recorded: pecking and knapping.[36] Pecking was the basic technique of raw material reduction and groove production, while knapping was performed on raw materials which naturally do not possess the optimal form for these types of tools, so they primarily had to be roughly processed. The same production technology of these tools was applied on this occasion.

The production of three types of hammerstones was planned: one hand-held hammerstone (handstone), one massive, pendulum type hammerstone and, one hammerstone which would be attached to a handle. Of 13 available pieces of raw material, we tested seven and discarded two of them due to fragmentation and poor quality (Table 2).

For the hand-held hammerstone (hammerstone no. 1) we chose a piece of raw material which was of a very suitable, ball-shaped form, with a natural dent in a shape of a thumb. The raw material had a natural ergonomic shape and fitted well into the hand (Fig. 3a). Minor modifications were carried out by pecking and grinding the existing edge, for the purpose of providing a better grip. No other modifications were performed. Since the raw material was so suitable for purpose, the processing of the hand-held hammerstone took no more than twenty minutes, producing a finished hammerstone head weighing 950 g. During later parts of the experiment, this hammerstone was mainly used as a percussion tool for pecking other hammerstones and for groove production, since its basic function is striking rock or pulverising ore. Only a small amount of malachite nuggets were pulverized using this hammerstone.

The production of the hammerstone which will be attached to a wooden handle was followed by two unsuccessful attempts (hammerstones no. 2 and no. 3), related to a bad choice of raw material. In both cases, after almost one and the half hours of processing, while forming the groove, a micro fracture was noticed on the medial part of a tool, which threatened to spread with each strong blow of the hand – held hammerstone. Subsequently, the tool fragmented in half, after which the fracture was documented and the damaged, semi-finished product was discarded. During closer observation of the fracture it was established that a very thin ferrous layer was formed within the fissure, being of the same origin as the one at the surface of the tool. In order to prevent future mistakes, while selecting each of the raw materials, their whole surface was carefully

[35] Including time spent for photo-documentation *in situ.*

[36] Антоновић 2013: 63.

No.	Row material	Row material shape	Production techniques	Trans-versal groove	Production time of a hammer--stone head	Hammer-stone weight before use	Hafting	Type
1	Quartz latite	Irregular ball-shaped	Grinding	No	20 min	950 g	None/hand-held	Hand-held hammerstone
2	Dacite	Pear-shaped	Pecking/knapping/ direct percusion	/	1 h 27 min	/	/	/ (fragmented during production and discarded)
3	Latite	Pear-shaped	Pecking/knapping/ direct percusion	/	1 h 36 min	/	/	/ (fragmented during production and discarded)
4	Quartz latite	Pear-shaped	Pecking/knapping/ direct percusion and direct inverse percusion	15 mm deep/ 35 mm wide	2 h 30 min	2970 g	Wooden handle/ vine and rope bindings	Hafted hammerstone
5	Dacite	Cylinder-shaped with a wedge-shaped poll	Pecking/knapping/ direct percusion	13 mm deep/ 27 mm wide	1 h 55 min	1400 g	Wooden handle/ vine and rope bindings	Hafted hammerstone
6	Latite	Egg-shaped	Pecking/knapping/ direct percusion	10 mm deep/ 20 mm wide	1 h	370 g	Wooden handle/ vine and rope bindings	Hafted hammerstone
7	Dacite	Irregular, egg-shaped	Pecking/knapping/ Direct percusion and direct inverse percusion	20 mm deep/ 50 mm wide	5 h	11100 g	Wooden handle as axle/wooden cradle (basket)/vine and rope bindings	Pendulum type hamemrstone

Table 2. Main characteristics of experimentally made hammerstones

Табела 2. Главне карактеристике експериментално израђених батова

examined both before and after removing the ferrous layer. To avoid the risk of having no working tools, as a result of the unforeseen fragmentation while using this type of hammerstone, it was decided that they should be reconstructed in triplicate (one main and two supporting). All three hammerstones were of different dimensions and weight, so they also represented a set of tools used by prehistoric miners at this site. The selected raw materials for these hammerstones were of different shapes: cylinder-shaped with a wedge-shaped poll, pear-shaped, and egg-shaped (Fig. 3 b, d, e; *see* Table 2). During the processing of all three specimens of hammerstones, the techniques of pecking and knapping were used with direct percussion, held in the hand, on the knee or on an anvil. Primarily, the hammerstone polls were processed in order to annulate the weak spots that could cause fragmentation during work and then the groove was manufactured (Fig. 4 a–f). The transversal groove was formed on all three hammerstones across their circumference and, depending on their size, it ranged from 20 to 35 mm in width and 10 to 15 mm in depth. The approximate time needed to complete the production of a single hammerstone head with a groove was between an hour and two and a half hours. The finished hammerstone heads weighed: hammerstone no. 4 – 2,970 g; hammerstone no. 5 – 1,400 g; hammerstone no. 6 – 370 g (*see* Table 2).

In the same way as previously described, the head of the pendulum type hammerstone was formed. A massive, hard stone of irregular, egg-shaped form was chosen, having sporadic ferrous deposits on the surface (Fig. 3 c). The reduction of raw material on the polls was primarily performed by pecking and knapping in order to discard sharp and irregular edges that could cause undesirable fractures during the work process as well as cleaning the raw material from its cortex. After creating an ideal shape, the transversal groove was manufactured, being formed across the whole circumference of the tool. The groove was 20 mm deep and 50 mm wide (Fig. 4 g). The approximate time needed for the production of the massive hammerstone head was five hours of effective work. After processing, the hammerstone (no. 7) weighed 11,100 g (*see* Table 2).

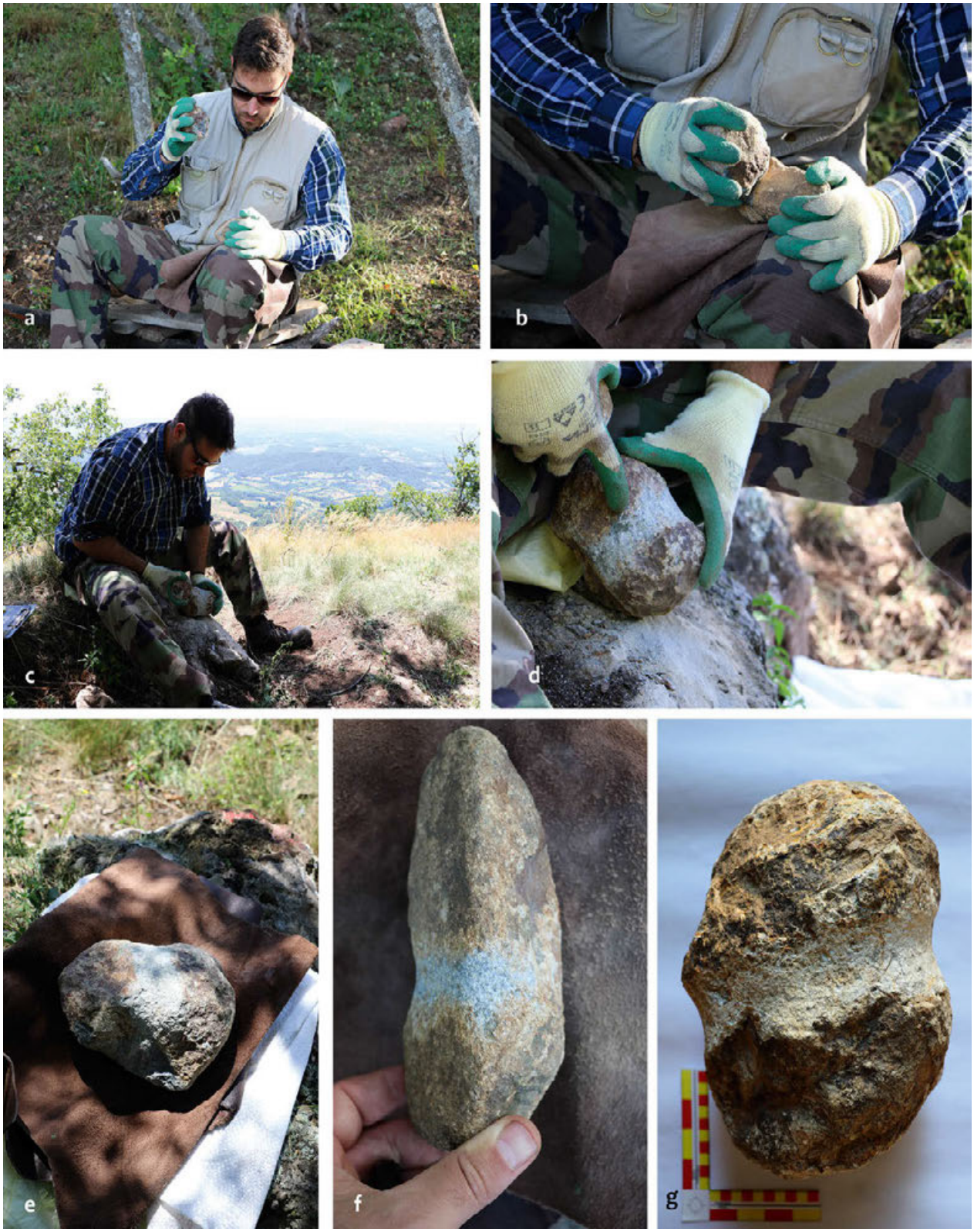

Fig. 4. a, b, c) Raw material processing using the pecking technique and groove making; d–g) appearance of the transversal groove (photo D. Antonović, V. Dimić)

Сл. 4. a, b, c) обрада сировине техником озрњавања и израда жлеба; d–g) изглед попречног жлеба (фото: Д. Антоновић, В. Димић)

Fig. 5. Hafting of hammerstone heads to a wooden handle (photo V. Dimić, S. Vitezović)

Сл. 5. Причвршћивање каменог чекића за дрвену дршку (фото: В. Димић, С. Витезовић)

Hafting and bindings

Data that was taken into consideration in order to reconstruct the binding method of the hammerstones with a handle was related to the existence and morphology of the transversal groove on the tool, the weight and shape of the tool, as well as an examination of the natural materials that have been easy to obtain and which could have serve for this purpose. Additionally, examples of complete tools with handles were seen in archaeological and ethnographic literature, so the impression of their general looks was made.[37]

The third stage of the experiment was the manufacture of wooden handles for the hammerstones and their hafting and fixing. It was necessary to choose tree species that existed in this area and the appropriate period of time[38], which was flexible (although not too flexible) and was able to endure the vibration and friction with the hammerstone head. The selection was narrowed to the following species: willow, hornbeam and hazel. Since willow is too flexible and soft it was immediately discarded, while hornbeam was a somewhat better choice, although slight defects were recorded during its processing. Hence, our choice fell on hazel. In the woods in the vicinity of the site, two straight hazel branches[39] (of around 2 m long and c. 4 cm in diameter at their thickest part) were selected and cut. The branches were soaked in water overnight with the aim of improving their flexibility.[40] After a few failures of banding the whole branches around the hammerstone heads (as done in the experiment at Alderley Edge[41]), they were split in half longitudinally. Segments for three handles were made out of the first branch, while both halves from the other branch, with minor reductions, were used to manufacture the handle for the massive pendulum-type hammerstone. The processing of the longitudinal branch segments (potential handles) was conducted as follows. Firstly, the segments were reduced to the desired length, thickness and width, then the processing of central part and the bending of the handle took place. The handle was bent very gradually, using a foot to put pressure on the middle the thinnest part, while the ends were pulled by hand towards the centre. It is crucial to note that the outward part of the branch was turned inward. After gradual, controlled bending, the central part of the handle was carefully beaten with the hammerstone in order to soften and to expand and loosen the plant fibres, which significantly sped up the bending process and prevented premature tearing of the fibres leading to the branch splitting. Then the handles were banded around the hammerstones, i.e. around their transversal groove, thus forming firm contact. The handles and hammerstone heads were joined by a rope and then set aside to dry for five days, after which they were disassembled and permanently fixed again. Drying was necessary so that the handles could adapt to their newly formed shape as well as to prevent the hammerstone head fall-

Fig. 6. Reconstruction of the hafted hammerstone and the massive pendulum-type hammerstone (photo V. Dimić)

Сл. 6. Реконструкција батова са дршком и масивног бата – типа клатно (фото: В. Димић)

[37] Craddock, Craddock, Langenscheidt 2002; Figueroa et al. 2013, Fuller 2004.

[38] Filipović et al. 2018; Filipović, Challinor, Andrič 2017.

[39] *Corylus avellana.*

[40] Their processing was carried out by (using) metal tools.

[41] Timberlake, Craddock 2013.

Fig. 7. Reconstruction of the massive pendulum-type hammerstone, rope and the construction from which it was suspended (photo V. Dimić)

Сл. 7. Реконструкција масивног бата – тип клатно, ужета и конструкције о коју је окачен (фото: В. Димић)

ing out of the handle after fixing as a result of the shrinking of the wood while drying. If the soaking of the handles in water over night is excluded, the handle production process and the primary binding to the hammerstone heads took around two and a half hours. The handle thickness, at the assembled ends of the grip part was 35 mm and 25 to 30 mm wide, where the massive hammerstone handle thickness was 45 mm and 40 mm wide. The handle length, excluding the part bent around the hammerstone head, was 40–50 cm.

The next task was the permanent hafting and binding of the hammerstones to their handles. It was necessary to fix the hammerstone as tightly as possible, so as to prevent any wobbling of the hammerstone head and the potential for it to fall out of the handle while being used. According to the analogy of these tools

from the site of Chuquicamata, the hammerstones might have been fixed to the handles with rawhide stripes[42]. However, for the purposes of this experiment, material of plant origin was used, which exists in abundance in the woods in the vicinity of the site, such as durable plant vine. Consequently, our choice was the so-called Wild Clematis[43] (Fig. 5a–b). Young, strong and flexible stems of 10–20 mm in diameter were collected, and used for binding, being cross-interwoven around the hammerstone head and the wooden handle. After that, the lower parts of the handle up to the tool head were bound neatly with industrial hemp rope[44] of 3 mm in diameter, in order to fix the handle in the best possible way (Fig. 5c–g, Fig. 6). Head binding of the massive pendulum-type hammerstone was carried out using the same principle, except that the interweaving of these vines, thin branches of hornbeam[45] and the supporting handle, as an axle were formed into a type of basket or cradle (Fig.7a–c). The basket and handle had the purpose of carrying the hammerstone weight and preventing its swaying while being hung on the rope, and consequently, preventing a lack of precision during use. The whole process of this stage of the experiment, from collecting lianas to binding hammerstones and handles as well as creating the basket (cradle) for the massive hammerstone took around three hours of effective work.

Since it was necessary to make a construction on which the massive pendulum-type hammerstone would be suspended, it was decided that a trestle (bipod) should be made for placing the horizontal beam.[46] Four straight, relatively young hornbeam trees of 10 cm in diameter were cut. The poles were cross-placed (in the shape of X) and bound tightly with vine and rope. A beam was placed on the top of them and also bound tightly, so as to avoid swaying during use. The construction was placed on the location where the experiment would be conducted, and the lower trestle parts were jammed with stones in order to put pressure on them and keep them stable (Fig.7 f). After that, a rope was made, on which the massive hammerstone would be hung. For this purpose, vines, i.e. lianas with sprouts were used and made into a plait. At one end of the rope a loop was made on which the massive hammerstone was hung (Fig.7 d–e). The construction of the trestle and rope took about one hour.

Usage

The second integral segment of the experiment, after the production of the mining hammerstones, was their testing, i.e. the (re)construction of their usage. This was both an inspiring and demanding task, since the experiment could not be conducted in the original shafts, which are protected by law as part of the site. In order to make the use of the hammerstones more convincing and thus the results veridical, the mining technology at Prljuša had to be observed, including the variables regarding the type of rock intended to process and its heat-treatment without posing any hazard to the site itself. Therefore, the original rocks obtained during former excavations from the collapsed ceiling of Object 1 were used for the experiment. Three massive and compact stone blocks were separated and placed into a semicircle next to each other. Since the fire-setting for weakening of rocks has been undoubtedly archeologically documented at Prljuša, the logs were piled and the fire was set right beside the rocks (Fig. 8 a–c). A strong fire (≥800 C°) was maintained for almost an hour and a half. Although it was summertime, very cold water obtained and bought from the nearby mining shaft, where had been naturally deposited. After the fire extinguished and the logs burned down, water was poured over the rocks. During heating and afterwards with the cooling by water, the rocks reacted and started to crack (Fig. 8 d). The hammerstone testing (hitting) was started with the massive pendulum-type hammerstone (11,100 g), which weakened the rock and promptly separated the first large pieces of stone (Fig. 8 e–f), while further work was performed using the hafted hammerstone (2970 g) (Fig. 8 g–h). After the primary testing of the pendulum-type hammerstone and the hafted hammerstone, it was proceeded by their alternate use depending on the needs (Fig. 9 a). Blows were struck with full strength, from different angles in order to get an insight into the range of possible movements and usage potential of hammerstones during work in a cramped space. It is important to note that during the work, minor formations and a thin scum of malachite and azurite were observed inside the rock (Fig. 9 b–c). For the purpose of estimating the needed effort and possible dynamics of crushing larger volumes of rock during the work, the

[42] Fuller 2004; Figueroa et al. 2013; Timberlake, Craddock 2013.

[43] *Clematis vitalba L.*

[44] *Cannabis sativa L.*

[45] *Carpinus betulus L.*

[46] Analogy of wooden bipod in top chamber of Zawar Mala Magra mine (Craddock 1995, Figure 2.36).

Fig. 8. a–c) Fire-setting and rock heating; d) cracks in the rock produced by high temperature; e, f) use of pendulum-type hammerstone; g, h) use of hafted hammerstones (photo V. Dimić, S. Vitezović, D. Antonović)

Сл. 8. а–c) паљење ватре и загревање стене; d) пукотине у стени произведене високом температуром; e, f) употреба масивног бата – типа клатно; g, h) употреба батова са дршком (фото: В. Димић, С. Витезовић, Д. Антоновић)

Fig. 9. a) The amount of crushed rock after 1 hour of work and the combined use of a pendulum – type hammerstone and a hafted hammerstone; b, c) the remains of malachite and azurite mineralisation inside the rock; d) the second crushed stone block (photo. V. Dimić)

Сл. 9. а) количина разбијене стене након сат времена рада и комбиноване употребе бата – типа клатно и батова са држаљом; b, c) остаци минерализације малахита и азурита унутар стене; d) разбијени други блок стене (фото: В. Димић)

Hammer-stone type	Activity performed	Kind of blows/ working surface	Work intensity (force applied)	Number of blows per minute	Weight before use	After 1 h of use	After 2 h of use	After 4 h of use	Repa-ration	Total working time	Amount of crushed rock per time unit	Damages	Traces of use on the hammerstone head
Hand-held hammer-stone	Pecking/ knapping of stone/ pulverize-ing of malachite lumps	Direct hitting by distal end	Intensive and moderate	40-70	950 g	/	920 g	900 g	None	8 h	?/ 40 g of malachite/ 20 min	None/ just typical use wear	Smaller dents (shallow, dens and spread in the arrangement); flattened/battered working face
Hafted hammer-stone	Crushing of heated and non-heated rock	Direct hitting by distal and proximal end	Very intensive	50-65	2970 g	2757 g	2735 g	/	Refixing and rebinding in 15–20 min interval	2 h	cca 300 kg/ 1 h	1 macroflake on the working poll/ wooden handle damaged	1 macroflake negative; smaller dents (shallow, dens and spread in the arrangement), flattened/battered working surface on both faces
Pendulum type hammer-stone	Crushing of heated and non-heated rock	Direct hitting by distal end	Moderate and intensive	30-40	11100 g	8600 g	/	/	None	1 h	cca 200 kg/ 1 h	Extensive damage of the working poll/ handle and the basket without damages	Extensive damage of the working poll (distal and medial part); bigger dents – spread, combined deep and shallow, battered working face

Table 3. Basic data of the experiment related to the use of mining stone hammerstones

Табела 3. Основни подаци експеримента који се односе на употребу рударских камених батова

number of blows exerted on the rock was measured, including the volume of crushed rock over a given time span (Table 3). Both hammerstones were alternately used for about three hours, not counting the short rest breaks or time needed for the reparation of the hammerstones. The reparation of the hammerstones involved their rebinding and reattachment to the handle after falling out of it. The stones selected for the hammerstone testing were crushed (Fig. 9 d), and the damage on the hammerstones which successively occurred during their use was recorded (*see* Table 3, Fig. 11 and 14). The hafted hammerstone head was not damaged but only its handle broke, while with the massive hammerstone the handle and the basket were quite intact, whereas its head was somewhat damaged and was rendered unusable (Fig. 11 a–d). The use of two auxiliary hammerstones with handles (no. 5 and 6), which were produced in case of the main hammerstone (no. 4) fragmentation, was not necessary since the envisaged task was successfully accomplished by the main hammerstone.

The hand-held hammerstone was primarily used as a percussion tool in the production of other hammerstones (7.40 h). It was used for making a transversal groove, for pecking sharp edges, knapping etc. After the primary usage, a clearly visible working surface was created which became relatively flat, out of the rounded – convex face by the end of six-hours of effective work (*see* Fig. 14 f, Table 3), After that, the hand-held hammerstone (no. 1) was also used for the pulverization of small malachite lumps (20 min). During the pulverization of the smaller amount of malachite (40 g), a green colour was clearly observed on the working surface of the hammerstone, deriving from the penetration of the malachite remains into the microfractures and dents of the rock surface.

OBSERVATIONS AND RESULTS OF THE EXPERIMENT

– The hypothesis that the raw materials used for the production of hammerstones were collected in the form of river pebbles, which were formed by the fluvial erosion of the Jasenica river[47] is disputed. On the other hand, macroscopically identical raw materials that we recorded in archaeological material were found and documented in the closest surroundings of Prljuša. They are all a part of the geological basis of the mountain top of Mali Šturac and the slope of Prljuša. They were all detached from the bedrock and scattered along the slopes under the influence of various geological processes (Fig. 10).

[47] Богосављевић 1988: 24

Fig. 10. Egg-shaped stones fallen from the bank on the side of the road which leads to the mountain top (photo V. Dimić)

Сл. 10. Јајолико камење (камене куīле) исīало из обале/īрофила īуīа који води ка врху īланине (фоīо: В. Димић)

– The best results in processing raw materials during the production of these tools were achieved using direct percussion on stone anvils. A technique of inverse direct percussion is also very efficient, especially if operating with raw materials of somewhat larger dimensions (≥2.5 kg). On the other hand, when it is necessary to process the hammerstone head more finely, it is better to hold it in the hand or leaning against the thigh, because a hard anvil, such as stone, provides a return wave and vibrations that can damage the object if there are any microfractures in it.
– Raw material processing, particularly the groove formation, is rather exhausting work that requires a lot of physical strength and patience.
– From 40 to 70 blows with a hand-held hammerstone (that weighed 950 g) were counted per minute, which meant that during one hour of effective work we lifted a hammer that weighed almost 1 kg and struck a blow between 2,400 and 4,200 times (*see* Table 3). A similar situation was observed during the use and testing of the other two hammerstones, therefore, short rest breaks were unavoidable.
– Long continuous work with a hand-held hammerstone (as a percussion tool) is very tiring and can lead to injury (swelling of the hand in this case). Hence, it is quite possible that hafted hammerstones of smaller dimensions (500–1,000 g) were also used for the hammerstone head or groove manufacture, not only for rock crushing and ore processing. In this way, the handle would absorb the vibrations and, using the extended arm principle, a more efficient and precise blow could be accomplished.
– Depending on size, it took one to two and a half hours to produce a single hammerstone head with a transversal groove, except for the massive pendulum – type hammerstone, for which it took about five hours (*see* Table 2).
– It took about five and a half to collect the necessary material (branches and lianas) to process branches, make shafts, and fix and permanently bind the hammerstone heads, and one more hour to make the trestles and the rope. In the hafting process, it appeared to be very important not to use the whole branch, but to longitudinally split it in half and then use those halves, otherwise the whole branch will not withstand the bending around the hammerstone head.
– Fire-setting, rock heating (≥800 C°) and sudden cooling by cold water were extremely effective. After 40 minutes of heating at high temperatures changes could be observed in the rock. The colour of the rock surface became red and black, and the scattered microfractures became clearly visible. An even more forceful reaction then happened, followed by a cracking sound, when the cold water was poured onto the rock, causing a thermal shock.
– The usage of the pendulum-type hammerstone during the rock crushing was very efficient, particularly if the rock had been previously treated by fire and sudden cooling. The hammerstone weight and mass were almost eliminated by using a rope and the trestle on which it was hung; making working with it was easy and not requiring much physical effort.
– For usage of the pendulum-type hammerstone, the help of another person was useful, to hold and control the rope on which the hammerstone was hung. Help was not strictly necessary as the rope could be controlled by the person who was working the hammerstone, but in that way, the agility and manoeuvrability of the user were significantly reduced.
– During testing of the hafted hammerstone, a very wide range of potential movements and angles were identified from which it was possible to strike the rock. On the other hand, the manipulation of the massive pendulum-type hammerstone, in the sense of striking a rock from different angles proved to be limited, with only height correction being possible (from the knee to the miner's head).
– With the alternate use of the pendulum-type hammerstone and the hafted hammerstone, during one hour of intensive work, 500 kg of rock was crushed (*see* Table 3).
– During the work, reparation of the hafted hammerstone was needed every 15–20 minutes (*see* Table 3). In the mentioned time interval, the handle was worn out and expanded due to the intensity of blows, which caused the hammerstone head to dislodge from the handle. The time needed for the rebinding and refixing of the hammerstone was two to five minutes, depending on whether the hammerstone head needed rebinding or just fixing back in its place on the handle. There was a general observation that a thorough binding of the hammerstone head was not so effective, hence it wasn't necessary since it would loosen and fall out either way during longer periods of usage.
– Reparation of the pendulum-type hammerstone was not required until damage occurred after one hour of effective work. The handle and the basket/cradle were completely undamaged, while the hammerstone head suffered severe damage and could no longer be used. (Fig. 11 c–d).

Fig. 11. Table represents damage that occurred on the working faces on the hammerstones and their reparation

Сл. 11. Оштећења на батовима и њихова репарација (фото: В. Димић, Д. Антоновић)

– After 2 hours of effective work, the hafted hammerstone head was not severely damaged, but the wooden handle had been broken and it could not be used further (Fig. 11b).
– During the hammerstone usage, it was noticed that the transversal groove is of crucial importance and one of the main factors that keep the tool firmly in place. The depth of the groove, and its careful and thoughtful processing in the places where the head of the hammerstone has the most contact with the handle, and thus the greatest friction, are of crucial importance and can enable better stability of the hammerstones head in the shaft.
– During work, traces of use were successively created on the hammerstones, which were identical to those documented on the hammers from Prljuša (*see* Table 3, Figure 14).

Fig. 12. a) Burn traces on the surface of the wall in Shaft 6 at Prljuša; b) soot formed on the wall of the stone block during its heating at the beginning of the experiment; c) traces of punching/crushing on the surface of the wall in Object 1; d) traces of punching/crushing on the stone block surface documented during the experiment (photo V. Dimić; D. Antonović)

Сл. 12. а) трагови горења на зидовима стене у Окну 6 на Прљуши; b) гареж која је формирана на зиду стене током њеног загревања на почетку експеримента; c) трагови ударања на површини зида из Објекта 1; d) трагови ударања на површини стене документовани током експеримента (фото: В. Димић, Д. Антоновић)

– Hand-held hammerstone traces of use: smaller dents (shallow, dense and spread in their arrangement); flattened/battered working face after pecking of other hammerstones. By using a hand-held hammerstone to pulverize the 40 g of malachite lumps, only a small amount of malachite scum and intrusion was recorded in the previously occurred dents. The weight of the hammerstone before usage was 950 g, after 2 hours of work – 920 g, after 4 hours – 900 g. Hence, a reduction of rock mass of about 10–12 g per hour of work was evident.
– Hafted hammerstone traces of use: 1 macroflake negative; smaller dents that are shallow, dense and spread in their arrangement, flattened/battered working surface on both faces. The weight of the hafted hammerstone before usage was 2,970 g and after effective work for 2 h, the weight was 2,735 g which meant that during an hour of usage it lost about 20 g of its mass if we exclude one bigger detached flake of 195 g.
– Pendulum-type hammerstone traces of use: Extensive damage of the working poll (distal and medial part); other traces: bigger dents – spread, combined, deep and shallow, battered working face. Before use the weight was 11,100 g, and after usage and damage 8,600 g.
– On the rock, which was afterward crushed with the experimental hammerstones, percussion marks were recorded that are identical to the traces documented on the walls of all explored mining shafts at the site. (Fig. 12).
– By fire-treatment, identical burning traces like those documented on Prljuša were produced on the surface of experimental stone blocks (Fig. 12).

DISCUSSION AND CONCLUSION

By conducting an archaeological experiment, data has been obtained regarding the operational sequence and wide range of activities from the raw material procurement for the production of this category of tools and their reconstruction, to the reconstruction of their usage. The new experiences that have been acquired, along with the results, data and observations derived from such an approach to this specific issue will be of importance in the future interpretation of mining hammerstones. Through the performance of this experiment some new knowledge and experiences were acquired, but it also opened up some new questions that need to be answered in the future.

Locations have been identified from which, in prehistory, the procurement of raw materials was most probably carried out. With the survey of immediate surroundings of Prljuša site, a large amount of the appropriate raw material was discovered. The entire area of Prljuša–Mali Šturac is rich with high quality, hard rock suitable for the production of hammerstones. Therefore, it is quite certain that prehistoric miners produced these tools at this location, from the raw material of local origin they collected, if not at the very site, then certainly in the immediate surroundings (Fig. 10). They chose raw material of suitable shape, with a smooth rather than rough, and a rounded rather than angular form. Thus, they saved a lot of time and particularly physical energy, needed for the procurement and transportation of raw materials from its source to the mine, and afterward for shaping into a suitable form, which was an extremely favourable factor for the Prljuša miners.

The archaeological remains from Prljuša clearly indicate the use of fire for primarily weakening the ore-bearing rocks, whether surface or underground exploitation is concerned.[48] Fire-setting, heating and sudden cooling with water were extremely efficient, while burning and working traces identical to those recorded at Prljuša were produced on the experimental rock (*see* Fig. 12). On the other hand, the performance of this stage of the experiment also raised some new questions:

– During the experiment, it was proven that the use of fire is very effective. Nevertheless, to what extent could it be controlled/not controlled within a relatively narrow space in the mining shaft?

– Were only the surrounding bedrock affected by the fire, or did the fire affect the ore veins too?

– How high a temperature could be reached in the relatively cramped space of the shaft and was there sufficient fresh air intake needed to achieve the optimum temperature?

– On the walls of almost every mining shaft on Prljuša, soot marks are clearly visible; therefore, what was the impact of smoke on the formation of reduction burning conditions and the achievement of optimum temperature.

– In our experiment, very cold capillary water from the nearby mining shaft was poured on the hot rock immediately after the fire was extinguished in order to achieve a thermal shock. However, is it reasonable to assume that the prehistoric miners could enter the mine shaft to pour the water immediately after the fire was extinguished, given that these shafts are relatively closed units that behave in these conditions probably as furnaces, whose walls accumulate a great amount of heat which they will radiate?

Where the hammerstones are concerned, the experiment has proved that all three types are very functional, and the traces of use on them completely correspond to those recorded on the original artefacts from Prljuša. However, during the experiment, the use of the hafted hammerstone and the pendulum-type hammerstone produced some new questions when it comes to their mutual differentiation and recognition.

– For example, under which type would the hammerstone with the transversal groove be defined if the traces of use occured on both working faces, and if the weight of the hammerstone was about 7, 8 or 10 kg?

– What is the possible weight that could be withstood by handles (on hafted hammerstones) during intensive work, so as not to be prematurely severely damaged?

– Also, which maximum weight of the hafted hammerstones is suitable for intensive and efficient work; and which weight makes the handling either aggravating or even impossible?

– Hence, a question of great importance arises from all of this: what is the threshold value of weight/massiveness that clearly makes the boundary between hafted hammerstones and those that are used with the pendulum principle, if there is no clear difference in traces of primary use, secondary use, or recycling?

Our pendulum-type hammerstone was used only on one side; therefore, the traces of use are located on that side only. Pickin and Timberlake[49] suggested through their experimentation a similar method of suspension

[48] Antonović, Dimić 2017

[49] Pickin and Timberlake 1988: 165–167

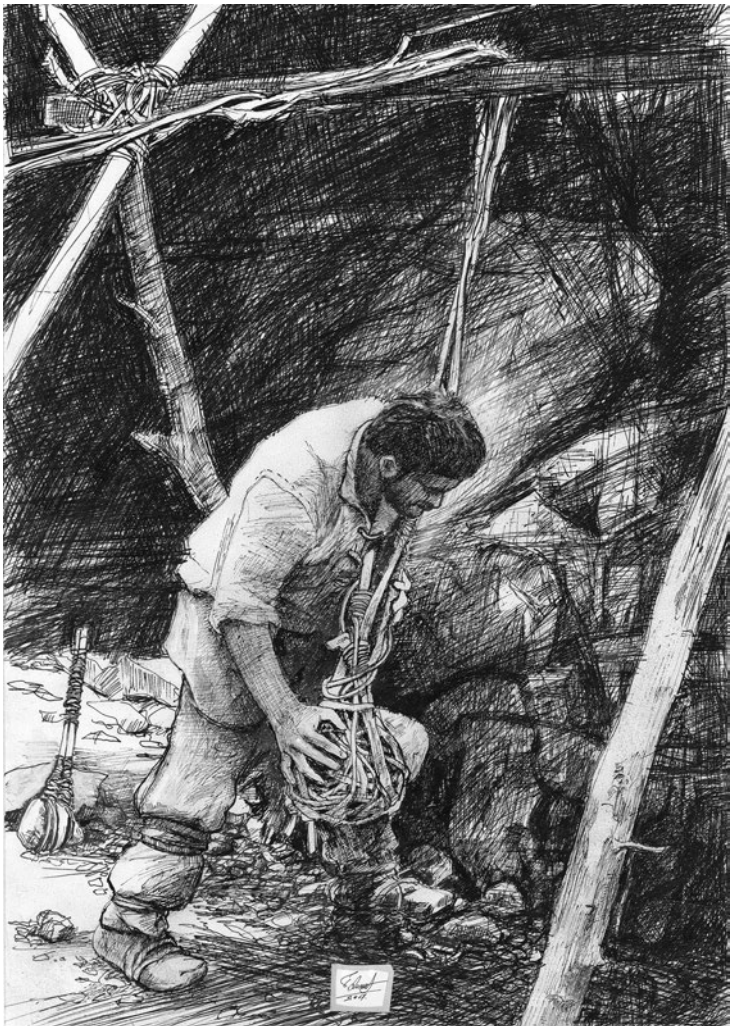

Fig.13. Reconstruction of the usage of the massive pendulum-type hammerstone (drawing by Blagoje Dimić ©)

Сл. 13. Реконструкција употребе масивног бата – типа клатно (цртеж: мр Благоје Димић)

of massive hammerstones (without basket/cradle) with the possibility of hitting the rock with both faces. Although their suspension method is quite possible, we think that it would not be overly effective because we did a similar thing at the beginning of our experiment and we immediately gave up because that kind of suspension drastically reduces manoeuvrability and impact force. The basket, in our case, although disabling working with both sides, kept the hammerstone steady without wobbling during impact and allowed us to strike the rock with precision (Fig. 13). With our method of fixing, there is also a reasonable opinion that, if the head of the massive hammerstone was damaged on one side, the other one could be turned to continue the work. In addition, Pickin and Timberlake used a massive hammerstone in one different method which we did not test on this occasion. They used it kneeling on the ground, sending the blow in an up and down motion, lifting the hammer over the head and lowering it onto a stone plate where the ore-bearing rock was collected. This kind of use of the massive hammerstone absolutely makes sense, and would also explain the working surface on both ends/faces. However, then the question arises, how long is it possible to work in this manner without excessive tiredness of the back and arm muscles, which would make any longer, continuous work almost impossible. Again, besides other factors, that is a question of optimal weight.

The experimental usage of the hafted hammerstone and the pendulum-type hammerstone also suggested that the use of the massive hammerstone is most effective at the beginning of the work for detaching bigger pieces of heat-treated rock. In the further flow of work, it was effective but not as much as the hafted hammerstone because of the reduced manoeuvrability and the possibility to strike a rock from different angles.

The experimental use of hammerstones also provided information regarding the inevitability of their

Fig. 14. A comparison of: a, c, e) original artefacts from Prljuša–Mali Šturac (C165/2015, C48/2015, C91/2015); b, d, f) experimentally made artefacts

Сл. 14. Упоредни приказ: a, c, e) оригинални артефакти са локалитета Прљуша–Мали Штурац (Ц165/2015, Ц48/2015, Ц91/2015); b, d, f) експериментално израђени артефакти

need for reparation and, therefore, the organisation of work. The hafted hammerstones' reparation had to be carried out every 15 to 20 minutes. It is quite certain that one member of the mining team was specifically entrusted with the reparation and production of the hammerstones. In this case, reparation meant the production and repair of the handles, reattachment of the hammerstones to them, and reparation of the hammerstone heads in case of damage etc. It was also made clear that there must have been a number of spare hammerstones which were alternately used under a rotation method – when one was damaged it would be replaced by another, allowing it to be repaired.

When it comes to the presumed typology, the possible appearance and the method of use, this experiment has shown that all these factors can be considered to

have been affirmed. However, during work with these three types of hammerstones, there was also a need to use a wider range of other tools, which we think would have facilitated the job. When we say a wider range, we mean antler tools, wooden stakes, and wedges, or some other pointed stone tools which were not found at the site at the time the experiment was conducted but their occurrence (especially antler and other stone tools) is possible and quite expected.

An active, more detailed view was obtained by performing the archaeological experiment and documenting the information and the experiences that this approach allows. This is the first experiment conducted with the aim of moving a step closer to the general knowledge of mining technology at the Prljuša–Mali Šturac site. It opens the door for other tests and perspectives which may be directed towards the study of all the aforementioned questions and at the organisation of labour and the logistics that the team of miners required in order to perform the ore exploitation and its further processing.

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Резиме: ВИДАН Б. ДИМИЋ, Археолошки институт, Београд

РАСКУЦАВАЈУЋИ ПРОШЛОСТ: ЕКСПЕРИМЕНТАЛНА (РЕ)КОНСТРУКЦИЈА И УПОТРЕБА ПРАИСТОРИЈСКИХ РУДАРСКИХ КАМЕНИХ БАТОВА СА ЛОКАЛИТЕТА ПРЉУША – МАЛИ ШТУРАЦ НА ПЛАНИНИ РУДНИК

Кључне речи – Прљуша – Мали Штурац, технологија рударења руде бакра, експериментална реконструкција, рударски камени батови, израда и употреба

Локалитат Прљуша – Мали Штурац на планини Рудник један је од најбогатијих праисторијских локалитета рударског карактера у Европи, гледано према броју забележених, сакупљених и анализираних рударских камених батова. Засновано процењен број тих алатки на 2000 и више, врло јасно осликава интензитет рударења на овој локацији током енеолита, као и очигледност рударског потенцијала који је ова планина поседовала. Током досадашњих истраживања локалитета сакупљено је и анализирано 688 батова, од којих 478 током нових истраживања. Из тих су анализа проистекли резултати на основу којих су оформљене претпоставке о начину њихове израде и употребе. Сходно томе, током лета 2017. године спроведена је експериментална (ре)конструкција и тестирана су три основна типа овог оруђа као комплементарни сегмент сету функционално-типолошких анализа. Циљ експеримента била је акумулација података и искустава који у будућим тумачењима могу омогућити већи степен објективности. Експеримент је имитативног типа, а методолошки је конципиран према Рејнолдсовом цикличном методу. Постављен је и успешно реализован тако да се у њему истраже све фазе у „животу" рударских камених батова: од сакупљања сировина од којих су прављени, преко начина израде и реконструкције њиховог изгледа, до реконструкције начина употребе, њиховог оштећења, репарације и, на крају, одбацивања. Током експеримента је спроведен велики број операција, те је стога приликом њиховог извођења акумулиран и велики број података.

Утврђене су локације са којих је било могуће сакупљање сировина. Рекогносцирањем непосредног окружења локалитета пронађене су веће количине одговарајуће камене сировине која има исте макроскопске карактеристике као оне што су коришћене за израду рударских батова на Прљуши. Када је израда ове категорије алатки у питању, практиковањем основних забележених техника редукције сировине стечена су нова искуства и сазнања о напору и времену потребном да се од комада сировине изради глава бата.

Према резултатима анализе батова, а затим и структуре рударских окана на Прљуши и траговима горења и ударања на њиховим зидовима, извршена је идеална (ре)конструкција технологије рударења кроз употребу сета батова као основних рударских алатки. Паљење ватре уз стену, њено загревање и нагло хлађење водом било је изузетно делотворно, а на самој стени су произведени идентични трагови горења попут оних забележених на Прљуши. Тако ослабљена стена примарно је разбијана масивним батом – типа клатно, а потом комбинацијом тог бата и бата припојеног за држаљу. Употреба масивног бата – типа клатно показала је велику ефикасност када је реч о разбијању и растресању већих комада стене. Међутим, манипулисање њим, у смислу упућивања удараца из различитих углова, ограничено је. За сада, најмасивнији пронађени примерак овог типа на Прљуши тежак је 19,8 кг. Носећа конструкција масивних батова при површинској експлоатацији руде вероватно је могла имати изглед сличан нашој, коришћеној током експеримента, док су за подземну експлоатацију сасвим сигурно коришћене само попречне греде о које је качено уже што је носило корпу (колевку) и бат. Оне Греде су ослањане на посебно израђена удубљења у стени, каква су забележена готово у свим окнима на локалитету. С друге стране, батови припојени за држаљу представљају изузетно ефикасно оруђе, којим се ударац ка стени могао упутити из различитих праваца и углова и различитим интензитетом. Употребом експерименталних батова, поред осталих, стечене су и информације које се односе на неминовност њихове репарације, а самим тим и на организацију рада. Током употребе батова је уочено да је попречни жлеб од пресудне важности и да је један од главних фактора који утиче на стабилност алатке. Дубина жлеба и његова педантна и осмишљена израда на местима где држаља са главом бата има највише контакта, а самим тим и највеће трење, од круцијалног су значаја и могу омогућити, бар за нијансу, бољу стабилност главе бата у држаљи.

Задатак овог рада био је да се извођењем археолошког експеримента омогуће „активни" подаци и информације који се не могу стећи увидом у „пасиван" археолошки материјал, чиме би сазнања о рударским каменим батовима са локалитета Прљуша била употпуњена. Веома успешно су (ре)конструисани изглед и начин употребе масивног бата – типа клатно. Такође, утврђена је изузетна ефикасност и друга два типа батова. Трагови употребе на њиховим теменима, трагови горења и трагови разбијања на стенама показали су у потпуности исту слику коју имамо и на самом локалитету.

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ARCHAEOLOGICAL SITE OF BOLNICA IN PARAĆIN AND ITS IMPORTANCE FOR THE PREHISTORY OF THE CENTRAL MORAVA REGION

– a contribution in chronology and horizontal and vertical stratigraphy

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Abstract – The paper presents the horizontal and vertical stratigraphy of the site of Bolnica in Paraćin, based on both earlier and the latest archaeological excavations and the material which had been collected for decades by the Hometown Museum in Paraćin, as a result of the construction works connected with the constant urbanisation of the area. The presented archaeological material is attributed to a period from the Early Neolithic to the so-called Dacian La Tène, meaning the 2nd century AD. One of the subjects discussed in this paper is the possibility that the sites of Bolnica and Motel Slatina, in fact, represent one large site, which was artificially divided by the E 75 highway and the Serbian Glass Factory. The comparative analysis, which encompassed the sites positioned on the right bank of the Velika Morava River, showed that this is one of the sites with the most independent chronological sequences in the Central Morava Region. Likewise, the importance of this site as a strategic point and an important intersection on the route from the Danube River to the Central Balkans, and further towards the south and east is underlined. Finally, we analysed the appearance of Dacian material culture during the 1st and the 2nd century AD and compared the occurrence of certain forms and decorations with relevant sites in present-day Romania. The paper cautiously suggests that the Dacian material culture represents traces of the deportation of 100,000 Transdanubians to the territory of Moesia by the legate Silvanus Aelianus, possibly between 61 AD and 64 AD, during the reign of Emperor Nero, which has been partially confirmed by new archaeological excavations at the site of Gložđak-Lidl during 2018.

Key words – Bolnica, Motel Slatina, prehistory, protohistory, Central Morava Region, intersection, Dacians, Late La Tène, Early Principate

Background, the extent of the site and a short history of the research

The site of Bolnica is located in the north-eastern part of the present-day city of Paraćin and lies on the first terrace of the Crnica River,[1] which in fact represents the southern slopes of Karađorđevo Hill. The altitude of the terrace varies between 130 and 140 m. The western part of the site is marked as "Crkva",[2] due

[1] The site itself is marked as Bolnica, which means hospital in Serbian. As seen in the paper, there is a distinction between these two terms, as the archaeological site of Bolnica is partially located within the present-day General Hospital complex in Paraćin. Therefore, the term Bolnica refers to the site itself and the term hospital refers the area incorporated within the present day General Hospital in Paraćin.

[2] Translates as church in Serbian.

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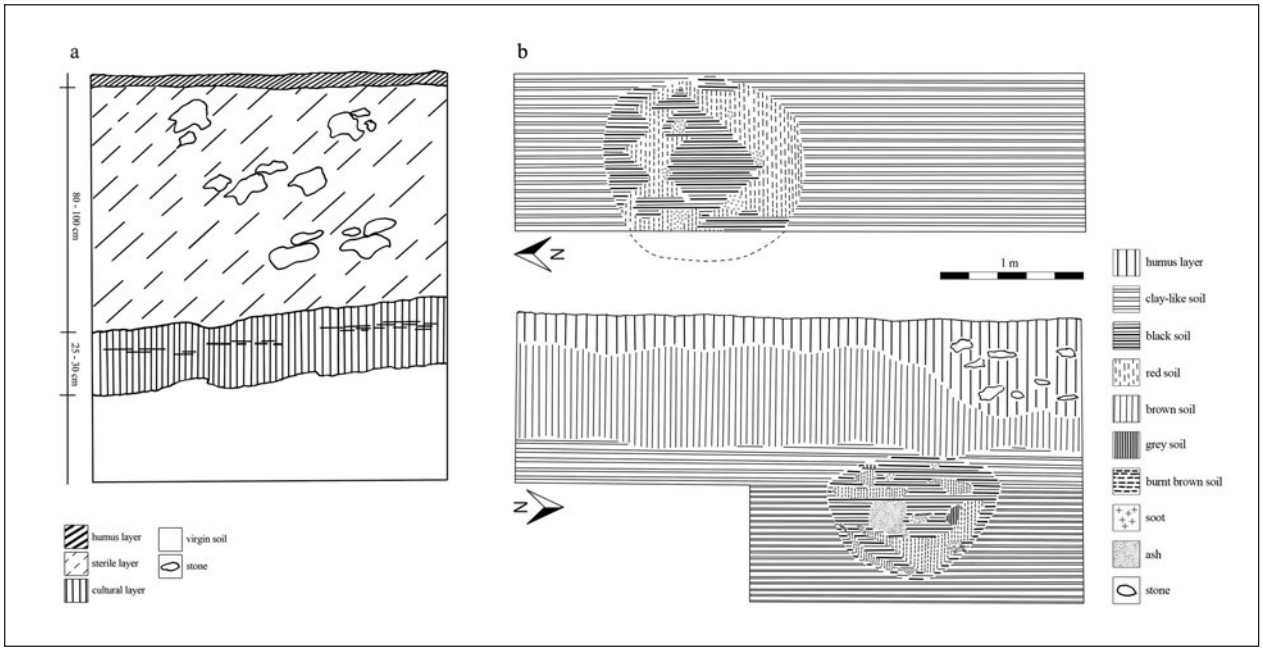

Fig. 1. a) Cross-section from Zelengorska Street, 1982; b) Trench from 1991, with the Dacian La Téne period pit, both in ground plan and cross-section (documentation of the HMP)

Сл. 1. а) Профил у Улици Зеленīорској, из 1982. īодине; b) Основа сонде, из 1991. īодине, са јамом из īериода дачкоī лаīена у основи и īрофилу (докумен̄тација ЗМП)

to the fact that certain archaeological finds originate from the infrastructural works which were conducted in front of the Holy Trinity churchyard.[3] Additionally, this part of the site lies closest to the river.

Nowadays, almost the complete area of the archaeological site is underneath the modern settlement, and only certain green spaces are available, in the General Hospital complex and church yard.[4] The Hometown Museum of Paraćin registered the site in 1982, and even then the site was partially positioned within the urbanised part of the city. The rapid development of the city towards the south and east in relation to the General Hospital progressively covered the site, which was neither registered or protected as cultural heritage. From that point, and on those occasions when the owners would allow access, archaeological material was collected during the construction of private houses. Regardless of the various adversities and due to the persistence of museum archaeologists M. Brmbolić, P. Vučković and A. Srndaković, during the 1980s and 1990s, today we have sufficient data to approximately define the borders of this site, which possesses a complex horizontal and vertical stratigraphy. It should be noted that the site of Bolnica remained unregistered even in the 1950s and 60s, during the first post-war excavations conducted by M. and D. Garašanin on the prehistoric and protohistoric necropolis of Gložđak, on the opposite bank of the Crnica River, some 550 m southeast of the central part of the site of Bolnica.[5]

The first data on the archaeological material from the right bank of the Crnica River originates from the former Zelengorska[6] and Tatar Bogdanova Streets, while the recognition of the cultural layer within the General Hospital complex, in the 1990s, confirmed that the archaeological site spreads towards the west.[7] Only

[3] The installation of a gas pipeline and the replacement of worn installations in the last 20 years.

[4] Certain small green spaces are available in the vicinity of several residential buildings, although this part of the city has been urbanised by private objects.

[5] Гарашанин 1958: 301 and further, note no. 25; Garašanin 1962: 62–64; Garašanin 1964: 79 and further.

[6] Present-day Ivo Andrić Street.

[7] In the documentation of the Museum, the aforementioned streets in the eastern part of the site were treated as Sector I, while the western part, which encompasses the General Hospital complex and later the churchyard with surroundings, was treated as Sector II.

a small number of finds have been published so far, primarily belonging to the Late La Tène and Romanisation periods in the territory of the Central Morava Region.[8]

The first archaeological situation which was recorded in the field dates back to 1982,[9] when M. Brmbolić and P. Vučković oversaw the works for the digging of foundations for a residential building in Zelengorska Street, directly behind the General Hospital. On that occasion they drew one of the cross-sections (Fig. 1a), described it and singled out two chronological horizons on that part of the site, both belonging to the Iron Age. The cultural layer was positioned between 0.8 and 1 m in depth, and measured a thickness of about 0.25–0.3 m, while virgin soil was recorded at a depth of about 1.3–1.4 m. According to the authors, the earlier layer was attributed to the Basarabi horizon of the Early Iron Age, and the younger layer is represented by Late Iron Age finds, without a more detailed attribution. Also, M. Brmbolić and P. Vučković state … *due to quite chaotic locations of the sites, as well as the inability to conduct more detailed excavations, we are unable to perceive the possible connection that exists between them or to determine the character of the sites more precisely*…

It was not until 1991 that the Hometown Museum of Paraćin conducted short-term archaeological excavations within the General Hospital complex, at which time two test trenches measuring a surface area of 6 m² each were excavated.[10] During the excavations, in addition to the cultural layer, archaeological features were recorded as well. A pit measuring a diameter of 1.4 m and a depth of 0.7 m should be highlighted, as it contained more than 20 almost completely preserved vessels of various types, which were attributed to the Late Iron Age and Early Roman periods in the territory of the Central Morava Region (Fig. 1b).[11] The excavations continued in 1992, when two more test trenches were excavated, measuring a surface area of 8 and 4.5 m². Unfortunately, no archaeological features were registered in addition to the cultural layer.

In following years, certain parcels in the vicinity or within the General Hospital complex, on which intensive construction took place, were prospected, which subsequently resulted in new archaeological material being collected from Zelengorska Street in 1993,[12] 1996,[13] 1999,[14] 2002 and 2003, as well as several boxes of archaeological material from Major Marko Street, the area of the Municipal Hospital boiler room and the corner of Čika Ljubina and Tatar Bogdanova Streets.[15]

New archaeological excavations at the site of Bolnica, preventive in character, were conducted in 2018.[16] A total of two trenches (control trenches) measuring a surface area of 10 and 6 m² were excavated in order to verify the stratigraphy and determine the degree of preservation of layers in this part of the site and to assess the potential endangerment of the site due to the planned construction. The overall stratigraphy in these two trenches is uniform and similar to that recorded during the previous excavations at the site. However, it should be noted that the cultural layer in this part of the site is quite disturbed, due to the existence of remains of the 19th century buildings and the 20th century gas pipeline. The remains of the 19th century buildings were recorded below the humus layer measuring a depth of between 0.3 and 0.4 m, and were in fact buried into the succeeding layer of loose brown soil. A layer of rubble, 0.2–0.3 m thick, stands in relation to the remains of buildings. The sporadic occurrence of prehistoric potsherds starts from this layer, although those potsherds were most certainly secondarily deposited. The archaeological finds were mostly recorded in the following layer comprised of loose brown soil, measuring a thickness of between 0.6 and 0.8 m. The finds are represented by sherds of hand-thrown and wheel-thrown pottery, which are preliminarily dated to the Iron Age (Early and Late) and the Early Roman period in the area. Apart from the prehistoric potsherds, small lumps of daub and Roman bricks were also recorded in this layer. The virgin soil occurs at a relative depth of between 1.3 and 1.4 m.

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[8] Живанић, Срндаковић 2002, 125 and further.

[9] Documentation of the Hometown Museum of Paraćin (hereinafter HMP), unpublished.

[10] The excavations were led by the archaeologist A. Srndaković, curator of HMP.

[11] Живанић, Срндаковић 2002, 129.

[12] Institute for Health Protection of Mother and Child.

[13] Zelengorska Street (Žarka Zrenjanina).

[14] Zelengorska Street, Parezanović and Jezdić backyard.

[15] The years in which this material was collected remain unknown to the authors.

[16] The excavations which took place during November 2018 were conducted due to the project for the expansion of the General Hospital, involving the connecting of the Surgery Department and the Children's Department. The excavations were organised by HMP and led by B. Stojanović and V. Vučković from HMP and V. Filipović from the Institute of Archaeology in Belgrade. Other members of the excavation team were the archaeologist Filip Stefanović from HMP, and the archaeologists Ognjen Mladenović and Jasminka Bogić from Belgrade.

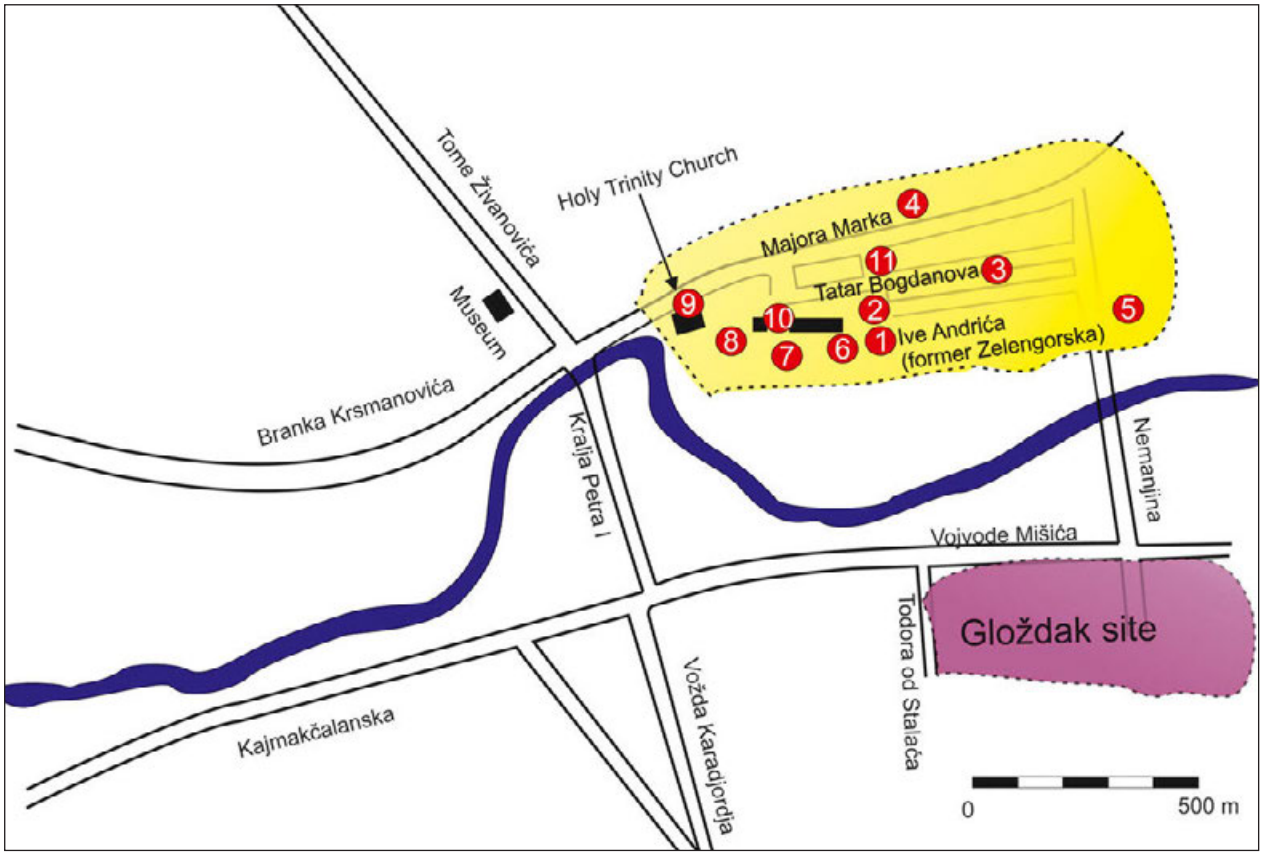

Fig. 2. The map of the wider area of the site of Bolnica and the points from which the material presented in the paper originates

Сл. 2. Карта шире околине Болнице и тачке одакле потиче материјал који се помиње у раду

The chronology and horizontal and vertical stratigraphy of the site

According to the situation presented above, and due to the fact that the archaeological finds ended up in museums by various means during the last four decades, the archaeological material will be presented according to the origin points, which can be tracked on the provided map of the wider area of the General Hospital complex (Fig. 2). The numbers marking the points from which the archaeological material originates correspond to the numbers on the map.[17]

1. and 2. Mali Jaz 1 and Zelengorska Street (present-day Ive Andrića Street)[18]

Since 1982, archaeologists of the HMP have successively visited the construction sites for residential buildings in this area of Parćin in order to collect archaeological material which originates from the area east of the General Hospital complex, in Zelengorska Street. Both points represent a row of several connected parcels in Zelengorska Street.

A fragment of a beaker with a handle that has an irregular circular cross-section and slightly surpasses the rim, decorated with a casually incised spiral motif (Pl. III/3), a fragment of a beaker (?) with a handle with modelled application on the top, starting from the rim (Pl. III/4), a fragment of a shallow cup with preserved root of a handle and a fragment of a rim and funnelled neck of a vessel with tongue-shaped decoration on the joint of the upper cone and the neck (Pl. III/6, 7), all

[17] The illustrated material does not originate from all of the points, but is rather a selection of the most relevant potsherds in terms of chronological and cultural attribution. All of the remaining material will be processed and presented in the volume of the Institute of Archaeology – Arheološka građa Srbije – Paraćin, which is currently in preparation.

[18] Cadastral parcel 2204/11.

originate from this point. The atypical potsherds are represented by belly fragments decorated with incised lines and shallow channels, sometimes with small tongue-shaped handles (Pl. III/8). Analogies for the beaker decorated with the casually incised spiral motif, characteristic for the Paraćin cultural group, can be found in grave 2 from the Gloždak necropolis and the site of Kneselačka česma at the periphery of present-day Paraćin.[19] In the immediate proximity of Paraćin, such a motif is recorded at the sites of Sarina međa[20] and Vecina mala,[21] and a number of similar examples have been recorded in object 2 at the site of Medijana's southern sector, near Niš.[22] Based on the analysis of the stylistic and typological characteristic of the pottery from the aforementioned object, which also contained archaeological material attributed to the early phase of the Brnjica culture and a previously published absolute date, those beakers are dated to the 13th century BC.[23] The fragment of beaker (?) handle which possesses a modelled application on the top (Pl. III/4), resembles handles typical of the Paraćin culture, although, the frequent occurrence of such handles during the Early Iron Age in the territory of the Central Morava Region does not allow a more precise chronological determination. For example, this handle is quite similar to the example originating from object 145 at the site of Panjevački rit, which has been dated to a period between the 13th and the 12th century BC,[24] meaning the same period as the presented beaker. The fragment of funnelled rim and neck of a vessel, with a small tongue-shaped application on the junction of the neck and the upper cone (Pl. III/7), could belong to phase II of the Paraćin culture, which is defined by grave 1962–2 from the Gloždak necropolis. During that phase, certain elements characteristic of the Belegiš culture appear. M. Garašanin dates this phase to the Br D period, meaning the 13th century BC.[25]

Two semi-globular beakers or small bowls with a slightly everted rim and a distinct groove below also originate from this point (Pl. III/12–13). Both vessels are wheel-thrown, fired orange, and have thin walls. These vessels most certainly do not represent products of the Late La Tène ceramic traditions, and would rather be connected with certain Roman shapes which are common for this area during the 1st and the 2nd century AD, as seen in Tekija[26] and Sirmium.[27] Small wheel-thrown and grey fired bowls resemble the Roman shapes, although both the colour and the surface treatment indicate the Late La Tène ceramic tradition (Pl. III/14). This bowl possesses an everted rim, with two parallel grooves below and an acute biconical belly. In terms of form, similar vessels are recorded in Singidunum during the 2nd century AD,[28] and the site of Napoca in Transylvania,[29] where a similar example is dated to a period of the first half of the 2nd century AD.[30] In terms of grey pottery, which seems to display La Tène ceramic traditions, a wheel-thrown pot, with an everted rim, fired dark grey and decorated with vertically grouped burnished bands should be noted (Pl. III/15). In terms of the form of the vessel, similar examples are found at sites in southern Pannonia, such as Čarnok,[31] Jaša Tomić,[32] Gomolava,[33] Kuzmin[34] and Minel in Karaburma.[35] Their chronological attribution falls within the period between the 1st century BC and the 1st century AD. A pot fragment similar to this example, although larger, undecorated and with a groove on the neck is also recorded at this point (Pl. III/11). Similar examples are recorded at the sites of Damića gradina,[36] Saraorci,[37] Mokranje,[38] Zlokučani,[39] and the site of Locusteni in Romania.[40] A fragment of a wheel-thrown beaker with the ribbon-like handle that is decorated with burnishing and two vertical grooves and fired grey is also recorded at this point (Pl. III/16). The profile of this fragment resembles an example from the site of Židovar,[41] which also possesses grooved handles, which is, in fact, a common method of decoration

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[19] Гарашанин 1970, 118–119, сл. 7–10; Garašanin 1983, 733, T. C/1; Stojić 1997, Pl. I/7, 8, Pl. I/5.
[20] Стојић 1982, T. III/9, 10; Stojić 1997, Pl. III/1, 3, 4, 7, 8, 10.
[21] Stojić 1986, 151, Сл. 35, 44, 45.
[22] Булатовић 2008, 223 and further, Сл. 4/1, 2.
[23] Булатовић 2008, 235.
[24] Стојић 2004, 88, T. LXVII/2.
[25] Garašanin 1983, 727–728, T. CI/3–6.
[26] Cermanović-Kuzmanović, Jovanović 2004, 153, kat. 7.
[27] Brukner 1981, 95, T. 88/110.
[28] Nikolić-Đorđević 2000, 47, type I/73.
[29] Rusu-Bolindeţ 2007, 629, Pl. LXVII/26.
[30] Rusu-Bolindeţ 2007, 260.
[31] Sladić 1998, 16, 7.
[32] Sladić 1998, 37, 2.
[33] Dautova Ruševljan, Brukner 1992, 46, T. 12/84.
[34] Брукнер 1995, 118, T. VIII/72.
[35] Sladić 1998, 69, 7.
[36] Dizdar 2001, T. 23/3.
[37] Popović 2000, Pl. 3/15–16.
[38] Булатовић *et. al.* 2013, 151, T. LXVIII/31.
[39] Sladić 1998, 115, 11.
[40] Popilian, Bondoc 2014, Fig. 11/3.
[41] Sladić 1986, T. XIX/2.

during the Late La Tène period. Also worth noting is a fragment of a wheel-thrown pithos with an inverted and jutted rim, fired in nuances of brown and orange (Pl. III/17). Similar pithoi, although rarely with the inverted rim, are known from throughout the Danube Region,[42] while the most similar examples are found on several sites in present-day Romania, such as the sites of Vărădia de Mureş[43] and Locusteni.[44] A fragment of a conical bowl with a slanted and triangularly profiled rim (Pl. III/18) can be connected with the territory of present-day Romania and the period between the 1st century BC and the 2nd century AD.[45] In terms of hand-thrown pottery, two characteristic fragments are presented. A pot with an everted rim, a concave neck, fired brown and decorated with incised semicircular lines (Pl. III/9), represents a common form in the Danube Region,[46] but also in the hinterland,[47] and the territory of present-day Romania.[48] A fragment of a vessel belly decorated with a modelled pinched band and an incised branch motif is quite interesting (Pl. III/10), since these are uncommon for the territory of present-day Serbia, with the only example originating from Singidunum, where it has been dated to the 1st century AD.[49] On the other hand, examples decorated with the motif of a branch, which is attributed to a period of transition between the old and new era, are numerous in the territory of present-day Romania, and recorded at the sites of Ciugud,[50] Moigrad,[51] Ocniţa,[52] Cugir,[53] Locusteni[54] , and Gruiu Dării,[55] and a similar example was also found in Bulgaria, at the site of Bagačina.[56] The examples from Romania are quite well dated to a period between the 2nd century BC and the 1st century AD. A small undecorated spindle whorl also originates from this point (Pl. IV/4).

Besides the pottery attributed to the so-called Dacian La Tène period, two objects made of deer horn originate from this point.[57] The first object could represent a tillage tool (a dibble?) or an antler pick (Pl. IV/5a–b), which was slantwise incised, with the point possibly damaged due to strong impacts during use (?). Similar objects originate from numerous Neolithic sites in the Danube Region.[58] Several deep parallel furrows are visible on the object, which were probably formed due to a rodent.[59] The second object most likely represents a handle of a metal awl (Pl. IV/6), considering that the base of the object possesses a large hole created by the insertion of a thinner object, and which subsequently radially broke the lower portion of the horn in three spots, due to heavy pressure. The top of the object is additionally burnished and flattened. Similar handles from the 1st century BC have been recorded in the territory of present-day Romania.[60]

3. Tatar Bogdanova Street[61]

A find of a pot which could be broadly dated to the Ha A/B period is recorded at this point.

4. Majora Marka Street[62]

Numerous potsherds attributed to the period between the 1st century BC and the 1st or even the 2nd

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42 Sladić 1986, T. XXII/3 – Židovar; Sladić 1986, T. XXXV/8 – Turski Šanac; Popović, Mrkobrad 1986, Fig. 9/7 – Ljubičevac–Obala; Поповић 1984, Сл. 123/3 – Ljubičevac–Gornje Ostrvo; Dizdar 2001, T. 11/1 – Dirov Brijeg; Popović 2000, Pl. 1/15 – Saraorci.

43 Berzovan 2014, Pl. 4/5.

44 Popilian, Bondoc 2014, Fig. 41/2–4, Fig. 42/8, Fig. 45/10.

45 For detailed analogies and dating refer to the fragment originating from the only enclosed context at this site – a pit excavated in 1991, point 6, fragment Pl. II/16.

46 Брукнер 1995, 130, T. XX/205 – Šimanovci; Sladić 1986, T. XLIV/3 – Sremska Mitrovica; Јовановић 1984, 324, T. II/2–3 – Hajdučka Vodenica; Булатовић *et. al.* 2013, 169, T. LXXXIII/40 – Prahovo; Trifunović 2014, 235, Fig. 15/9 – Čurug; Popović 2000, Pl. 10/18 – Ajmana; Dautova Ruševljan, Brukner 1992, 53, T. 19/122, 54, T. 21/126 – Гомолава; Jeremić 2009, 57, Fig. 36/57 – Салдум; Jevtić, Ljuština 2008, Pl. 2/1 – Židovar; Јацановић, Ђорђевић 1989–1990, 79, T. LXXXVI/4 – Orašje; Стојић, Јацановић 2008, 235, T. XCI/7 – Ram; Babović 1986, Fig. 22, 36 – Zbradila-Fund; Popović, Mrkobrad 1986, 318, Fig. 7/8 – Ljubičevac–Obala; Nikolić-Đorđević 2000, 80, type II/34.

47 Sladić 1998, 104, 2 – Ravna; Поповић 2003, T. I/lower left, T. II/lower left – Gloždak.

48 Berzovan 2014, 105, Pl. 1/5, Pl. 106/5 – Vărădia de Mureş; Rusu-Bolindeţ 2007, Pl. XIV/9–10 – Napoca; Popilian, Bondoc 2014, Fig. 6/11, Fig. 51/2, Fig. 55/4 – Locusteni; Guma, Rustoiu, Sacarin 1995, Pl. IX/5 – Divici; Sîrbu, Dăvîncă 2014, 300, Fig. 9/13–14 – Moigrad; Sîrbu *et al.* 2014, Fig. 6/p – Gruiu Dării; Crişan, Sîrbu 2010, Pl. 7/5 – Covasna; Sîrbu, Arsenescu 2006, Fig. 11/6 – Lancram.

49 Nikolić-Đorđević 2000, 80, tip II/34 – upper left.

50 Crişan 1969, Pl. LXI/7.

51 Crişan 1969, Pl. LXXIV/4; Sîrbu, Dăvîncă 2014, 300, Fig. 9/15.

52 Sîrbu, Arsenescu 2006, Fig. 9/12, 17.

53 Popa 2004, 156, Pl. 7/8.

54 Popilian, Bondoc 2014, Fig. 1/5.

55 Sîrbu, Matei 2013, Fig. 18/7.

56 Бонев, Александров 1996, 168, T.XXX/lower right.

57 The authors would like to thank MA Ivana Stojanović and Nemanja Marković, Ph.D. from the Institute of Archaeology in Belgrade for their helpful comments and suggestions.

58 Perišić, 1984, T. 20–23.

59 Vitezović 2016, 58–59.

60 Ferencz, Beldiman 2012, Pl.16/ARC 14, Pl. 17/ARC 15, Pl. 30/ARC 31.

61 Cadastral parcel 2234.

62 Cadastral parcel 1942/1.

century AD, were collected during the digging of foundations for a residential building at 61 Majora Marka Street. A fragment of a wheel-thrown bowl with a widely everted rim, fired grey originates from this point (Pl. IV/2). The recipient of the bowl, below the rim, is decorated with incised lines and a burnished wavy line, which undoubtedly has a La Tène origin. This type of vessel is common for the Late La Tène and Early Principate ceramic production in the Morava and Danube regions, and similar examples are recorded at sites in the wider area of the Serbian Danube Region, such as Židovar,[63] Vrtlozi near Šimanovci,[64] Gomolava,[65] Čurug[66] and Orašje near Dubravica.[67] Similar examples, in terms of the form of the vessel are recorded in the territory of eastern Banat, such as two examples from the site of Vărădia de Mureş, dated to a period between the 1st century BC and the 1st century AD,[68] or in Wallachia at the site of Gruiu Dării, where two similar examples have been recorded.[69] Similar ornamentation of the inner side of the recipient of La Tène vessels occurs during the 1st century BC, and probably lasts throughout the 1st century AD.[70] Such a manner of decoration is also noted on retarded La Tène pottery of the 2nd century AD.[71] Another vessel which could be attributed to the Late La Tène period is an S profiled wheel-thrown bowl, fired in nuances of brown and orange (Pl. IV/1). Similar examples are recorded at numerous Late La Tène sites in the Danube Region, such as Židovar,[72] Popov Salaš,[73] Gomolava,[74] Pantelejeva kruška,[75] Saraorci,[76] Panjevački rit,[77] and an almost identical example, fired reddish, originates from the so-called Dacian pit at the site of Ljubičevac-Obala in Đerdap.[78] Analogous examples are found within the so-called Daco-Roman horizon in the territory of present-day Romania, such is the case with the example from the site of Locusteni.[79] All of the examples attributed to the Late La Tène period are dated to the second half of the 1st century BC and the 1st century AD. However, similar bowls are common for the Early Provincial Roman pottery in this part of the Danube Region, which is noted at the sites of Gomolava[80] and Vojka,[81] and related forms prevail up to the 4th century AD.[82] There are also certain similarities with some bowls dated to the 2nd/3rd century AD, which could connect the Early and Late Antique examples.[83] A small wheel-thrown bag-shaped beaker, fired grey is quite interesting (Pl. IV/3). Such beakers rarely appear within the Late La Tène ceramic inventory, and similar examples, although fired red, are attributed to a period between the 1st and the 3rd century AD, such as the examples from Singidunum[84] and Saldum,[85] while the examples from Tekija[86] and Hajdučka Vodenica[87] could be slightly earlier, considering that the example from Hajdučka Vodenica was recorded together with a coin of Emperor Tiberius.

5. Nemanjina Street
(former Žarka Zrenjanina Street)[88]

There is no precise data regarding the origin of the archaeological material from this point in the documentation of the HMP. The only existing data is that the potsherds came to the Museum in 1996 and that the potsherds were collected during the construction of the foundation for an object located some 100 m south of the Glass Factory in Paraćin. Only a couple of pottery fragments have been selected from this location:

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[63] Sladić 1986, 34, T. XXVII/1–3; Jevtić, Sladić 1999, Pl. III/2–3.

[64] Брукнер 1995, 100, T. XIX/193.

[65] Jovanović, Jovanović 1988, 119, T. I/9, 149, T. XXV/4.

[66] Trifunović 2014, 229, Fig. 7/2, 5–6.

[67] Јацановић, Ђорђевић 1989–1990, T. LXXXIV/5.

[68] Berzovan 2014, 109, Pl. 5/2, 4.

[69] Sîrbu *et al.* 2014, Fig. 10/t, u.

[70] Sladić 1986, Жидовар – T. XVII/4, 8, T. XVIII/7, T. XXV/6, XXVI/6, Сремска Митровица – T. XLV/7, Ајмана – T. L/5; Dizdar 2001, Damića gradina – T. 38/4–5; Brukner 1981, Dumbovo – T. IV/2; Булатовић, Филиповић 2011, T. 4/1–2; Popović 2011 Krševica – fig. 21/1, 4

[71] Трифуновић, Пашић 2003, 271–272, Сл. 7/7.

[72] Sladić 1986, T. XVII/3, T. XXV/1; Jevtić, Sladić 1999, Pl. III/6.

[73] Sladić 1986, T. XXXVIII/7.

[74] Jovanović, Jovanović 1988, 159, T. XXXI/3.

[75] Kapuran 2014, T. 32/37, with a more elongated rim, yet the same form.

[76] Popović 2000, T. 3/3.

[77] Sladić 1998, 93, 1/2.

[78] Popović, Mrkobrad 1986, 308, Sl. 9/1.

[79] Popilian, Bondoc 2014, fig. 6/16, fig. 17/5–7, fig. 19/14, fig. 20/5.

[80] Dautova Ruševljan, Brukner 1992, T. 7/50.

[81] Brukner 1981, T. 88/107.

[82] Nikolić-Đorđević 2000, 36, tip I/42; Jeremić 2009, 79, tip I/18.

[83] Nikolić-Đorđević 2000, 38, tip I/47.

[84] Nikolić-Đorđević 2000, 170, tip IX/31.

[85] Jeremić 2009, 122–123, cat. 358.

[86] Cermanović-Kuzmanović, Jovanović 2004, 151, kat. 7.

[87] Јовановић 1984, 321, T. I/1.

[88] Cadastral parcel 2279/2.

a fragment of a bowl with an inverted rim (Pl. III/1) and a fragment of a large pot with a slightly everted rim and a massive ribbon-like handle, ellipsoid in cross-section (Pl. III/5). A more precise chronological attribution is not possible at the moment and, in terms of general considerations, it can be noted that these fragments most likely originate from the Bronze Age or the Early Iron Age.

6. Zelengorska Street, General Hospital complex, archaeological excavations

Four test trenches measuring a total of 18 m² were excavated during 1991 and 1992 in the area of former Zelengorska Street, in the south-eastern part of the General Hospital complex. Besides the portable finds from the layer, represented by potsherds and animal bones, a pit measuring a diameter of 1.4 m and a depth of 0.7 m, filled with burnt black soil, ash and soot mixed with potsherds and animal bones, was also recorded. The finds originating from this pit have only been partially published so far,[89] and those finds are dated to the Late Iron Age and Early Roman period in the area. The archaeological excavations confirmed the existence of an earlier layer in this area as well, defined as the Early Iron Age layer.

A fragment of a bowl with an inverted rim is characteristic for this earlier horizon. The neck of the bowl is decorated with parallel horizontal incisions and combined zigzag incisions below (Pl. III/2). Similar bowls have been recorded at the nearby sites of Sarina međa[90] and Panjevački rit.[91] The example from the site of Panjevački rit originates from object 220, and was, based on the accompanying ceramic inventory from the object, dated to the very beginning of the 10th century BC.[92] Previous archaeological excavations at this site yielded a fragment of a bowl with an inverted and facetted rim which is decorated with parallel incisions on the upper surface and possesses a small tongue-shaped handle below the rim (Pl. II/12). The bowl is fired in nuances of grey, with a slightly burnished surface and tempered with small stones. An almost identical form of bowl was registered at the site of Raskrsja near Vranje, which is relatively dated to the Ha B1–C period, meaning the period between the 10th and the 8th century BC.[93] An analogy for this bowl can also be found at the nearby site of Milićevska reka in Donje Štiplje, near Jagodina, where a bowl similar in form also possesses the parallel incisions on the upper surface of the rim.[94] A fragment of a vessel belly, decorated with horizontal bands comprised of two parallel strips performed by a running S motif, is quite interesting (Pl. II/11). Such a motif is characteristic of the Basarabi phase of the Early Iron Age.

In terms of the younger horizon, only potsherds originating from the aforementioned pit have been selected for presentation, due to the fact that the pit represents the only enclosed archaeological context.[95] Previously published vessels are wheel-thrown pithoi,[96] hand-thrown pots,[97] and small Early Roman bowls fired in nuances of red.[98] This inventory should be complemented with several characteristic fragmented vessels, such as a wheel-thrown slightly S profiled bowl, fired grey (Pl. II/15), which is a common form throughout the Serbian part of the Danube Region during the Late La Tène period. Similar examples have been recorded at the sites of Dirov brijeg,[99] Damića gradina,[100] Židovar,[101] Toplik,[102] Rgotina,[103] Lazarev grad,[104] Panjevački rit,[105] Medijana,[106] Gomolava,[107] Saraorci,[108] and Čurug.[109] The examples from all of these sites are dated to the second half and the very end of the 1st century BC, although similar examples are known from the 1st century AD as well. On the other hand, analogous and concurrent examples are also found in present-day Romania, at the sites of Locusteni[110] and Divici.[111] A fragment of a wheel-thrown phitos with a horizontal rim and fired in nuances of dark grey and black is quite

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89 Живанић, Срндаковић 2002, 129.
90 Stojić 1986, 21–22, T. 20/2.
91 Стојић 2004, 116–117, T. XCVI/11.
92 Стојић 2004, 250, chronological table for the objects.
93 Булатовић 2007, 237–239, T. LXXII/2.
94 Stojić 1986, 16, T. VI/2, 3.
95 Живанић, Срндаковић 2002, 129, сл. 3.
96 Живанић, Срндаковић 2002, сл. 3/1–2.
97 Живанић, Срндаковић 2002, сл. 3/5–6.
98 Живанић, Срндаковић 2002, сл. 3/3–4.
99 Dizdar 2001, T. 8/3.
100 Dizdar 2001, T. 16/1, T. 24/2, T. 28/3, T. 39/5.
101 Sladić 1986, T. XXV/2; Jevtić, Ljuština 2008, Pl. 3/7.
102 Sladić 1998, 74, 3.
103 Kapuran 2014, T. 32/24.
104 Стојић, Чађеновић 2006, 121, T. L/103.
105 Стојић 2004, 108, T. LXXXVIII/3.
106 Перић 2001, 18, T. II/6.
107 Jovanović, Jovanović 1988, 164, T. XXXV/1; Dautova Ruševljan, Brukner 1992, T. 10/63.
108 Popović 2000, 102, Pl. 1/4, Pl. 3/2.
109 Trifunović 2014, 233, Fig. 13/7.
110 Popilian, Bondoc 2014, Fig. 9/5.
111 Guma, Rustoiu, Sacarin 1995, Pl. V/3, Pl. 8/4

interesting (Pl. II/17), considering the fact that there are no similar examples within the Late La Tène ceramic inventory of the Danube Region, as their occurrence is connected with the Final La Tène and the 1st century AD. A decoration composed of parallel lines performed with some sort of combed tool is positioned on the lower portion of the neck of the pithos and similar yet wavy lines are performed directly below. Since the fragment is not complete, we can only assume that the parallel lines repeated below the wavy lines. Similar examples have been recorded at the sites of Sikirica,[112] Selenča,[113] Singidunum,[114] Gomolava,[115] Sirmium,[116] and Ljubičevac–Obala.[117] Aside from the examples from Sikirica, Selenča, and Ljubičevac–Obala, which originate from the Late La Tène contexts, finds from Srem would rather belong to the Early Roman-Provincial ceramic forms, according to O. Brukner. Such forms are common for the period of the 1st and the 2nd century AD and occur together with autochthonous latenoid pithoi.[118] A fragment of a wheel-thrown conical bowl with an inverted and triangularly profiled rim and fired grey also originates from the pit (Pl. II/16). This form of vessel is uncharacteristic for the La Tène period pottery in the Serbian part of the Danube Region, as it is often recorded in the territory of present-day Romania, for example, at the sites of Locusteni,[119] Sighişoara[120] and Sanziendi,[121] where such bowls are dated to a period between the 1st century BC and the 2nd century AD. Several analogous examples have also been recorded in the territory of the Danube Region, although in Roman contexts, such as one example from Gomolava,[122] one example from Singidunum[123] and two examples from the site of Zbradila-Fund.[124] The chronological attribution of the examples from the sites of Gomolava and Zbradila-Fund falls to the end of the 1st century and the first half of the 2nd century AD, while the example from Singidunum falls within the very end of the 2nd century AD. In terms of hand-thrown pottery, two ovoid pots with an everted rim and fired brown were recorded in the pit. Such pots are common for the Late La Tène ceramic inventory from sites in the Lower Danube Region and neighbouring territories during the transition between the old and new era.[125] One of the pots possesses a modelled horizontal band decorated with pinching and with a modelled triangular prong-shaped application (Pl. II/14). Such decoration is uncommon for the Serbian part of the Danube Region, but represents a common characteristic of the modelled pinched bands in the territories of present-day Romania and Banat, as such applications have been recorded at the sites of Napoca,[126] Covasna,[127] and Židovar.[128] All of the examples which possess such a decoration are attributed to a wide chronological span from the 2nd century BC to the 2nd century AD. A similar pot, although decorated with a horizontally positioned double modelled band with sharp incisions which are not as common as the pinching, has analogies at the sites of Tekija,[129] Viminacium,[130] Zbradila-Fund,[131] Napoca,[132] Covasna,[133] Locusteni[134] and Turdaş-Luncă.[135] It is similarly dated as the previously discussed example.

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[112] Живанић, Срндаковић 2002, 134, сл. 4/1.
[113] Popović 2000, 110, T. 9/11–12.
[114] Nikolić-Đorđević 2000, 130, type VI/3;
[115] Brukner 1981, T. 127/1, 3.
[116] Brukner 1981, T. 127/2, T. 128/8.
[117] Popović, Mrkobrad 1986, 320, Fig. 9/7.
[118] Brukner 1981, 42–43.
[119] Popilian, Bondoc 2014, Fig. 53/1, 6, Fig. 55/3.
[120] Crisan 1969, Pl. LIV/7.
[121] Puskas 2015, Fig. 11/1.
[122] Brukner 1981, 92, T.79/31.
[123] Nikolić-Đorđević 2000, 22, type I/13 – upper.
[124] Babović 1986, Fig. 46–47.
[125] Брукнер 1995, 130, T. XX/204 – Vrtlozi-Šimanovci; Jovanović, Jovanović 1988, 123, T. IV/9, 164, T. XXXV/9 – Gomolava; Јовановић 1984, 324, T. II/1 – Hajdučka Vodenica; Булатовић *et. al.* 2013, 112, T. XL/21, 151, T. LXVIII/36 – Korbovo and Mokranje; Поповић 2003, 265, T. I/upper right, T. II/numerous upper examples – Gloždak; Petković, Tapavički-Ilić 2011, 272, T. II/11 – Ćuprija; Popović 2000, Pl. 10/17 – Ljubičevac (Ostrvo); Dautova Ruševljan, Brukner 1992, 53, T. 19/124, 55, T. 20/138 – Gomolava; Jeremić 2009, 57, Fig. 36/55–56, 58 – Saldum; Nikolić-Đorđević 2000, 80, Tip II/34 – Singidunum; Tapavički Ilić, Grašar 2017, 76, Fig. 3 – Viminacium; Јацановић, Ђорђевић 1989–1990, 79, T. LXXXVI/1 – Orašje; Стојић, Јацановић 2008, T. XCI/9 – Ram; Babović 1986, 124–127, Fig. 18, 19, 51 – Zbradila-Fund; Baumann 2009, 208, Pl. V/upper right – Teliţa; Crişan 1969, 163, Fig. 75/4–6, Fig. 76/1–4 – Poiana; Berzovan 2014, 105, Pl. 1/1 – Vărădia de Mureş; Sîrbu, Arsenescu 2006, Fig. 9/16–17 – Ocniţa, Fig. 11/1, 3 – Lancrăm; Rusu-Bolindeţ 2007, Pl. XV/15 – Napoca; Popilian, Bondoc 2014, Fig. 9/6, 9, Fig. 13/13, Fig. 38/11, Fig. 59/1–3 – Locusteni; Guma, Rustoiu, Sacarin 1995, Pl. VIII/13, IX/1 – Divici; Sîrbu, Dăvîncă 2014, 300, Fig. 9/6, 12, 15–18 – Moigrad; Sîrbu, Matei, Ştefan, Ştefan 2014, Fig. 7/k, Fig. 8/f – Gruiu Dării.
[126] Rusu-Bolindeţ 2007, Pl. XVIII/43.
[127] Crişan, Sîrbu 2010, Pl. 6/5.
[128] Jevtić, Ljuština 2008, Pl. 2/1.
[129] Cermanović-Kuzmanović, Jovanović 2004, 189, kat. 4.
[130] Tapavički Ilić 2015, 622, Fig. 3.
[131] Babović 1986, 127, Fig. 79, 83.
[132] Rusu-Bolindeţ 2007, Pl. XVIII/44
[133] Crişan, Sîrbu 2010, Pl. 7/3.
[134] Popilian, Bondoc 2014, Fig. 3/2.
[135] Natea, Palaghie, Luca 2012, Pl. X/1.

7. Boiler room, General Hospital complex

Among the usual ceramic inventory of the Bronze Age, Early and Late Iron Age, two fragments attributed to the Starčevo culture are recorded at this point.[136] The first fragment of a conical bowl (Pl. II/9) has analogies at the nearby site of Drenovac,[137] the site of Grivac,[138] and object 3 at the site of Blagotin.[139] The other fragment probably belongs to a pot with a concave neck and slightly thickened rim (Pl. II/10). This example resembles examples from the site of Drenovac[140] and from object 3 at the site of Blagotin.[141] Both fragments could be attributed to the early phase of the Starčevo culture, but due to the considerable fragmentation, such a chronological determination should be treated with caution.

8. Institute for Health Protection of Mother and Child, General Hospital complex[142]

In the course of 1993, several potsherds came to the HMP. These potsherds were recovered during the placement of utilities (?) near the Institute for Health Protection of Mother and Child, to the west of the aforementioned boiler room. The potsherds belong to bowls and pots, which can broadly be dated to the Ha A1/A2 period.

9. Holy Trinity Church

The church is located on the edge of the river terrace and probably represents the western border of the site. Several portable finds collected during the construction of the gas pipeline, north of the churchyard, are attributed to the Early Iron Age, without the possibility of a more precise chronological determination.[143]

10. Green space between the Surgery Department and Children's Department

In the course of preventive archaeological excavations in 2018, potsherds attributed to the Early Iron Age (Transitional period) were recorded in trenches (control trenches) 1 and 2. Particularly characteristic are fragments of a slightly biconical bowl with an inverted rim and facetted upper cone (Pl. I/1), a shallow bowl with an inverted rim and neck decorated with vertical channels and a vertically positioned S motif (Pl. I/2), a conical bowl with a slightly inverted rim (Pl. II/1), a bowl with an inverted rim or S profile decorated with incised lines and oblique channels (Pl. II/2),[144] and pots or amphorae with more or less everted rims which sometimes possess horizontal channels on the neck (Pl. I/3, 4, Pl, II/3, 4). In terms of handles, massive ribbon-like handles with an irregularly rectangular cross-section, ribbon-like handles with a triangular cross-section, vertically channelled ribbon-like handles with an ellipsoid cross-section and small tongue-shaped handles (Pl. I/5–7, Pl. II/5–7) are recorded at this point. The atypical fragments of bellies are decorated with double incised zigzag lines, and horizontal and oblique channels (Pl. I/8, 9). All of the potsherds are made of clay tempered with small stones, fired in nuances of black, grey and brown, and possess slightly burnished surfaces. The slightly biconical bowl with an inverted rim and horizontally facetted upper cone belongs to the type Ia, according to the division proposed by A. Bulatović (Pl. I/1).[145] This type of bowl is recorded at the nearby sites of Panjevački rit,[146] Sarina Međa,[147] and Vrbica in Dragocvet, near Jagodina.[148] The occurrence of this type of bowl in the Central Morava Region is connected with the Ha A1/A2 period, according to Reinecke, meaning a period starting from the 13th century BC, although this type of bowl has quite a prolonged duration.[149] In terms of chronology, the manner of decoration is somewhat indicative. The fragment of a bowl with an inverted rim and a tongue-shaped handle below is decorated with vertical channels and a vertically positioned S motif (Pl. I/2). Such a motif has been registered at numerous sites in the territory of Vojvodina, which

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136 The exact year in which the archaeological material from this point came to the HMP is unknown.

137 Perić 2008, Pl. I/5, Pl. II/1.

138 Богдановић 2004, 47–127, T. 5/24, 37

139 Vuković 2004, T. II/1–2.

140 Perić 2008, Pl. III/4.

141 Vuković 2004, Pl. XVI/8.

142 Cadastral parcel 1977/1.

143 According to the church elder, skeletal remains were recorded on that occasion as well, although such data should be treated with caution. A metal cross indicating the altar of the previous St. Mark's Church, which was supposedly erected during the first half of the 19th century AD, is located in the northern part of the churchyard. Unfortunately, historical sources related to that church are scarce, as the entire archive was burned during WWI.

144 This fragment could belong to the neck of an amphora or a pot and, if that is the case, the channels would be positioned on the vessel belly, with horizontal parallel incisions at the very bottom of the vessel neck.

145 Булатовић 2009, 90–91.

146 Стојић 2004, T. XII/1, 2, T. XXX/3, T. LXXXIV/1, T. LXXXIX/1, T. XCVI/6–8, T. CXII/3–6, T. XXXIII/1, T. XXXV/8, T. LI/1, 2, T. LX/3–6, T. LXXIII/2, 3, T. LXXIV/3, T. LXXVII/1, T. LXXXII/3–6, T. LXXXIII/4–8, T. CIII/2, T. CVI/5.

147 Стојић 1982, 33, T. I/2; Stojić 1986, 21–22, T. 1/1, 2.

148 Stojić 1986, 17,T. 6/1–2.

149 Булатовић 2009, 99–12l, with cited literature.

are ascribed to the Bosut culture, and more precisely the Bosut-Basarabi phase, for which this motif is quite characteristic.[150] However, at the eponymous site of Bosut, such a manner of decoration sporadically appears in the enclosed features of settlement horizons 1 and 2, which are attributed to a slightly earlier Bosut-Kalakača phase (phase IVa).[151] P. and M. Medović date this horizon to a period between the middle of the 9th and the middle of the 8th century BC.[152] Still, the running S motif occurs at the nearby site of Panjevački rit starting from the Lanište I phase (Ha B3),[153] which begins around 800 BC according to the chronological division proposed by M. Stojić, and it therefore encompasses the Kalakača (IVa) and Basarabi (IVb) phases of the Bosut culture.[154] A bowl decorated in a similar manner, with a vertically positioned running S motif is recorded at the site of Prkljavica and dated, similarly, to the Ha B/C period.[155]

The Late La Tène and Early Roman periods at this point are characterised by hand-thrown potsherds, fired in nuances of brown and decorated with modelled bands with oblique incisions or pinching (Pl. I/15–18) and some of the examples possess slanted rims (Pl. I/10, 11). Such a repertoire of the so-called Dacian pottery is recorded at certain points within the site of Bolnica, as well as at the surrounding sites, but the significant fragmentation does not allow a precise reconstruction of the original forms of the vessels. Wheel-thrown vessels (Pl. I/12–14, 20, 21), which are without a doubt of Late La Tène origin, are simultaneous with the aforementioned hand-thrown vessels. Such vessels are decorated with an incised wavy line framed by parallel horizontal lines, which are characteristic of the period between the end of the 1st century BC and the 1st century AD (Pl. I/19),[156] although the decoration comprised of a combination of incised parallel bands and wavy lines continues throughout the Late Antique and even later.

11. The corner of Čika Ljubina and Tatar Bogdanova Streets

This point is located in the central part of the assumed location of the site.[157] In the course of digging the foundations for a residential building during the 1990s, at the Milenković estate, numerous potsherds were collected from a relative depth of 1 m. The potsherds belong to large vessels,[158] pitchers, pots and bowls which could be dated to the Late La Tène and Early Roman periods, meaning the second half of the 1st century AD for this part of the Morava Region.

Conclusion

There are several important conclusions which can be drawn from the foregoing information. Likewise, certain problems arise concerning the site of Bolnica, which has, so far, been almost irrelevant in professional literature. In the first place, there are questions concerning the extension of the site, its surface, and horizontal stratigraphy, as well as its relationship to the site of Motel Slatina. Namely, if we observe the site as it is represented on the map (Fig. 2), based on the recorded points, it can be concluded that the site encompasses an area of approximately 16 hectares: 700 m on the west-east axis, from the Holy Trinity Church to the administrative building of the Serbian Glass Factory (hereinafter SGF), and 230 m on the north-south axis (width), from the southern part of the General Hospital complex to the northern side of Major Marko Street. On the other hand, based on observations by M. Brmbolić and the results of the excavations at the site of Motel Slatina during the 1980s, which yielded Early Iron Age finds, besides the Early and Late Neolithic finds, the possibility cannot be excluded that the site of Bolnica encompasses a much larger area.[159] With that in mind, the site of Bolnica could be considered the same site as Motel Slatina. This is supported by the fact that the site of Motel Slatina was artificially interrupted on the north-south axis by the construction of the E75 highway[160] and that, in fact, its western portion borders with the area of the SGF, while the eastern border of the site is represented by the graveyard in the village of Glavica. During the 19th century, a textile factory was erected at the present location of the SGF. In 1906, the first glass factory was built following a great fire which burned the textile factory. There is no data to indicate if any archaeological remains were recorded

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150 Popović 1981, 28–29.

151 Medović, Medović 2010, Sl. 33/9, Sl. 38/3, Sl. 48/11, Sl.50/6, Sl. 51/13, Sl. 54/10.

152 Medović, Medović 2010, 72, 272.

153 Стојић 2004, 275–279.

154 For the Basarabi phase sites in the vicinity of Jagodina refer to Стојић 1979, 97 and further.

155 Булатовић, Јовић 2010, 154–160, T. LV/24.

156 For the analogies for the Dacian and La Tène forms refer to the archaeological material originating from other points in this paper.

157 Cadastral parcel 2218/1.

158 Живанић, Срндаковић 2002, 129.

159 Madas 1988, 90.

160 Perić *et al.* 2016, 12.

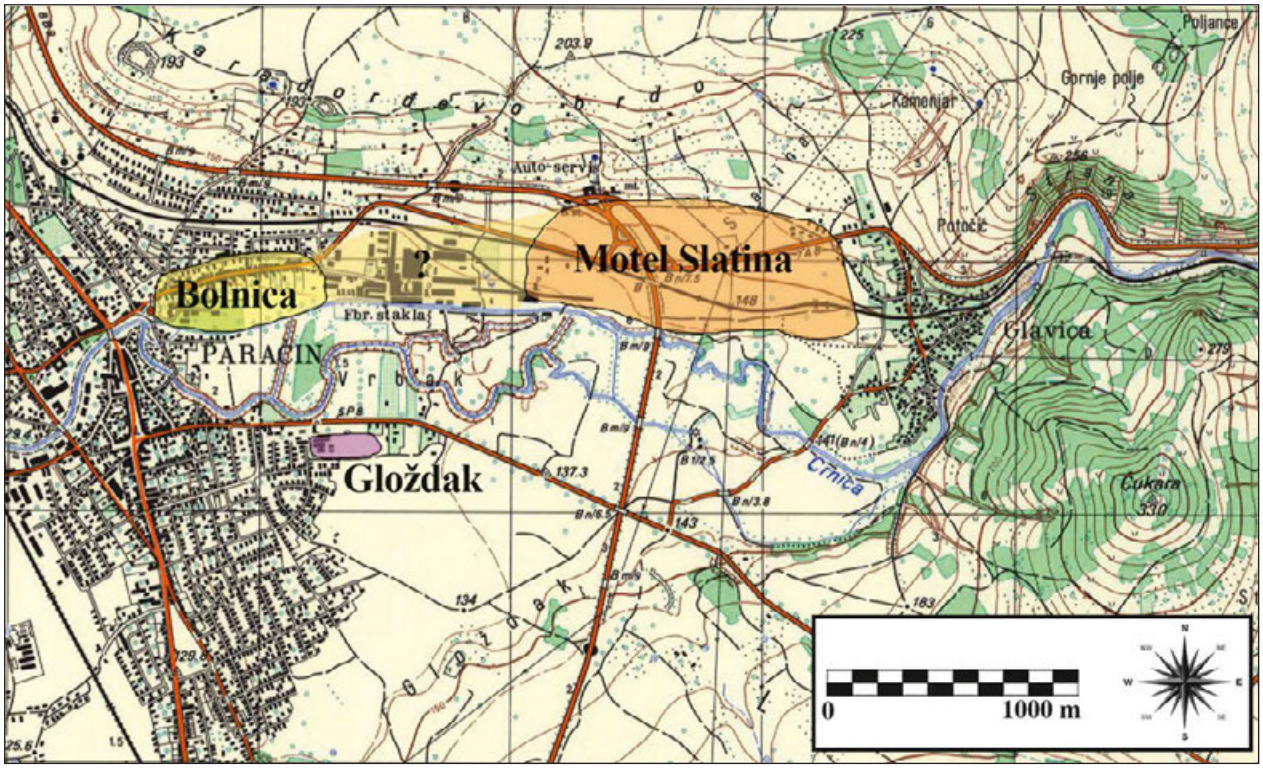

Fig. 3. The position of the sites of Bolnica, Motel Slatina and Gloždak on the topographic map (Kruševac 2–4), scale 1:25:000

Сл. 3. Позиција локалитета Болница, Мотел Слатина и Гложђак на топографској карти 1:25.000, Крушевац 2–4

during the construction of the glass factory, although the construction of the factory lasted for decades and subsequently expanded the area connected with the factory some 1.2 km on the west-east axis. S. Vetnić states that "*most of the site is devastated by the construction of economic buildings for the SGF*", but provides no additional data on that matter.[161] The distance between the graveyard in the village of Glavica and the area connected with the SGF is around 750 m on the right terrace of the Crnica River. The site of Bolnica is located on the same terrace, west of the area of the SGF. If the sites of Bolnica and Motel Slatina are in fact one site, which, based on current data, seems plausible, the total area of the site would measure 2,750 x 2,000 m,[162] which is an area of more than a 50 hectares (Fig. 3). Based on our current knowledge, it seems as though the thickest cultural layers are located in the area east of the SGF and the part of the site interrupted by the highway, although, most of the contexts from that area belong to the Starčevo and Vinča cultures but, as we have presented, the archaeological material attributed to the Starčevo culture is recorded in the central portion of the General Hospital complex as well. The Iron Age settlement also encompassed a large area, considering that similar archaeological material is recorded both in the area of the General Hospital and at the site of Motel Slatina. Such vast plain settlements from the given period are not rare in the Central Morava Region.[163] The Bronze Age and Late Iron Age/Early Roman period finds are recorded solely within the General Hospital complex.

The second important fact arising from the previous discussion on the horizontal stratigraphy and the extension of the site, is the comparison of the site of Bolnica, i.e. the site of Bolnica–Motel Slatina with multilayered sites in the immediate proximity, which are located on the right bank of the Velika Morava River. A

[161] Vetnić 1974, 139.
[162] The minimum average width.
[163] Stojić 1986, 63–65.

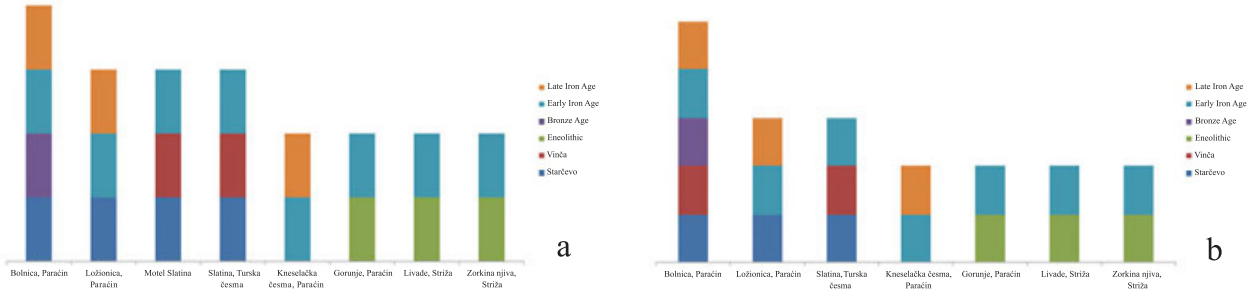

Fig. 4. Charts representing the number of prehistoric chronological horizons at the sites located on the right bank of the Velika Morava River: sites of Bolnica and Motel Slatina treated as separate sites (a), and as the same site (b)

Сл. 4. Графикони са бројем праисторијских хронолошких хоризоната на локалитетима на десној обали Велике Мораве: са одвојеним локалитетима Болница и Мотел Слатина (а) и са спојеним у један локалитет (b)

total of seven sites have been recorded, of which only the site of Bolnica possesses four chronological horizons (Early Neolithic, Bronze Age, Early Iron Age, and Late Iron Age). Three sites possess three chronological horizons – Ložionica–Paraćin, Motel Slatina and Slatina–Turska Česma in the village of Drenovac, while four sites possess only two chronological horizons – Gorunje and Kneselačka česma in the wider area of Paraćin, and the sites of Livade and Zorkina njiva in the village of Striža (Fig. 4a).[164] However, if we treat the sites of Bolnica and Motel Slatina as one site, as previously suggested and argued, the site would possess a total of five chronological horizons,[165] two sites would possess three, and four sites would possess two chronological horizons (Fig. 4b).

Based on the size of the site and the number of chronological horizons, a logical question regarding the importance of the site of Bolnica–Motel Slatina for the prehistory of the Central Morava Region arises. According to Jovan Cvijić, a series of large rifts in a meridian direction, with a length of more than 100 km, occur from Golubac on the right bank of the Danube River to the city of Paraćin.[166] In that direction the massifs of Homolje, the Beljanica Mountain and the Kučaj Mountain separate the Velika Morava and Mlava valleys from the Timok Basin. However, Jovan Cvijic also states: *from Paraćin, through the Crnica Valley and Grza Valley, the terrain rises towards the Stolice mountain pass and from that point on falls towards the Crnorečka Gorge*[167] *below the Rtanj Mountain*.[168] Also, Cvijić states that somewhat south, through the Moravica valleys near Aleksinac and following the Nišava River towards the Gramada Mountain, one could easily access the Timok Basin.[169] Still, it is apparent that the valleys of the Crnica and Grza rivers and Čestobrodica with the Stolice mountain pass are the most easily accessible natural communication from the Morava Valley towards the Timok Basin, in the territory south of the Danube River. Such a situation, with the natural communications in mind, explains the problem of the existence of a large and chronologically versatile site (Bolnica–Motel Slatina) on the right bank of the Crnica River, some 4.5 km east of its confluence with the Velika Morava River. In that area the Crnica River comes out of a small glen between the Strana and Glavica hills and starts into its valley with a slightly meandering flow. The later Roman road, the *Via Militaris*, followed the Mlava Valley from Viminacium and entered the Velika Morava Valley near Dražimirovac, where it continued further to the south,[170] following the right bank of the river. In the area or in the vicinity of the site of Bolnica–Motel Slatina, the *Via Militaris* had to cross the transversal road which followed the aforementioned natural communication towards the Crni Timok Valley.

[164] Seven single layered archaeological sites were recorded within the given territory, but were not relevant to the discussion.

[165] There is a possibility that Eneolithic pottery occurs at the site of Bolnica–Motel Slatina as well, which has yet to be confirmed, since the archaeological material from the site of Motel Slatina is stored in at least three different museums in Serbia (National Museum in Belgrade, Hometown Museum of Paraćin and Hometown Museum of Jagodina). If that is the case, the site would possess a total of six chronological horizons.

[166] Цвијић 2000, 59.

[167] Crni Timok Valley.

[168] Цвијић 2000, 59.

[169] Цвијић 2000, 59.

[170] Петровић 2015, 304.

In a manner, the site discussed in this paper had to represent an important intersection of those two roads, and a major strategic point of great significance. This route is the only east-west communication presented on the Austro-Hungarian map from 1718,[171] although on that map the route follows the left bank of the Crnica River. According to the General Staff map from 1894, the route followed the left bank for only 500 m.[172] Numerous sites in the valleys of Crnica, Grza, Čestobrodica and Crni Timok utilised this communication, starting from early prehistory. In the Grza Valley, several sites are recorded near the villages of Lešje and Mutnica – Trševine, Vrelo, Ćurčar, Slanište and Selište, which have yielded Iron Age finds.[173] On the other hand, numerous prehistoric sites have been recorded in the Crni Timok Valley, such as the Neolithic sites in Zlotska pećina and the villages of Savinac and Podgorac, the Eneolithic sites in Bogovinska pećina and the village of Sumrakovac, and sites from later prehistoric periods such as those in the villages of Strmljane, Lukovo or Podgorac.[174]

Based on the presented archaeological material, the question arises regarding the presence of the Dacian material culture in this area, together with the Late La Tène and Early Roman material. Also, it should be noted that in terms of the Bronze and Early Iron Age, this site represents a lowland settlement and that the Bronze Age material corresponds to the Gložđak necropolis on the opposite bank of the Crnica River (Fig. 2). The presence of the Dacians in the area of Paraćin was discussed more than 50 years ago by D. Garašanin, following the excavations at the aforementioned Gložđak necropolis.[175] Since then, no renewed or extensive research has addressed that particular problem, and conclusions have primarily been based on the works of D. Garašanin. P. Popović made interesting statements that the graves[176] from Paraćin possess no similarities with the Dacian necropolises in present-day Romania and that these graves represent the traces of a forced relocation of the population during the 1st century AD.[177] The archaeological material recorded at the site of Bolnica, and especially in pit 1, which is an enclosed context, suggests a strong presence of Dacians in this area, who lived together with the autochthonous population of Scordiscian origin, while the Roman material culture is recorded to a lesser extent. As previously presented, most of the Dacian archaeological material corresponds to the territory of present-day Romania, and some of the elements which are registered on hand-thrown pottery (double modelled pinched bands, bands with sharp incisions, suspended modelled pinched bands, branch motifs, and triangularly modelled prong-shaped applications) originate exclusively from the Late Dacian culture in their original territories. A similar situation can be noted for certain elements on the wheel-thrown pottery, such as the bowl with an inverted and triangularly profiled rim or the pithos with an inverted and jutted rim. These forms of vessels and decoration motifs are characteristic for the original Dacian regions and occur from the 2nd century BC to the 2nd century AD, when we find them mixed with Roman material, which is also the case with the sites of Bolnica and Gložđak. D. Garašanin,[178] M. Garašanin,[179] and P. Popović[180] assume that the site of Gložđak represents the results of Dacian deportations during the 1st century AD, which are confirmed in historical sources, although there was no precise data detailing which of several deportations. Based on the latest excavations at the site of Gložđak–Lidl, in which a thick layer of the Dacian La Tène period was recorded, which completely corresponds to the archaeological material from the previous excavations at the site of Gložđak and the site of Bolnica, together with numismatic finds from the 1st century AD,[181] it can be assumed that the deportation in question is connected with the displacement of 100,000 "Tansdanubians" by Silvanus Aelianus, the legate with pro-praetorian authority in Moesia (legatus propraetore Moesiae), during the reign or Emperor Nero. The first 13 lines from the inscription of Silvanus Aelianus' tombstone, which was found near present-day Tivoli, not far from Rome, state:[182]

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171 Брмболић 2011, 12.

172 General Staff map 1894.

173 Живанић, 2002; Живанић, 2010; Brmbolić 1981.

174 Гарашанин, Гарашанин 1951; Тасић 1982; Капуран *et al.* 2014.

175 Garašanin 1964, 79 and further.

176 Based on the results of the latest excavations at the site of Gložđak–Lidl, in 2018, we can note that these are not Dacian graves. However, the conclusions on the chronology and the Dacian presence in the Central Morava Region remain as P. Popović suggested.

177 Поповић 2003, 264–265.

178 Garašanin 1964, 85.

179 Гарашанин 1973, 523.

180 Поповић 2003, 265.

181 The numismatic finds are represented by coins of Tiberius, Claudius and Vespasian.

182 CIL XIV, 3608.

TI PLAVTIO M F [---]
SILVANO AELIANO
PONTIF SODALI AVG
IIIVIR A A A F F Q TI CAESARIS
5 LEG LEG V IN GERMANIA
PR VRB LEGAT ET COMITI CLAVD
CAESARIS IN BRITTANNIA CONSVLI
PROCOS ASIAE LEGAT PRO PRAET MOESIAE
IN QVA PLVRA QVAM CENTVM MILL
10 EX NVMERO TRANSDANVVIANOR
AD PRAESTANDA TRIBVTA CVM CONIVGIB
AC LIBERIS ET PRINCIPIBVS AVT REGIBVS SVIS
TRANSDVXIT

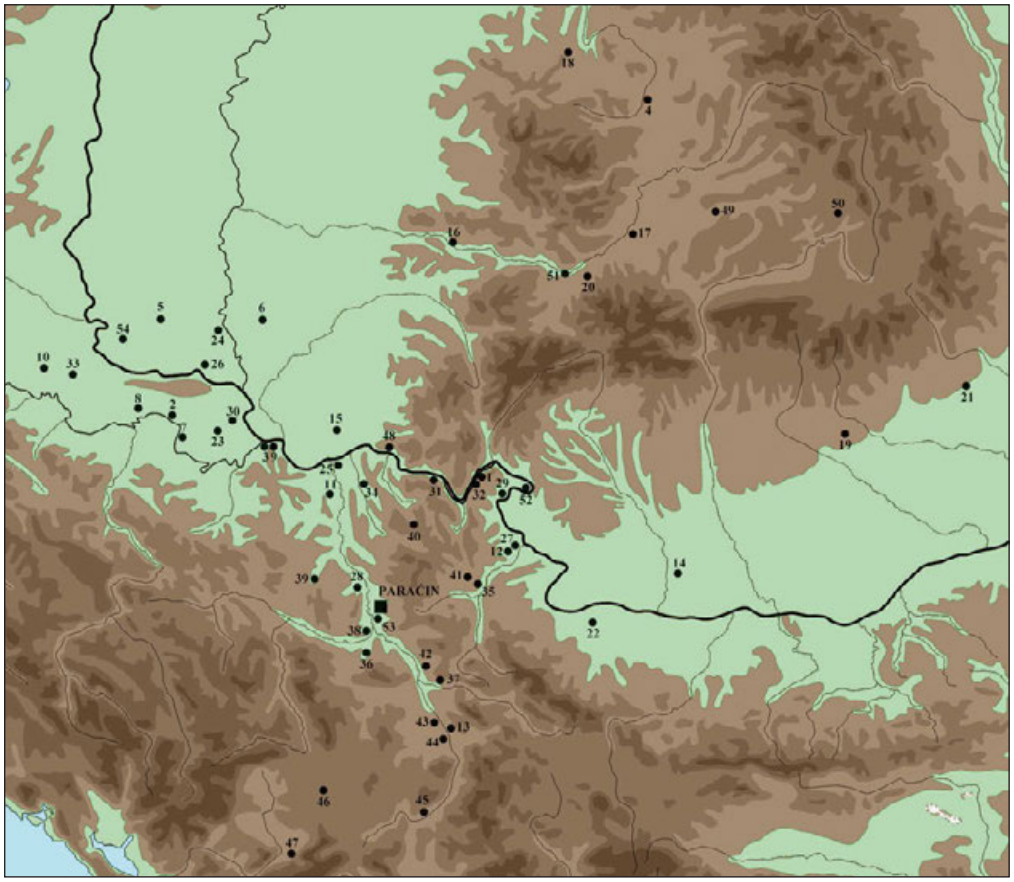
Ti(berio) Plautio M(arci) f(ilio) [Ani(ensi)]
Silvano Aeliano,
pontif(ici), sodali Aug(ustali),
IIIvir(o) a(ere) a(rgento) a(uro) f(lando) f(eriundo),
q(uaestori) Ti(beri) Caesaris,
5 leg(ato) leg(ionis) V in Germania,
pr(aetori) urb(ano), legat(o) et comiti Claud(i)
Caesaris in Brittannia, consuli,
proco(n)s(uli) Asiae, legat(o) pro praet(ore) Moesiae
in qua plura quam centum mill(ia)
10 ex numero Transdanuvianor(um)
ad praestanda tributa cum coniugib(us)
ac liberis et principibus aut regibus suis
transduxit;

Tiberius Plautius, son of Marcus, (of the tribe) [Aniensis], Silvanus Aelianus, pontifex, fellow of the priesthood of the deified Augustus, triumvir in charge of the mint, quaestor of Tiberius Caesar, legate of the Fifth Legion in Germany, urban praetor, legate and companion of Claudius Caesar in Britain, consul, proconsul of Asia, legate with pro-praetorian power of Moesia, in which (command) he led across (the Danube) more than 100,000 of the multitude of the Transdanubian peoples to make them pay tribute, along with their wives and children, their leaders or their kings.[183]

Therefore, the relocation of the aforementioned 100,000 Dacians to the territory of Moesia could be ascribed to a period when Silvanus Aelianus served in Moesia, between 61 and 64 AD,[184] while the material evidence indicates the Dacian presence in the Central Morava Region during the second half of the 1st century and the 2nd century AD. The Central Morava Region was not selected as their final destination without good reason. Namely, prior to the construction of the Roman road and the erection of Trajan's Bridge, the only and the most accessible crossing over the Danube River in the Morava confluence area was the area of present-day Ram, antique Lederata.[185] The island of Sapaja, which is positioned closer to the left bank of the Danube River and present-day Stara Palanka, facilitated the crossing towards a relatively dry area between the Karaš and Nera rivers, in contrast to the upstream area on the left bank of the Danube River which was, up until recently, marshy and barely accessible. Aside from the Roman and Medieval finds, scarce prehistoric finds have also been recorded on the island of Sapaja.[186] On the other hand, a strong indication of settling during the last centuries of the old era was recorded in the area of Lederata.[187] The Roman road went from Lederata towards the neighbouring Viminacium, where it connected with the *Via Militaris* and reached the Central Morava Region through the Mlava Valley and several small passes, some 10 km north of present-day Ćuprija, antique Horreum Margi.[188] The exact reason for the settling of a large number of Dacians in this area, in particular, remains unclear, although the fact that this area is considerably distant from their original territories, at least two or three days walking including a controlled passage of the Danube River. Based on the present state of research and available publications, the Dacian presence is recorded from the area of present-day Jagodina,[189] to the territories south of present-day Paraćin.

Another interesting fact can be noted in relation to the Late La Tène pottery, which we have found mixed with Dacian and Early Roman pottery. The pottery recorded at the site of Bolnica, as well as at the site of Gložđak possesses distinct characteristics of La Tène pottery production, in terms of the wheel-thrown pottery. On the other hand, the number of represented forms decreases and S profiled bowls, large pots decorated with a wavy combed ornament and beakers with two handles are dominant. Unlike the previous period, those forms are fired in shades of dark grey and black and the ornamentation is performed by burnishing, which is characteristic of the Late La Tène period. Unfortunately, there were no attempts at systematisation of the existing

183 Sherk (ed.) 1988, 104.
184 Griffin 2000, 24.
185 Jovanović 1996, 69 and further.
186 Димитријевић 1984, 32.
187 Стојић, Јацановић 2008, 234–235.
188 Петровић 2015, 304; Danković 2015, with cited literature.
189 Vetnić 1967, 43.



1. Tekija;
2. Sirmium;
3. Singidunum;
4. Napoca;
5. Čarnok;
6. Jaša Tomić;
7. Gomolava;
8. Kuzmin;
9. Minel – Karaburma;
10. Damića Gradina;
11. Saraorci;
12. Mokranje;
13. Zlokućani;
14. Locusteni;
15. Židovar;
16. Vărădia de Mureș;
17. Ciugud;
18. Moigrad;
19. Ocnița;
20. Cugir;
21. Gruiu Dării;
22. Bagačina;
23. Vrtlozi near Šimanovci;
24. Čurug;
25. Orašje near Dubravica;
26. Popov Salaš;
27. Pantelejeva kruška;
28. Panjevački rit;
29. Ljubičevac–Obala;
30. Vojka;
31. Saldum;
32. Hajdučka Vodenica;
33. Dirov Brijeg;
34. Toplik;
35. Rgotina;
36. Lazarev Grad;
37. Medijana;
38. Bedem – Maskare;
39. Korićani;
40. Ćetaće – Sena;
41. Staro groblje – Bor;
42. Vrtište;
43. Jeričište;
44. Kumarevo;
45. Rašina okućnica – Vranje;
46. Gladnice;
47. Prizren;
48. Divici;
49. Sighișoara;
50. Covasna;
51. Turdaș-Luncă;
52. Zbradila-Fund;
53. Sikirica;
54. Selenča

Fig. 5. Map of the Late La Tene and Early Roman sites mentioned in the text

Сл. 5. Мапа йознолашенских и раноримских локалишеша који се йоминьу у раду

material, which would be based on Late La Tène ceramic production recorded in an Early Roman context. Another interesting observation can be made in terms of the situla-shaped pots. Such pots, which are a characteristic hand-thrown form of the Late La Tène period, are characterised by the situla-shaped profile, a shallow groove below the rim and, in most cases, a combed ornament which covers the entire surface of the vessel.[190] In comparison to other forms, such as the so-called Dacian cups or hand-thrown pots decorated in a characteristic "Dacian" manner, which originate from the territories predominantly inhabited by Dacian populations, the distribution of the situla-shaped pots in the territory of Serbia is connected with the Late La Tène Scordisci settlements in Srem, southern Banat and on the right bank of the Danube River, from the mouth of the Morava River to the Đerdap Region. Their occurrence is quite sporadic in the hinterland of the Danube Region and further to the south. In the territory of the Central Morava Region, fragments of such pots have been recorded at the site of Panjevački rit near Paraćin,[191] and at the sites of Maskare Bedem[192] and Lazarev grad[193] near Kruševac and the site of Dautovac–Korićani near Kragujevac.[194] East of the Central Morava Region, situla-shaped pots are recorded at the sites of Ćetaće, in the village of Sena[195] and the site of Staro groblje, in Bor.[196] Further to the south, similar pots

[190] Such decoration can be organised in various ways, horizontally, obliquely, spirally, vertically, comprising rhomboid fields, or semi-circles which are connected to each other. If there is no combed ornamentation, the situla-shaped pots are mostly decorated with wide and deep incisions and vertical channels (Todorović 1968, 45).

[191] Стојић 2004, T. 15/ 1, 3, 4, 5; Булатовић, Филиповић 2011, 12, T. 4/9–14.

[192] Стојић, Чађеновић 2006, 163–173, T. LXXXVII/43–46.

[193] Стојић, Чађеновић 2006, 101–121, T. L/105, 106.

[194] Капуран *et al*. 2014, 202–203, T. CXXI/7–9.

[195] Булатовић *et al.* 2011, 120–121, Сл. 3, 4.

[196] Sladić 1998, 100–103, T. 2/1, 2.

are quite scarce and recorded in the vicinity of Niš,[197] Leskovac,[198] Vranje,[199] Priština,[200] and Prizren,[201] which is the southernmost find of a situla-shaped pot in the territory of present-day Serbia. It is interesting that no fragments of situla-shaped pots were recorded at the points presented in this paper,[202] compared to the pots of Dacian provenance (Pl. I/10, 11, Pl. II/13, 14, Pl. III/10, 11).[203] On the other hand, as previously noted, situla-shaped pots are the main form of hand-thrown vessels within the Late La Tène ceramic inventory of wheel-thrown pottery in the Middle Danube Region. Therefore, it seems that, within the territory discussed in this paper, which is abundant both in Late La Tène, Dacian and Early Roman ceramic forms, pots of a Dacian provenance have completely taken over the role of the situla-shaped pots, whose production ceased, at least in the somewhat restricted area presented in this paper. The reason behind this can be found in the nature of the site of Bolnica and nearby sites in the territory of present-day Paraćin. Namely, the heterogeneous archaeological material indicates either a peaceful cohabitation of different communities which inhabited this area or the acceptance of certain forms by other communities. In both cases, the need for taking only certain ceramic forms could be caused by the greater utilisation value or qualities of such forms, compared to the analogous ceramic forms of the societies that accepted them. This resulted in the fact that the hand-thrown pottery of Dacian provenance was favoured, compared to the wheel-thrown pottery, where Late La Tène and Early Roman forms are dominant.

Future excavations at the site of Bolnica and the publication of all material originating from both new and earlier excavations at the site of Gloždak, and several sites in the Central Morava Region that yielded similar material culture,[204] could provide answers to certain questions which have arisen in this paper. Nevertheless, it seems that the site of Bolnica/Motel Slatina represents the largest and chronologically most durable settlement in the Central Morava Region, even though its potential excavations are limited by the modern infrastructure of the city of Paraćin.

Translated by Ognjen Mladenović

[197] The site of Velika česma in Vrtište (Стојић, Јоцић 2006, 67–77, T. XVI/70), the site of Medijana (Перић 2001, 12, T. I/1–3).

[198] The site of Sastanci in Kumarevo (Булатовић, Јовић 2010, 84–112, T. XXIX/118) and the site of Jeričište (Булатовић, Јовић 2010, 211–227, T. XCIII/67).

[199] The site of Rašina okućnica near Vranje (Булатовић 2000, 323–326, T. I/11; Булатовић 2007, 117–124, T. XXII/35).

[200] The site of Gladnice (Sladić 1998, 137–139, T. 2/8).

[201] The village of Vrbica, near Prizren (Sladić 1998, 329–330).

[202] This data also refers to potsherds which are not presented in this paper, and which originate from the aforementioned points.

[203] An identical situation was recorded during archaeological excavations at the site of Gloždak–Lidl in Paraćin, in 2018 (unpublished, documentation of the HMP). Likewise, there are no situla-shaped pots within the previously published Late La Tène material from the Gloždak necropolis (Garašanin 1964, 79 and further, Поповић 2003, 259 and further).

[204] Several sites which yielded similar archaeological material were excavated by S. Vetnić and M. Stojić from the Hometown Museum in Jagodina, and that material corresponds to that from the sites of Gloždak and Bolnica, based on the personal insight of one of the authors.

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Vojislav M. FILIPOVIĆ, Ognjen Đ. MLADENOVIĆ, Vesna P. VUČKOVIĆ
Archaeological site of Bolnica in Paraćin and its importance for the prehistory of the Central Morava Region (113–138)

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ЛОКАЛИТЕТ БОЛНИЦА У ПАРАЋИНУ И ЊЕГОВ ЗНАЧАЈ У ПРАИСТОРИЈИ ЦЕНТРАЛНОГ ПОМОРАВЉА
– прилози хронологији, хоризонталној и вертикалној стратиграфији

Кључне речи – Болница, Мотел Слатина, праисторија, протоисторија, централно Поморавље, раскрсница путева, Дачани, позни латен, рани принципат

Локалитет Болница у Параћину налази се у североисточном делу данашњег града, на првој речној тераси Црнице, чија надморска висина варира између 130 m и 140 m, а која заправо представља јужне обронке Карађорђевог брда. Читав локалитет данас је прекривен модерним насељем, које је у великој мери оштетило његову стратиграфију, због чега нису могућа истраживања ширег обима. Последња археолошка истраживања, превентивног карактера, реализована су крајем 2018. године у самом болничком кругу.

Приказан одабир археолошког материјала потиче са укупно 11 тачака из круга данашње Опште болнице у Параћину и његове непосредне околине, а прикупљан је сукцесивно још од 80-их година прошлог века. Уломци посуда што су у претходне три деценије доспели у Завичајни Музеј у Параћину указују на постојање најмање четири културно-хронолошка хоризонта на овом локалитету – ранонеолитски, бронзанодопски, хоризонт старијег гвозденог доба и хоризонт млађег гвозденог доба. Највећа пажња посвећена је пре свега налазима из млађег гвозденог доба, чији облици и карактер упућују на порекло са територије данашње Румуније, односно на материјал дачке провенијенције. Управо су на том простору пронађене бројне аналогије материјалу који потиче са више локалитета на територији града Параћина (Болница, Глождак, Глождак–Лидл) и његове непосредне околине.

Поређењем територијално-стратиграфских односа локалитета Болница са њему територијално блиским локалитетом Мотел Слатина дошло се до одређених закључака који говоре у прилог томе да се ради о јединственом локалитету што је још почетком XX века вештачки подељен изградњом Српске фабрике стакла и ауто-пута Е–75. Тако посматрано, локалитет Болница, односно Болница / Мотел Слатина представља у стратиграфском погледу један од најбогатијих локалитета на простору централног Поморавља.

Посебно је разматран и положај локалитета Болница у односу на главне комуникационе правце у праисторијском и раноримском периоду, па је закључено да је ова област представљала важну раскрсницу на којој су се сусретали путеви који су водили са севера на југ, али и према истоку, према просторима који су гравитирали територији насељавања дачких популација. Упоредна анализа керамичког инвентара са локалитета Болница, резултата старијих истраживања у Параћину и постојећих историјских извора указала је на могућност да постојање материјалне културе Дачана на овом простору може бити последица присилног премештања становништва током I века наше ере. Наиме, епиграфски извори говоре о томе да је током I века наше ере, а вероватно између 61. и 64. године, извесни Силван Елије, легат са пропреторским овлашћењима, насилно преселио 100.000 „прекодунаваца” на територију тадашње Мезије, данашње Србије.

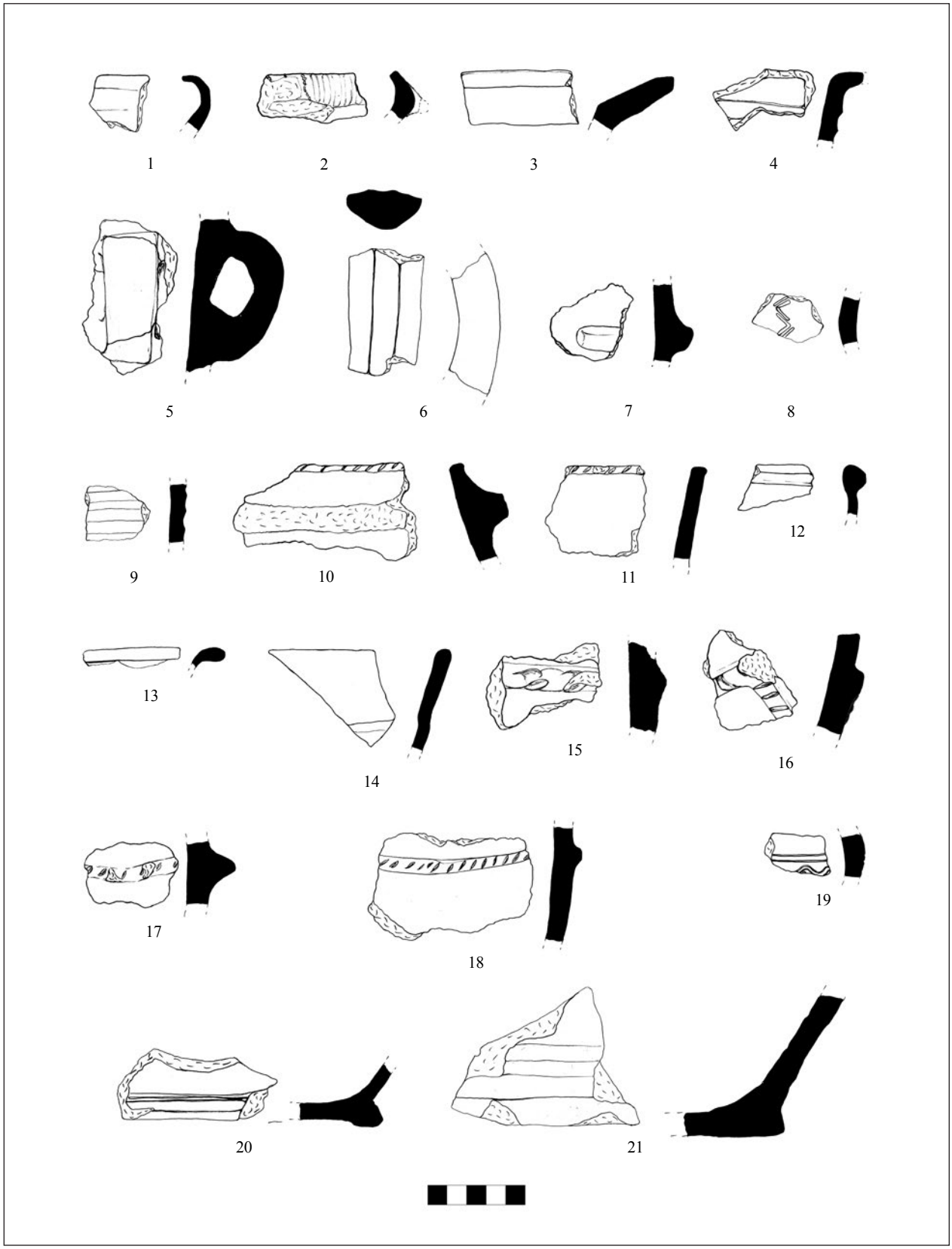

Plate I – Bolnica, trench 1, excavations in 2018 (1–21) (drawing J. Bogić)

Табла I – Болница, сонда 1, ископавања 2018. (1–21) (цртеж Ј. Богић)

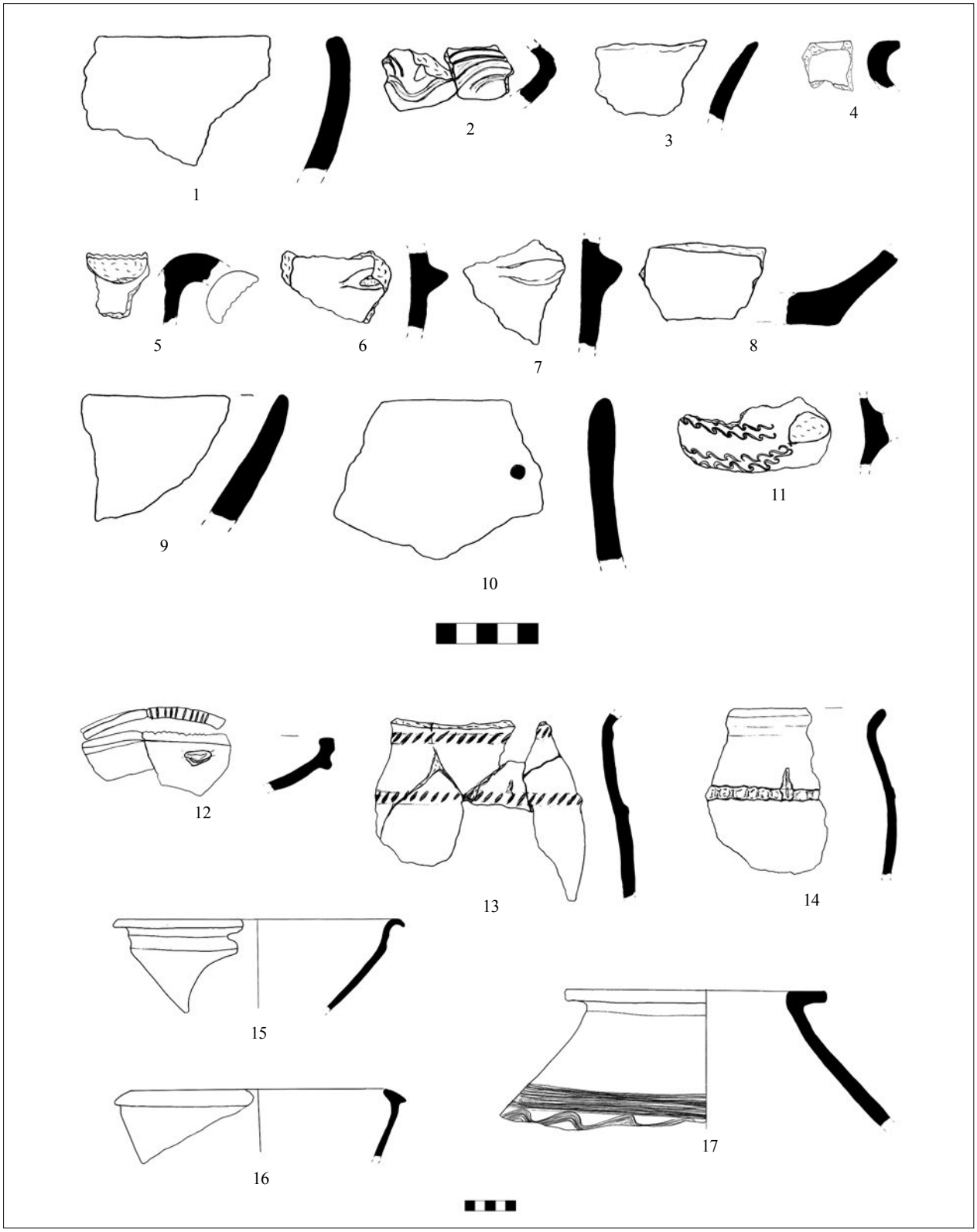

Plate II – Bolnica, trench 1, excavations in 2018 (1–8); Boiler room (9–10); excavations in 1991 (11–17) (drawing J. Bogić)

Табла II – Болница, сонда 1, ископавања 2018. (1–8); Котларница (9–10); ископавања 1991. (11–17) (цртеж Ј. Богић)

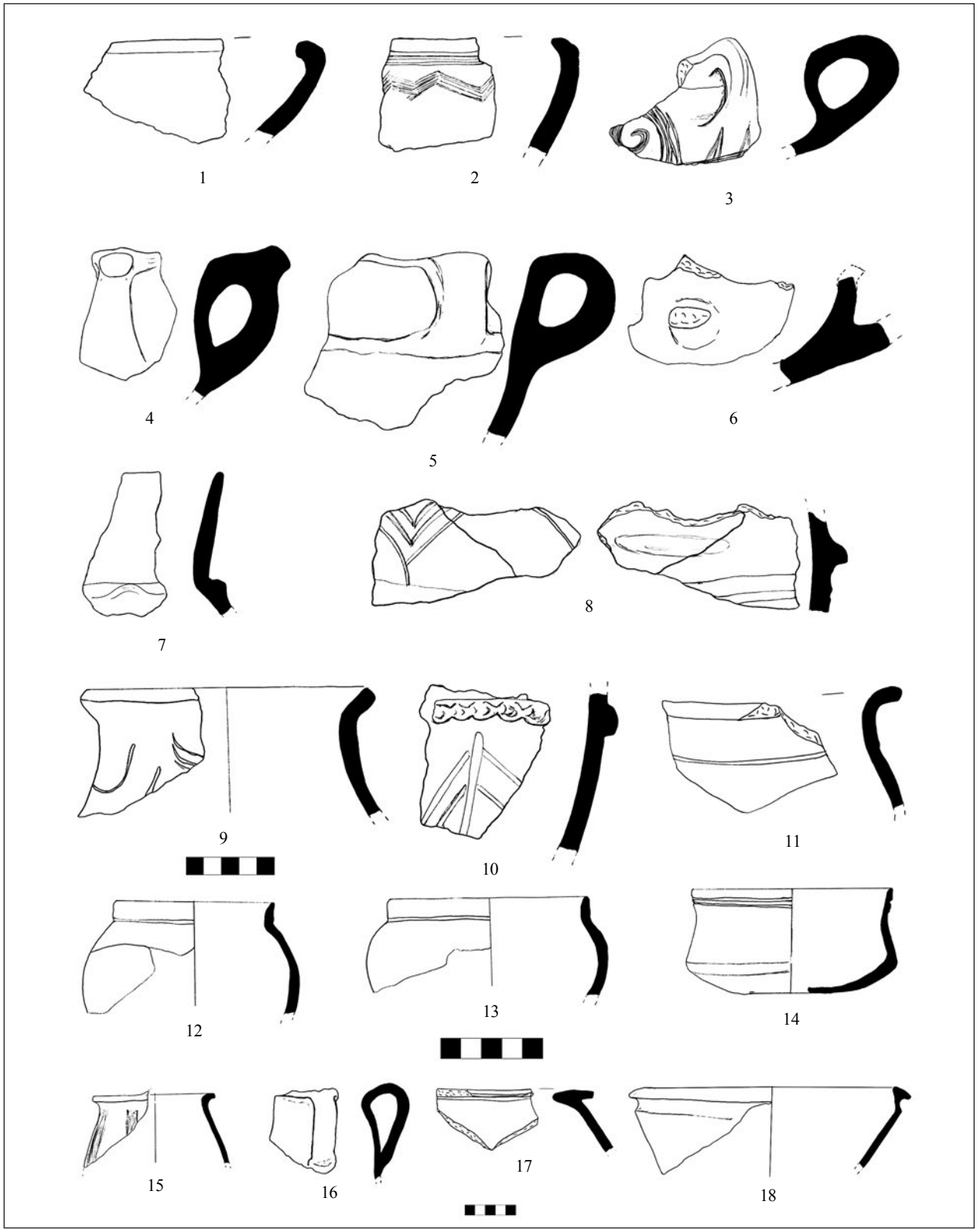

Plate III – Nemanjina Street (1, 5); excavations in 1991 (2); points 1 and 2, Mali Jaz 1 and Zelengorska Street (3–4, 6–18) (drawing J. Bogić)

Табла III – Улица Немањина (1, 5); ископавања 1991. (2); Тачке 1. и 2. Мали Јаз 1 и Зеленгорска улица (3–4, 6–18) (цртеж Ј. Богић)

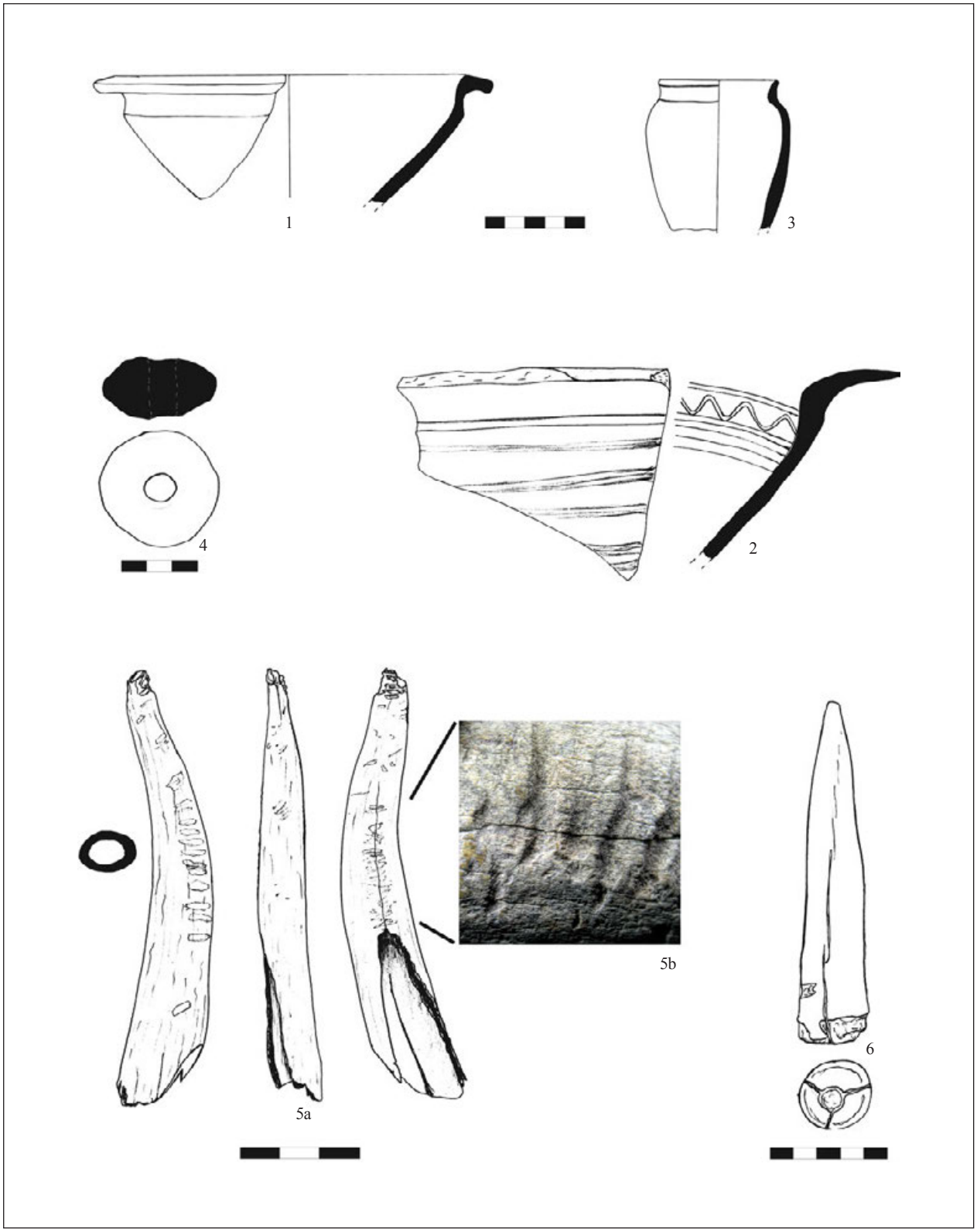

Plate IV – Majora Marka Street (1–3); Mali Jaz 1 and Zelengorska Street (4–6) (drawing J. Bogić)

Табла IV – Улица мајора Марка (1–3); Мали Јаз 1 и Зеленīорска улица (4–6) (цртеж Ј. Боīић)

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THE MOULDS FROM VELEBIT AND EUROPEAN BRONZE AGE METAL ANVILS

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Abstract – During the first excavations of the cemetery dating from the Bronze Age and Early Antiquity in the village of Velebit near Kanjiža (Northern Serbia) one of the excavated artefacts was found to belong to a used and broken stone mould for casting anvils. However, without an expert archaeologist to supervise the recovery of this find, which remained unknown for decades after its discovery, as a starting point, the authors of this article present a synthesis that takes into account several aspects of this significant class of metalcraft object. This proceeds from the history of the excavation to the general role of European Bronze Age anvils in gold and bronze metalworking, and then further on to their typological, terminological, chronological and functional analysis and to their long-range distribution as a sign of an interregional network of craftsmen, including their social context and symbolism.

Key words – Bronze Age, Carpathian Basin, Tumulus Culture, anvils, moulds, jewellery, metallurgy

THE CONTEXT OF THE MOULDS FROM VELEBIT

During the Middle Bronze Age, according to N. Tasić,[1] or Br B-C according to R. Vasić,[2] or developed Bronze Age according to A. Bulatović, V. Filipović and R. Gligorić,[3] the first finds of the Tumulus culture (*Hügelgräberkultur*) appeared in the territory of Northern and North-Western Serbia. The process of the spread of these influences began from the Carpathian Basin and developed in two geographical areas (groups), the first being northern Bačka and Banat, whereas the second extended to the Danube Basin,[4] The Drina and the Western Morava river valleys (Map 1).[5] Cemeteries of the first group are characterised exclusively by flat graves without barrows, while in the territory of the second group barrows occur regularly. In relative terms, the necropolis at the modern village of Velebit, near (ca. 14 km NNW) the town of Kanjiža (Senta county, Vojvodina Province), represents the best investigated cemetery site of the Tumulus culture in the territory of Serbia, bordering the influence zone of the Belegiš culture and sharing certain traits and elements with better investigated cemeteries under the barrows, which are usually in The Drina and the Western Morava river valleys (Western Serbia).

* During the research and writing of this topic, Raško Ramadanski was working as an archaeologist in the Town Museum in Senta, and provided the archaeological material from the Velebit site, with the support of Rastko Vasić, to Albrecht Jockenhövel and Alexsandar Kapuran, after the finds had spent forty years in relative obscurity. Jockenhövel was then able to persuade Barbara Armbruster to collaborate on this study.

1 Tasić 2004: 31.

2 Vasić 2003: 3.

3 Булатовић, Филиповић, Глигорић 2017: 53.

4 Tasić 1974: 234

5 Tasić 1974: 234

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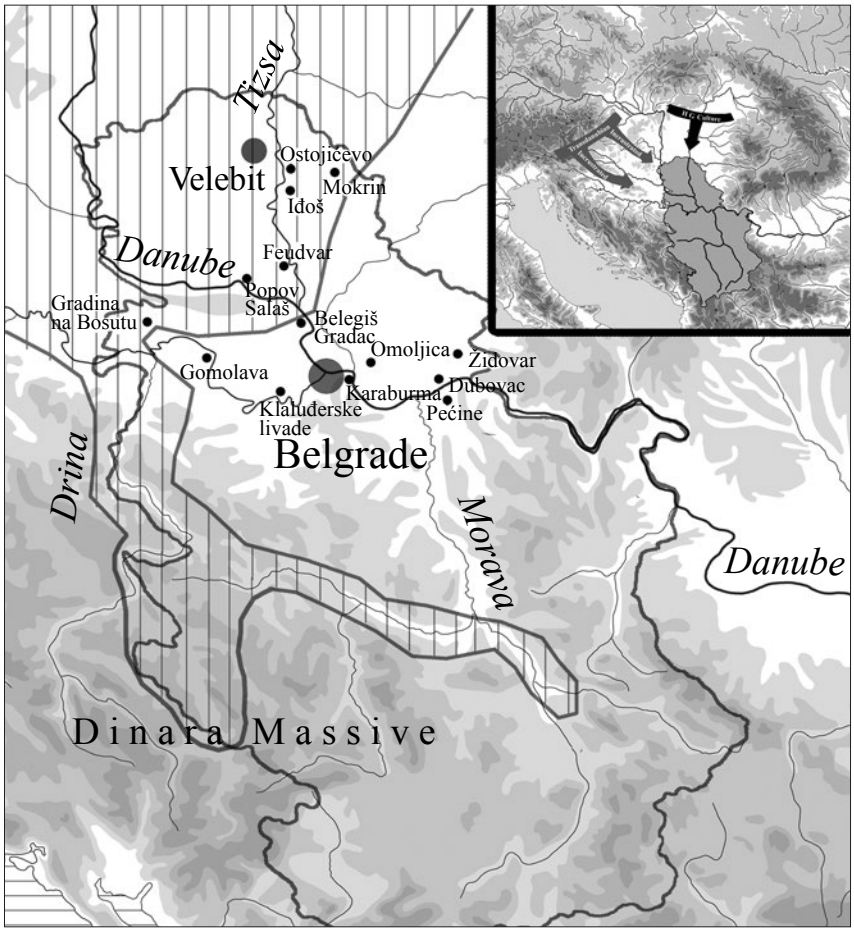


Map 1. Tumulus culture (Hügelgräberkultur) penetration into the Central Balkans

Карта 1. Продор културе тробних хумки на простор централног Балкана

The site of the Velebit cemetery

During construction of a major road in the village of Velebit, small scale archaeological excavations were carried out in the mid-1950s that, despite their limited extent, provided significant finds. The further need for extending the road infrastructure in the village, as well as financial support from the Smithsonian Institute (Washington D. C, USA),[6] led to systematic archaeological excavations in 1970 when the site was investigated to the fullest possible extent. During the Bronze Age, a biritual burial rite (inhumation and cremation) was practiced at the Velebit cemetery[7] (Fig. 1; 2). During these excavations in 1970, a total of 108 graves were discovered, of which 77 are from the Bronze Age, including 43 cremation and 34 inhumation burials. The remaining 31 graves are from Late Antiquity and described as Sarmatian from the 4th century AD (Plan 1).[8]

The most representative of Bronze Age inhumation burials at the site is grave No 7 with rich bronze objects (Fig. 1) (Plate 1). Grave 7 is also interesting because of two large pottery vessels that typologically correspond to the Tumulus culture. Another representative example of a Bronze Age skeletal burial at the Velebit site is grave No. 80,[9] where a pair of *Regelsbrunn* type greaves (Plates 2/12.13), a typical Belegiš culture beaker, two lunular pendants (Plate 1/6), bronze sheet metal applications (Plate 1/10) and three spirally bent wires, most likely rings, were found (Plate 1/3).[10] Inhumation grave No. 94 contains two *Petschaftkopfnadeln* type pins (Plates 2/8.9) and a large belt made of thin hammered bronze sheet metal.[11]

A characteristic example of a cremation grave at the Velebit site is grave No 14 (Fig. 3) (Plate 1/12; 3/5.6), (Plate 1/12; 2/2). Cremation grave No 33 is also

[6] Tasić 1974: 235; Тасић 1983: 87; Sekereš 1971; Kapuran 2018.

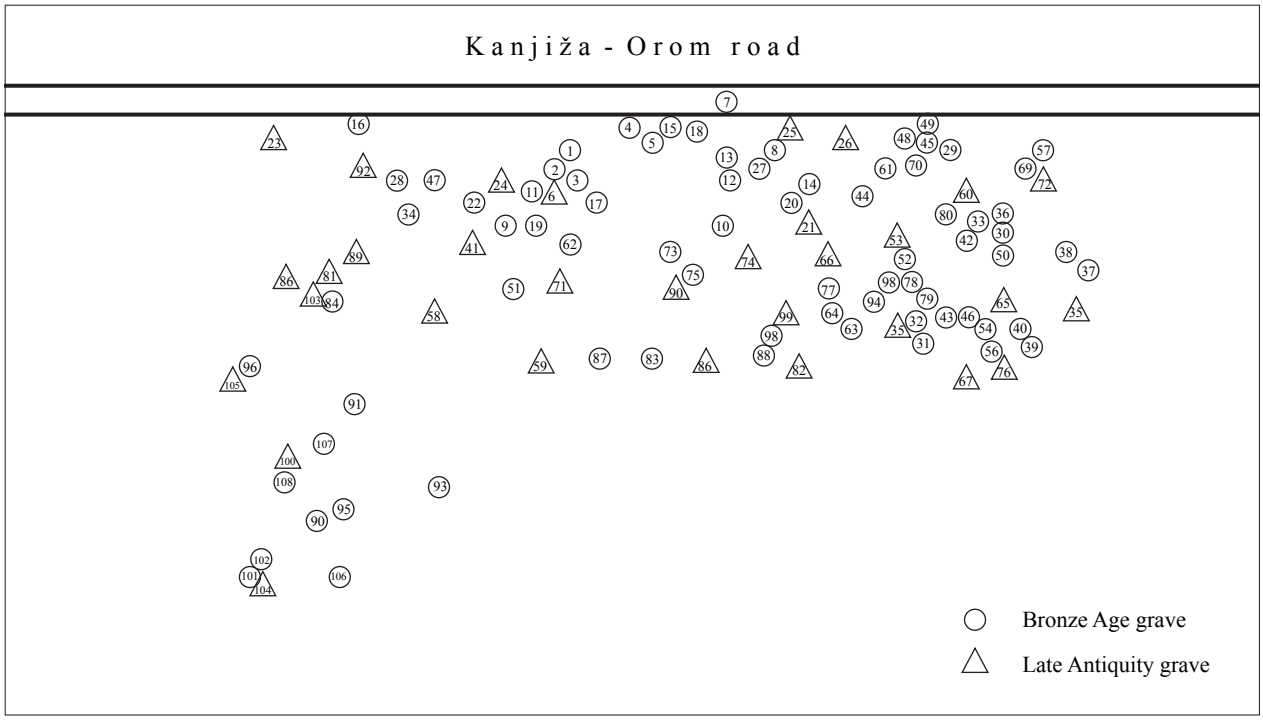
[7] Tasić 1974: 235.

[8] Sekereš 1971; Kapuran 2018.

[9] Kapuran 2018.

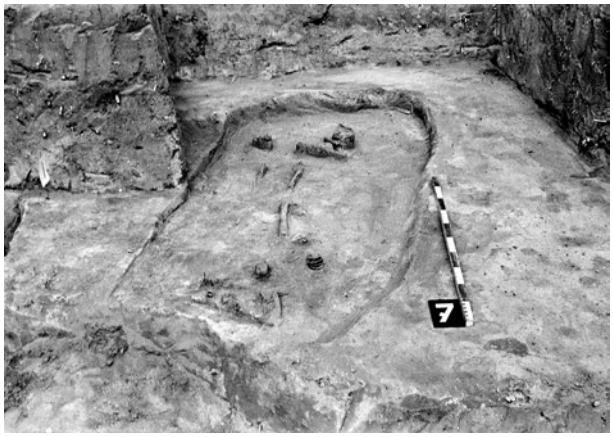
[10] Ibid.

[11] Ibid.



Plan 1. Velebit. Plan of the cemetery

План 1. Распоред гробова на некрополи Велебит



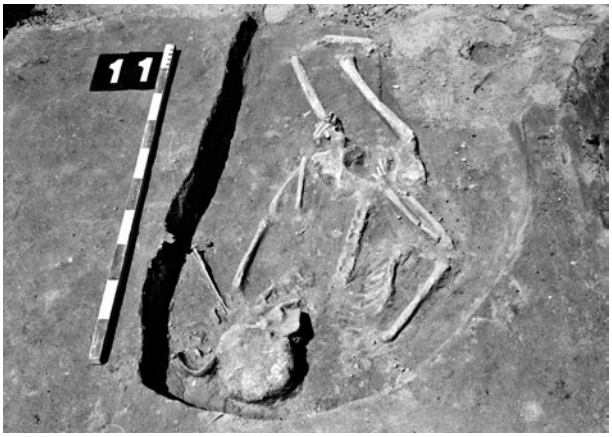


Fig. 1. Velebit. Inhumation grave No. 7. Extended body
Fig. 2. Velebit. Inhumation grave No. 11. Contracted body

Сл. 1. Велебит, гроб бр. 7:
скелетно сахрањен покојник у испруженом положају
Сл. 2. Велебит, гроб бр. 11:
скелетно сахрањен покојник у згрченом положају

Fig. 3. Velebit. Cremation grave No. 14

Сл. 3. Велебит, гроб бр. 14: гроб спаљеног покојника

interesting, mostly due to the fact that three typologically different beakers were discovered. While the first two are characteristic of the *Hügelgräber* culture (Plates 3/3.4), the third is a typical example of a so called „Pannonian" beaker and is part of the Belegiš culture (Plate 3/2). In contrast, the cremated remains were put in a rustic shaped urn of a relatively rough surface (Plate 3/7).

While the pottery production discovered at the Velebit necropolis manifests characteristics of the „Carpathian" variant of the Tumulus culture, which spread along the Tisza River towards the south of Pannonia, the assemblage of bronze products shows characteristics of the Kozsider bronze production from the Middle Bronze Age.[12] The same can be stated for the jewellery used to adorn the bodies at the Velebit cemetery, which differ only slightly from the usual assemblage of jewellery from the graves of similar Tumulus culture cemeteries in the Carpathian basin.

The moulds

Besides the attractive finds of jewellery and pottery discovered at the Velebit cemetery, one of the most significant finds are certainly a group of sandstone moulds (Plate 5), for which the context of finding still remains unclear, since they were discovered in the summer of 1954 when small scale excavations by the Senta Town Museum (Gradski muzej) were conducted, but without the supervision of an expert archaeologist. Consequently, it was never clear whether they represent grave goods, or belong to a hoard (perhaps to a so called „grave-hoard") or belong to an as yet undiscovered settlement in the vicinity of the site that existed at the time as the cemetery. All the moulds were made of sandstone, which is suitable for the engraving of negatives that were cast. Sandstone is a very common material for casting and easy accessible in various geological formations and locations, also in the Pannonian and Carpathian regions.[13] Some specimens have burnt edges around the negatives caused by high temperatures during the direct casting of molten bronze (Fig. 4/1–3). Most of the moulds of the Velebit complex are damaged and they could not be used for further castings.

Mould 1 a. b: a two part (bivalve) mould with negatives for the simultaneous casting of two lunular pendants (Fig. 4/2; 5/2–4; Fig. 4/1; 5/1. 2; Pl. 4/6a, 6b) that are typologically close but not the same as the pendants from grave No 80 (Plate 1/6). [14] The first part of this bivalve mould (Plate 4/6a) measuring 12 x 7 x 2 cm, was bifacial, or had a dual function, since its reverse side contained another, very damaged negative, for which we can only assume the shape of a socketed axe (Plate 4/1). Besides the pendant negatives, it contains two dowel-holes. The other part of the mould (Plate 4/6b) measuring 11.5 x 8.5 x 2 cm, also contained two dowel-holes. This stone mould, used to cast three lunular pendants that would have been typologically identical to pendants from Velebit grave 80, is almost identical to the double Mould 1 from the Velebit necropolis, and is kept today in the Museum of Subotica (Fig. 5/3).[15] From the territory of Eastern Serbia comes one more mould, discovered on the banks of The Danube in 1971, in the course of archaeological surveys at the Velesnica site (Fig. 5/1).[16] Lunular and heart-shaped pendants had an important role in the costume fashion of the Bronze Age, besides the large number of these pendant finds, they can also be indirectly observed on examples of the numerous anthropomorphic clay idols from that time.

Mould 2: The fragmented mould (Plate 4/5; Fig. 5/4) measuring 8.5 x 7 x 3 cm, seems to have served for the casting of bronze sickles. We assume this on the basis of the negative shape, which shows an elongated banded form of a handle of thin cross-section and a ribbed pattern. This assumption is strengthened by another fragmented mould (Plate 4/4) measuring 5.5 x 8 x 3 cm, in which the negative has an arched shape with a rib along the sharp edge. It also has the same thickness as the previously described mould, so we assume that they could together represent part of a larger mould for casting sickles, as indicated by one specimen discovered in Romania.[17]

Mould 3: An elongated mould measuring 7 x 3.5 x 3 cm, has a negative in the form of a pin with a seal shaped head or broadening (Fig. 4/3; Plate 4/1). The second oval broadening located below the first one may have been decorated with a sequence of parallel cannelures. Perhaps a mould like this could have served for the casting of a pin found in the Beltiug hoard in Romania. [18]

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[12] Kovács 1975: 43,44.

[13] See Soltvaldkert (Bács-Kiskun, Hungary) hoard: Gazdapusztai 1959.

[14] Bader 1978: pl. LXXXVI/5.

[15] Tasić 1974: 239/146.

[16] Васић, Ерцеговић-Павловић, Миниħ 1984: Сл. 110/4.

[17] Bader 1978: pl. LXIII/12.

[18] Bader 1978: 120, pl. LXXVII/15.

Fig. 4. Velebit. Sandstone moulds from an unknown area of the cemetery

Сл. 4. Велебиш, калупи од камена пешчара са некрополе

Mould 4: Mould 4 has an elongated form measuring 12.5 x 3 x 3 cm, for which we assume that it also served for casting some kind of pin shaped objects, containing three additional grooves that intersect the negatives at a 90° angle (Plate 4//5; Fig. 4/5). It is possible that this kind of mould was also used for the casting of the body of the *Blattbügel* type of fibulae dating in the Early Hallstatt (Ha A) period. [19] One mould from the Soltvaldkert (Bács–Kiskun, Hungary) hoard, has a negative that shows two pins connected with a channel at a 90° angle.[20]

Mould 5: This mould (Plate 4/3; Fig. 4/4) is small (measurement: 3.5 x 4 x 2.5 cm), and could have served for the casting of objects in the form of nails. It is possible that this mould was used as an auxiliary tool in a further metallurgic process, in the course of casting certain complex objects, or that it represented a small tool for decorating other bronze objects.

Mould 6: The last example from this group of moulds and the most interesting one measures 9 x 8 x 4 cm, and served for casting an anvil (Fig. 4/2; 5/4.5; 12/7). The negative shows that the anvil had a spike on one side probably not for fixing into a wooden support but for banding wire-shaped jewellery,[21] as seen on the specimen discovered in Fresné-la Mère (Fig. 13/10). The upper part of the Velebit anvil has a triangular shape. Moulds for casting anvils belong to rare finds of Bronze Age mould assemblages. Additionally, anvils are not easy to identify, especially when the moulds in which they were cast are fragmented. Anvils had a major role in various crafts and were necessary for plastic shaping techniques and the final treatment of objects after their casting. Without them, the processing of ingots into sheet metal shaped jewellery would hardly be possible, as a strong and flat support is necessary for forging. We assume that the belt from grave 94 could not have been properly made without such a small anvil, necessary for forging and decoration.

As stated earlier, during the Kozsider horizon in the Middle Bronze Age there was a significant expansion in jewellery and weapon production, especially those of

[19] Kytlicová 2007: 38, 256, pl. 178/B2.
[20] Gazdapusztai 1959: pl. IV/6–7.
[21] Tylecote 1987: 265, Fig. 7.19.

copper and tin alloys. Such a need for bronze products must have driven a certain social stratification based on metal smith crafts performed by Middle Bronze Age societies in Europe. Numerous sites have been found in the Alps, Carpathians, Eastern Serbia, and Western Bulgaria, at which traces of copper, and more rarely tin, were discovered. All tin ore deposits in Europe have been known to geologists for a long time, as well as in vicinities of the Cer and Bukulja mountains in Western Serbia.[22] It is assumed that the trade and exchange of tin and antimony led to the integration of the Tumulus culture during the Kozsider period.[23] Although animal husbandry and farming were still dominant in the economy, the rise of certain societies specialised in mining and metallurgy for the purpose of metal production is evident. Such societies are, among others, identified thanks to several decades of archaeological research conducted through the project „Research of

Fig. 5. Bronze Age stone moulds: 1) Velesnica; 2, 4, 5) Velebit; 3) Subotica

Сл. 5. Калуйи од камена: 1) Велесница; 2, 4, 5) Велебиш; 3) Суботица

ancient mining and metallurgy in the Timok eruptive basin" in the area of north-eastern Serbia, in the vicinity of Bor.[24]

In the territory of South-eastern Europe, moulds for bronze casting were found in the context of settlements, hoards, and rarely in burials.[25] Indirect evidence for the separation of metalworking as a specialised branch of the economy during the Middle and Late Bronze Age, beside burials with metalworking tools, is also provided by hoards containing moulds. B. Nessel assumed upon her analysis of burial assemblages tied to metallurgy in Central Europe, that there is no evidence that metalworkers enjoyed special social status in these communities, but rather they were fully integrated and respective members of the communities.[26] This was perhaps the case because of the fact that many members of these societies participated in the metalworking process, so it was not felt necessary to specially accentuate their role in funeral rites.[27]

The closest analogies to the mould hoard from the site of the Velebit necropolis is the site of Soltvaldkert (Bács–Kiskun) in Hungary, where 41 sandstone moulds for the casting of bronze objects were discovered in a pit, about 0.9 m deep.[28] Also, close to the Velebit necropolis, identical hoards of clay and stone moulds were discovered at the site of Şagu Site „A1–1" in Western Romania (Lower Mureş valley), although that context is chronologically somewhat younger, and corresponds to the Br D–Ha A1 period.[29] In the vicinity there is one more chronologically younger hoard of casting moulds from the Early Iron Age (8th–7th century BC) discovered at the site of St. Peter of Ludberg in Croatia.[30]

Relative and absolute chronology of the site

B. Hänsel and T. Kovács assume that finds of the Tumulus culture in the Carpathian Basin appear over a large time span from Br B1 to Br D (or during the phases MD II, MD III/SD I).[31] In the „Prehistory of Vojvodina", published nearly half a century ago, N. Tasić proposed that the sites of *Hügelgräberkulrur* in the surroundings of Subotica should be put a in chronological framework from the end of 14th to the beginning of the 13th century BC.[32] Vasić assumes that the same culture in Serbian territory can be determined in the Middle Bronze Age, or Br B and Br C,[33] which chronologically corresponds to the period between 1600/1500–1200 BC, and its second phase, as suggested by Tasić.[34] There are certain divisions of the Bronze Age according to which the Tumulus Hügelgräber culture in the Danube Basin is simultaneous to MD III, and does not start before the end of Br B1, or lasts between 1500–1300 BC,[35] with which F. Falkenstein also agrees.[36]

Turning to recent absolute dates obtained for sites in Serbia, we can say that previously stated relative chronologies did not diverge much from the results obtained by absolute dating. The first result is related to an AMS date from the central grave of mound XVIII at the site of Paulje, which shows the span of 1415–1278 cal BC with 95.4% confidence. [37] It means that the grave from Paulje certainly belongs to the mid-14th century BC.[38] Another absolute date is from the Velebit necropolis. An acquired date of 3061±25, with a modelled span of 1407–1236 cal BC, with 95.4% confidence[39] means that the incineration grave from grave 107 at the Velebit cemetery most certainly belongs to the 14th–13th century BC, similar to the grave from mound XVIII at Paulje. This tells us that the relative dates for *Hügelgräberkultur* in the north of Vojvodina, proposed by Tasić, were closest to the absolute dates obtained at the sites of Velebit and Paulje.

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[22] Powell at al. 2018; Durman 1997; Valera, Valera 2003.

[23] Sánta 2013: 82.

[24] Kapuran 2014: 64–66.

[25] Jockenhövel 2017: 53.

[26] Nessel 2013: 144,145; with differentiation Jockenhövel 2018: 276–277; 313.

[27] Nessel 2013: 144.

[28] Gazdapusztai 1959: Taf. IV/6–7; Hänsel 1968: 233; Mozsolics 1973: 80.

[29] Sava and Andreica 2013: 69.

[30] Šimek 2004: 92, 96.

[31] Hänsel and Kovács 1986: 69.

[32] Tasić 1974: 240.

[33] Vasić 2003: 3; Vasić 2010: 3.

[34] Tasić 2004: 31.

[35] Hänsel 1968: 143, 170.

[36] Falkenstein 1998: fig. 10.

[37] Gligorić, Filipović, Bulatović 2016: 105.

[38] Gligorić, Filipović, Bulatović 2016: 105.

[39] Kapuran 2018; The team engaged in the AMS dating procedure was comprised of: Molnár M, Riny L, Veres M, Seiler M, Synal H-A, Environ MICADAS: a mini 14C AMS with enhanced Gas Ion Source Interface in the Hertelendi Laboratory on Enviromental Studies (HEKAL) Hungary. Radiocarbon Vol 55, Nr 2–3 2013, p. 338–344. Molnar M, Janovic R, Major I, Orsovszki J, Gönczi R, Veres M, Leonard AG, Castle SM, Lange TE, Wacker L, Hajdas I, Jull AJT. Status report of the new AMS C14 sample preparation lab of the Hertelendi Laboratory of Enviromental studies (Debrecen, Hungary) Radiocarbon, Vol 55, Nr 2–3 2013, p. 665–676.

THE ANVIL MOULD FROM VELEBIT AND EUROPEAN BRONZE AGE METAL ANVILS

History of research

From the second half of the 19th century, Bronze Age metal anvils were discovered and published.[40] V. G. Childe published a short study on the anvil of Inshoch Wood (Scotland) (no. 121; Fig. 11/2) including metal analysis.[41] In 1975 J. Nicolardot and G. Gaucher provided a variant-rich typology based on French anvils, which was simplified by M. R. Ehrenberg (1981).[42] Namely, she listed a total of 36 Bronze Age anvils from Europe. On the basis of ca. 60 anvils, D. Jantzen (2008) classified them by physical and functional criteria.[43] Recently, regional studies on anvils have been published in Italy, including Sardinian anvils, as well as Moravia and Romania.[44]

Remarks on stone anvils

More than fifty years ago, J. J. Butler and J. D. van der Waals identified several small rectangular flat stones as metalworking tools, mostly dated as early as the Bell Beaker Culture and the Early Bronze Age of Central and Western Europe.[45] Such stone anvils gradually became significant elements in tool kits of gold, silver and coppersmiths. The anvils of the Amesbury Archer (or „King of Stonehenge") (Wessex, England) and of the „Chief of Leubingen" (Saxony-Anhalt, Germany) became well known a so called „cushion stones" (German: *Kissensteine*).[46] Several recent studies provided evidence for stone tools in the context of metalworking during the Bell Beaker period but also during the rest of the European Bronze Age when bronze tools were predominantly in use.[47] Some specimens of stone tools featuring flat or flat and curved sides and working faces or with prominent and slightly rounded edges and corners are supposed to have been anvils of the Middle and Late Bronze Age. A small stone anvil made of serpentine, embedded in a wooden stump, was found in the Late Bronze Age lake village of Mörigen (Switzerland), where bronze socketed hammerheads were also discovered.[48] Another combination of bronze and stone tools for metalworking appears in the Late Bronze Age hoard of fine metalworking tools from Génelard (Burgundy, France). It consists of several bronze socketed hammerheads and anvils (no. 28–31) and includes a hammer shaped like a stone axe head (Fig. 18).[49] Large and heavy stones were presumably also used as anvils.[50] In that regard, B. Armbruster observed West African blacksmiths of the Dogon community constructing their smithy around an *in-situ* rock which they used as an anvil.[51] A forging tool set consisting of a stone anvil and hammer, associated with moulds and scrap metal, is known from House 1 at the Early Bronze Age settlement of Çukuriçi Höyük (Western Anatolia).[52] It is possible that hardwood blocks were also used as anvils. It is additionally possible that such „archaic" installations were also common in Bronze Age Europe. However, by the Late Bronze Age, „cushion stones" disappeared from the inventory of metalworkers.

List of Bronze Age metal anvils

Abbreviations: E = Ehrenberg 1981; J = Jantzen 2008; N/G = Nicolardot/Gaucher 1975; G = grave; H = hoard; R = river find; S = settlement; W = wetland find

Austria (A)

1. Augsdorf (H), Carinthia (Müller-Karpe 1959: 278 [no. 21], pl. 129, 21) (Fig. 16/1)

2. Hallstatt (G; Grave 283) (G), Upper Austria (Kromer 1959: 82, Fig. 50, pl. 44, 8 [*iron*]) (Fig.7/8)

3. Sipbachzell (H), Upper Austria (Höglinger 1996: 111, pl. 1, 2 (Fig. 14/7)

Bosnia and Herzegovina (BiH)

4–6. Boljanić 1–3 (H), Doboj (König 2004: 191, no. 3 [39. 40. 41], pl. 17, 39–41) (Fig. 12/3; 15/6. 7)

Czechia (CZ)

Bohemia

7. Jarpice (H), okr. Kladno (Kytlicová 2007: 267 no. 66 [5], pl. 145, B 5) (Fig. 16/2)

8. Újezd (H), okr. Písek (Kytlicová 2007: 311 no. 345, pl. 1, B 12) (Fig. 7/1)

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[40] Chantre 1875; Evans 1881; Gross 1883; Hampel 1886; von Miske 1908; Coutil 1912; Müller 1920; Ohlhaver 1939.

[41] Childe 1945/46.

[42] Nicolardot/Gaucher 1975; Ehrenberg 1981.

[43] Jantzen 2008: 253–259. 326–333.

[44] Iaia 2014; Lo Schiavo 2018; Salaš 2014; Medeleț 1995; Gogâltan 2005.

[45] Butler/van der Waals 1966.

[46] Fitzpatrick 2011; Bertemes 2004.

[47] Bátora 2002; Armbruster 2006; idem 2010; idem 2012; Brandherm 2010.

[48] Gross 1883: 45, pl. 27, 17.

[49] Thevenot 1998; Armbruster 2008.

[50] A. Müller-Karpe 1994: 159.

[51] Armbruster 1995: 120, fig. 2; idem 2001, 13.

[52] Horejs/Mehofer/Pernicka 2010.

9. Velim (H), okr. Kolín (Kytlicová 2007: 312 no. 251, pl. 159, A 8) (Fig. 10/4)

Moravia

10. Blučina (H 4), okr. Brno-venkov (Salaš 2014: 65 no. 1, obr. 15, 1) (Fig. 15/4)

11. Brno-Rečkovice (H), okr. Brno-mešto (Salaš 2014: 65 no. 2, obr. 7, 10) (Fig. 6/5)

12. Jevičko (H), okr. Svítavy (Salaš 2014: 65 no. 3, obr. 15, 2) (Fig. 14/11)

13–15. Loučka 1–3 (H 2) (H), okr. Přerov (Salaš 2014: 65 no. 1. 5–7, obr. 15, 3. 4. 6) (Fig. 10/2. 3; 11/9)

16. Loučka 4 (SF), okr. Přerov (Salaš 2014: 65 no. 7, obr. 15, 5; 18) (Fig. 7/10)

Denmark (DK)

17. Damsholte (H), Frenderupgård, Vordingborg com., Møn (J 256 no. 370, pl. 68) (Fig. 16/7)

18. Sengeløse (H), Vasby, Københavns Amt (idem no. 35; J 256 no. 372, pl. 68) (Fig. 12/2)

19. Sulsted (H), Vestbjerg, Ålborg Amt (idem no. 36; J 256 no. 372, pl. 68) (Fig. 7/21)

France (F)

20. Alise-Sainte-Reine (R) (Canal de Bourgogne aux Laumes), Côte-d'Or (idem no. 21, fig. 2a; N/G 34 fig. 34; Thevenot 1998: 136, fig. 8,3 [see also Provenance unknown [no. 48]) (Fig.13/2)

21. „Angerville" (R), Essonne (Mohen 1977: 251 [no. 91–1]; N/G 32, fig. 2) (Fig. 11/3)

22. Bardouville, Seine River (R), Seine-Maritime (idem no. 16; N/G 30, fig. 2) (Fig. 13/7)

23. „Calvados" (?) (idem no. 15) (no illustration)

24. Coray (Keranfinit) (H), Finistère (Mohen 1990: 130, fig. 38, 70) (Fig. 13/9)

Corbeil see Seine between Corbeil/Villeneuve-Saint-George (fig. 11/7)

25. Cuiry-les-Chaudardes (S; mould), Aisne (Blanchet 1984: 186, fig. 99, 18) (Fig. 12/10)

26. Fort-Harrouard (S; mould), Eure-et-Loir (Mohen/Bailloud 1987: 127, fig. 69) (Fig. 12/8)

27. Fresné-la-Mère (H), Calvados (idem no. 14 fig. 2d; N/G 29, fig. 1) (Fig. 13/10. 10a))

28. Génelard 1 (H), Saône-et-Loire (Thevenot 1998: 130, fig. 4, 1) (Fig. 14/2)

29. Génelard 2 (H), Saône-et-Loire (Thevenot 1998: 127, fig. 3, 3) (Fig. 9/7)

30. Génelard 3 (H), Saône-et-Loire (Thevenot 1998: 127, fig. 3, 2) (Fig. 13/1)

31. Génelard 4 (H), Saône-et-Loire (Thevenot 1998: 127, fig. 3, 1 (Fig. 9/6)

32. Graville-Sainte-Honorine (H), Seine-Maritime (O'Connor 1980: 398 no. 174; Dubus 1912: 14–24, pl. 5, 47; Watté 2010: 39, fig. 2, 47) (Fig. 8/2)

Gray see Saône near Chalon-sur-Saône (no. 44) (fig. 13/4)

Keranfinit see Coray (no. 24) (fig. 13/9)

33. La Lède-du-Gurp (SF; mould), Gironde (idem no. 13; Moreau 1971) (fig. 12/9)

34. Larnaud (H), Jura (N/G 35, fig. 1) (Fig. 14/3)

35. La Tour de Langin (SF), Haute-Savoie (idem no. 26, pl. 1; fig. 4a; N/G 25, fig. 1) (Fig. 11/4)

Laumes see Alise-Sainte-Reine (no. 20) (fig. 13/2)

36. Mâcon (R), Saône-et-Loire (idem no. 24, fig. 2c; N/G 22, fig. 2) (Fig. 10/7)

37. Nantes, Prairie de Mauves (H), Loire-Atlantique (N/G 24, fig. 7) (Fig. 16/10)

38. Ouroux-sur-Saône (R), Saône-et-Loire (idem no. 32, fig. 3c; N/G 23, fig. 4) (Fig. 10/6)

39. Paris, La Villette/Pont du Flandre (R) (idem no. 18; Mohen 1977: 159 f. [246 no. 75–21] 178, fig. 649) (Fig. 10/5)

40. Plainseau (H), Amiens, Somme (idem no. 17; N/G 22, fig. 3) (Fig. 8/1)

41. Pontpoint (SF), Oise (N/G 24 fig. 6) (Fig. 16/1)

42. Porcieu-Amblagnieu (H), Isère (Mortillet 1906; Coutil 1912; idem no. 25) (Fig. 12/5)

43. Questembert (H), Morbihan (idem no. 12) (Fig. 14/10)

44. Saône bei Chalon-sur-Saône or Gray (R), Saône-et-Loire (idem no. 22, fig. 3b; N/G 33 fig. 1; Thevenot 1998, 136, fig. 8, 2]) (Fig. 13/4)

Seine, Paris (idem no. 20 = see „Angerville" [no. 21]) (fig. 11/3)

45. Seine between Corbeil/Villeneuve-St.-George (R) (idem no. 19; Mohen 1977: 159 f. [252 no. 91–12], 178 fig. 647) (Fig. 11/7)

46. St. Denis-de-Pile (H), Gironde (Coffyn 1969) (Fig. 7/2)

Tour de Langin see La Tour de Langin (no. 35) (fig. 11/4)

47. Trégorf-en-Surzur (H), Morbihan (Briard 1984: 163, fig. 13, 2; N/G 35, fig. 2) (Fig. 14/5)

48. „Provenance unknown" (Musée de la civilisation gallo-romaine Lyon) (Thevenot 1998: 136, fig. 8, 4) (modern copy of no. 20?) (Fig. 13/3)

Germany (D)

49. Altentreptow (SF?) Lkr. Mecklenburgische Seenplatte, Mecklenburg-Western Pomerania (Schoknecht 1974 [1975] : 166 [no illustr.; shape unknown])

50. Golchen, Lkr. Mecklenburgische Seenplatte, Mecklenburg-Western Pomerania (Schmidt 2014: 182, fig. 2, 5) (Fig. 9/5)

51. Lachen-Speyerdorf 1 (G), Stadt Neustadt an der Weinstraße, Rhineland-Palatine (Sperber 2000: fig. 2 (Fig. 14/1)

52. Lachen-Speyerdorf 2 (G), Stadt Neustadt an der Weinstraße, Rhineland-Palatine (Sperber 2000: fig. 10 (Fig. 16/7)

53. Maintal-Hochstadt (H), Main-Kinzig-Kreis, Hesse (Jockenhövel 1983: 587, fig. 1) (Fig. 16/4)

54. Murchin (H), Lkr. Vorpommern-Greifswald, Mecklenburg-Western Pomerania (Schoknecht 1974 [1975]: 163, fig. 10, 77; 359 no. E 314; 364 no. 363) (Fig. 11/8)

55. „Murnau" (H), Lkr. Rosenheim, Upper Bavaria (Nessel 2008: 58 no. 26, pl. 2, 26; 4, 26) (Fig. 13/5)

56. Oberwilflingen (H), Lkr. Ostalbkreis, Baden-Württemberg (Primas/Pernicka 1998) (Fig. 16/5. 5a)

57, 58. Ochtendung 1, 2 (H), Lkr. Mayen-Koblenz, Rhineland-Palatine (von Berg 2005) (Fig. 7/18; 12/1)

59. Plestlin (H), Gem. Bentzin, Lkr. Vorpommern-Greifswald, Mecklenburg-Western Pomerania (idem no. 34; Sprockhoff 1956: I 51; II 126, pl.11, 6; J 364 no. E 364) (Fig. 11/5)

60. Ruthen (H), Lkr. Ludwigslust-Parchim, Mecklenburg-Western Pomerania (J 364 no. E 362; Sprockhoff 1956: I 31; II pl. 73, 17 [Holzendorf]; Hundt 1997: 63 no. 129, pl. 36, 17) (Fig. 9/3)

61. Steinkirchen (G; Grave 10), Gem. Stephansposching, Lkr. Deggendorf, Lower Bavaria (Müller-Karpe 1969: 89, fig. 3) (Fig. 7/21)

Hungary (H)

62. Biharugra (H), Kom Békés (Gallus/Horváth 1938, 92, pl. 19, B 8 [Ugra]; Kemenczei 2005: 131 f. B 6 (no. 95), pl. 16, A 95 („hammer") (Fig. 9/8)

63. Esztergom (H), Kom. Komárom-Esztergom (Mozsolics 1985: 116 ff. 118 no. 91, pl. 138, 9) (Fig. 12/6)

64, 65. Lesenceistvánd 1, 2 (H), Kom. Veszprém (Mozsolics 1985: 144 no. 9, Pl. 270 A, 22. 24) (Fig. 7/16. 17)

66. Mátraszőlő-Kerekbükk, (H) Kom. Nógrád (Szabó 2011: 337, fig. 2, 3 [no illustration; „small anvil")

67–69. Nadap 1–3 (H), Kom. Fejér (Makkay 2006: pl. 19, 166. 167; 20, 184) (Fig. 7/5–7)

70, 71. Tállya-Várhegy 1, 2 (H), Kom. Borsod-Abaúj-Zemplén (Szabó 2013: 812 f., fig. 18) (Fig. 6/8. 9)

72, 73. Velem-Szentvid 1, 2 (S), Kom. Vas (von Miske 1908: pl. 29, 7. 8) (Fig. 14/8)

74. Velem-Szentvid 3 (S; mould), Kom. Vas (von Miske 1908: pl. 22, 3) (Fig. 14/9)

Ireland (IRL)

75. Bishopsland 1 (H), Co. Kildare (Eogan 1983: 36 f. no. 16; 226, fig. 10, 11; idem no. 9) (Fig. 13/6)

76. Cullen (H), Co. Tipperary (Eogan 1983: 155 ff. no. 135 [no illustration])

77. „Ireland" (idem no. 11; Coffey 1913: 27 f., fig. 22 [Bronze Age?]) (no illustration)

78. Lusmagh (H), Co. Offaly (idem no. 10, fig. 3a; Eogan 1983: 192–193 no. 22; 321, fig. 105, B 6) (Fig. 15/5)

79. „Near Sligo", Co. Sligo (Bronze Age?) (Milligan 1885-1886: 538, fig.; idem no. 8) (Fig. 6/1)

Omagh (123): see United Kingdom, Northern Ireland (fig. 11/1)

Italy (I)

80. Bologna-San Francesco 1 (H), Emilia-Romagna (idem no. 31; Iaia 2014: no. IB6; 103, fig. 9 [IB6]) (Fig. 9/2)

81. Bologna-San Franceso 2 (H), Emilia-Romagna (Iaia 2014: no. IB5; 103, fig. 9 [IB5]) (Fig. 16/11)

82. Bor di Pacengo (S), Verona (Iaia 2014: no. IB3; 103 fig. 9 [IB2]) (Fig. 15/8)

83. Contigliano (H), Rieti (Ponzi Bonomi 1970: 129, fig. 12, 4) (Fig. 9/2)

84, Falerii (G), Civita Castellana, Viterbo, Mazzano Romano (Montelius 1905/1910: pl. 329, 8 [*iron*]) (Fig. 7/19).

85. Frattesina (S), Rovigo (Iaia 2014: no. IB2; 103, fig. 9 [IB2]) (Fig. 11/13)

86. Gorzano (S), Modena (Iaia 2014: no IB1; 103, fig. 9 [IB1]) (Fig. 14/6)

87. Monte Cavanero (Chiusa di Pesio) (H), Cuneo (Iaia 2014: no. IB7; Venturino Gambari 2009: 63, fig. 45; 60, fig. 42, 4) (Fig.6/4)

88. Redù, Modena (Iaia 2014: no. IB4; 103, fig. 9 [IB4]) (Fig. 16/2)

Sardinia

89. Chiaramonti (S; Nuraghe Su Cobelciu) (Lo Schiavo 2018: 429 fig. 4. 5) (Fig. 15/1)

90, 91. Lei/Silanus-La Maddalena (H) (Lo Schiavo 2018: 429 fig. 4, 4. 9) (Fig.6/2. 7)

92. Lotzorai-Genna Tramonti (Lo Schiavo 2018: 430 fig. 4, 8) (Fig. 6/6)

93. Lula-Savadde (H) (Lo Schiavo 2018: 429 fig. 4, 3) (Fig. 7/4)

94. Nuragus-Forraxi Nioi (H) (Lo Schiavo 2018: 428 fig. 4, 1) (Fig. 11/10)

95. Ozieri-Chilivani (H) (Lo Schiavo 2018: 428m fig. 4, 7) (Fig. 15/3)

96. „Provenance unknown" (Sardinia?) (Lo Schiavo 2018: 428 fig. 4, 2) (Fig. 11/11)

97. „Provenance unknown" (Sardinia?) (Lo Schiavo 2018: fig. 4, 6) (Fig. 15/2)

98. „Provenance unknown" (Sardinia) (Lo Schiavo 2018: fig. 4, 10) (no illustration)

Poland (PL)

99. Przemyśl (H) (Gedl 2004: 72 no. 251, pl. 18, 251) (Fig. 7/14)

100. Świnoujście-Międzyzdroje (H), Woiw. Zachodniopomorskie (J 365 no. E 369; Blajer 1984: 54 no. 155, pl. 96, 30) (Fig. 9/4)

101. Witkowo (H), Woiw. Pomorskie (idem no. 32; J 365 no. E 370; Gedl 2004: 72 no. 252, pl. 18, 252) (Fig. 7/11)

Romania (RO)

102. Fratelia (H), Timişioara (Medeleţ 1995: fig. 3) (Fig. 7/3)

103. Gușteriţa (H), com. Sibiu (Gogâltan 2005: 31, pl. 12, 65b) (Fig. 16/3)

Serbia (SRB)

104. Velebit, Kanjiža, Severno-Banatski okrug (Fig. 4/3; 5/4. 5; 12/7)

Spain (E)

105. Valdevimbre (H), prov. Léon (Monteagudo 1977: 98 f. no. 607. 625, pl. 149, B 1) (Fig. 8/3)

Sweden (S)

106. Bromma, Ivetofta (W), Skåne (Oldeberg 1974: 17 no. 83; J 365 no. E 366) (Fig. 16/8)

107. Holmedal (SF), Varmland (Oldeberg 1974: 366 no. 2625; J 365no. E 367) (Fig. 16/9)

Switzerland (CH)

108. Auvernier 1 (S; mould), Kt. Neuchâtel (Gross 1883: pl. 29 12; Rychner 1979: pl. 134, 3) (Fig. 7/12)

109. Auvernier 2 (S), Kt. Neuchâtel 2 (idem no. 28; Rychner 1979: pl 125, 9) (Fig. 7/13)

110. Grandson-Corcelettes (S; mould), Kt. Vaud) (Musée cantonal vaudois 1896: pl. 30, 3; idem no. 27) (Fig. 14/3)

111. Riddes (SF), Kt. Valais (idem no. 26, fig. 2d; N/G 32, fig. 3; Wyss 1967: 10, pl. 3) (Fig. 12/4)

112, 113. Zürich-Wollishofen 1, 2 (S), Haumesser, Kt. Zürich (idem no. 29, fig. 4b; N/G 26, fig. 2; Wyss 1967: 10, pl. 2. 3) (Fig. 6/3; 11/6)

Ukraine (UA)

114. Nedilys'ka (H) [Неділиська, ehem. Niedzielska], Oblast Lwiw (Gedl 2001, 63: pl. 80, C 64 [*iron*]) (Fig. 7/9)

United Kingdom (GB)

England

115. Flax Bourton (H?), Somerset (idem no. 4; Pearce 1983: 514. no. 651a, pl. 74, 651a.) (Fig. 11/12)

116. Lakenheath, Suffolk (idem no. 2: „simple; gabled work-surface opposite spike") (no illustration)

117. Lichfield (H), Knowle Farm, Staffordshire (Meeks/Needham 1993) (Fig. 8/4)

118. Netherhampton (H [„Salisbury Hoard"]), Wiltshire (MacGregor 1987: 109 [no. 11.67]; Stead 1998: fig. 6) (Fig. 8/5).

119. St. Leonards, Marina (H), Sussex, England (idem no. 3; Rowlands 1976: pl. 3, 7) (Fig. 10/1)

120. West Row, Suffolk (idem no. 1: „simple; T-shape with flat work surface; no additional features") (no illustration)

Scotland

121. Inshoch Wood (H), Nairn (Childe 1945/46; idem no. 5, fig. 2b) (Fig. 11/2)

122. Kyle of Oykel („cairn"), Sutherland (Smith 1881; idem no. 6, fig. 1) (Fig. 13/8)

Northern Ireland

123. Omagh (H; mould), Co. Tyrone (Ó Faoláin 2004: 155 [no. 2], 208, fig. 12, 2) (Fig. 11/1)

Channel Islands, Jersey

124. Clos de La Blanche Pierre, St. Lawrence (Coombs 1988: 325, fig. 6, 69) (Fig. 7/15)

Socketed hammerheads used as anvils (?)
(selected examples: Fig. 17)

Deville-les-R ouen (H), Seine-Maritime, France (Verron 1971: 65 f., fig. 54) (no illustration)

Génelard 5 (H), Saône-et-Loire, France (Thevenot 1998: 125, fig. 1, 3) (Fig. 17/4)

Génelard 6 (H), Saône-et-Loire, France (Thevenot 1998: 126, fig. 2, 1) (Fig. 17/2)

Génelard 7 (H), Saône-et-Loire, France (Thevenot 1998: 126, fig. 2, 2) (Fig. 17/3)

Hallstatt (G; grave 469), Upper Austria (Kromer 1959: 110, fig. 91, pl. 82–84) (Fig. 17/10.

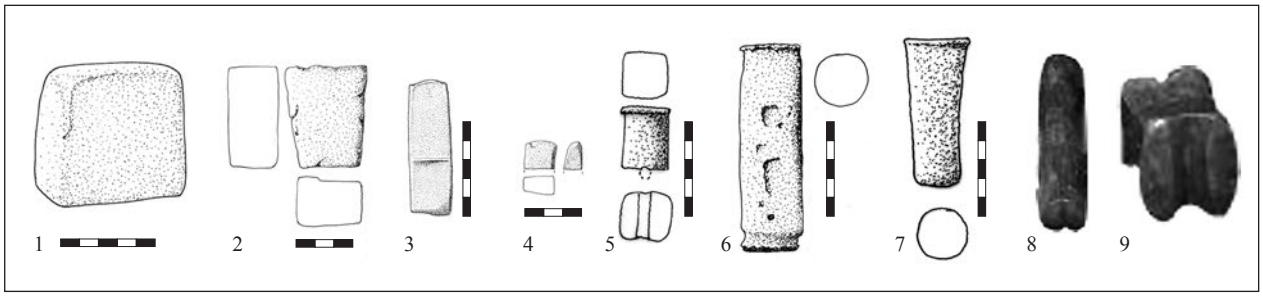

Fig. 6. Class 1, subclass 1a. Bench/block anvils: 1) "Near Sligo" (no. 71); 2, 7) Silanus (nos. 90, 91); 3) Zürich-Wollishofen (no. 113); 4) Monte Cavanero (Chiusa di Pesio) (no. 87); 5) Brno-Rečkovice (no. 11); 6) Lotzaroi-Genna Tramonti (no. 92); 8, 9) Tállya-Várhegy (nos. 70, 71). – Bronze. – M. 1:3 (8, 9 no scale)

Сл. 6. Класа 1, подкласа 1а: плоснато-равни наковњи, бронза, R 1 : 3

Rýdeč 1 (H), okr. Ústí nad Labem, Bohemia (Kytlicová 2007: 301 no. 207 [95: „fitting"], pl. 88, 95) (Fig. 17/5)

Rýdeč 2 (H), okr. Ústí nad Labem, Bohemia (Kytlicová 2007: 301 no. 207 [253], pl. 94, A 253) (Fig. 17/6)

Schiltern 1, 2 (H), Lower Austria (Girtler 1970; Hansen 1994: fig. 80, 1. 2) (Fig. 17/7. 8)

Tise (H), Hjørring amt, Denmark (Armbruster 2001: 11 fig. 2; J 242 no. 369, pl. 242) (Fig. 17/11)

Trenčianske Bohuslavice (H), okr. Nové Mesto nad Váhom, Slovakia (Novotná 1970: 99 no. 803, pl. 43, 803) (Fig. 17/1)

Zoggendorf (SF), com. Heiligenstadt, Lkr. Bamberg, Bavaria (Ausgrabungen und Funde in Oberfranken 11, 1997–1998: 20. 8, fig. 8, 5) (Fig. 17/9)

Terminology and classification

The English term *anvil* is currently used in archaeological literature mostly for pre-Iron Age tools. This refers to a blacksmith's tool, whilst today, the smaller tools used by fine metalworkers are called *stakes*. However, considering how embedded this technical term is, we are using the term *anvil* in this paper.

Bronze Age metal anvils reveal different features and each functional group corresponds to a specific technical definition. When addressing function, anvils can be described as an inactive percussion tool or support for receiving hammer strikes. All anvils in this regard can be considered as two-piece tools because they consist of a metal and a wooden part in order to operate. The most important characteristic is the shape anvils have. The shape of an anvil can be pyramidal, truncated pyramidal, cylindrical, hollow cylindrical, conical, truncated conical, spherical, hemispherical or barrel-shaped. Most anvils have a short or long spike (German: *Angel;* Serbian: *Трн*) for fitting to a wooden stump. Sometimes grooves and swages (German: *Sicken, Rillen, Kerben, Gesenk*; Serbian: *Шаре*) or hemispherical depressions are wrought into the working surface, which is called an anvil face (German: *Ambossbahn*; Serbian: *Лице наковња*). One or two lateral prolongations are named beaks but also spikes or tangs (German: *Horn/Stecken*; Serbian: *Рог, Pen*). Complex anvils can provide several working surfaces as well as beaks with round or rectangular cross sections. The central cavity in the anvil structure is called a punching hole (German *Nagelloch, Stanzloch;* Serbian: *Pyna*).[53]

Considering the spectrum of various forms and functions, we can distinguish five main classes (and subsequent subclasses) of Bronze Age metal anvils.[54] Apart from certain exceptions with well-defined characteristics, we will not refer to „types" of anvils, because when considering the broader traits, each anvil can have an individual character.

Class 1: Bench, block and pyramidal (frustrum) flat anvils

Subclass 1a: Flat anvils (German: Brettambosse)

The block shaped flat anvils consist of a simple block of a more or less rectangular shape. The Bronze Age (?) anvil from „Near Sligo" (no. 79) in fact appears

[53] Jantzen 2008, 253, Abb. 90; Nessel 2009, 49, Abb. 12.

[54] Coutil 1912; Ohlhaver 1939; Drescher 1973, 250 fig. 34; Nicolardot/Gaucher 1975; Ehrenberg 1981; Eluère/Mohen 1993; Armbruster 2001; Jantzen 2008, 253–259, 326–333.

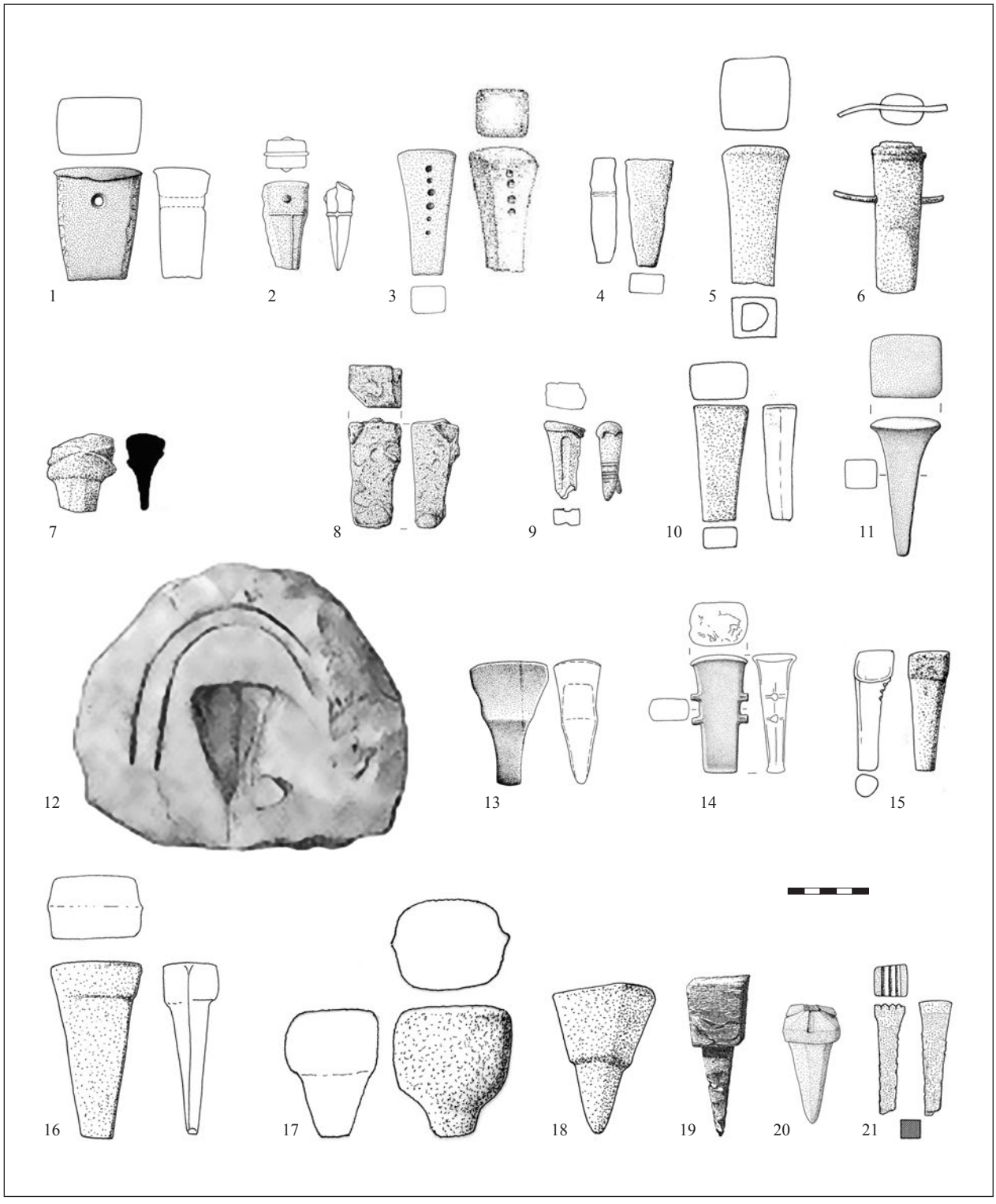

Fig. 7. Class 1, subclass 1b. Pyramidal (or frustrum) anvils: 1) Újezd (no. 8); 2) St. Denis-de-Pile (no. 46); 3) Fratelia (no. 102); 4) Lula-Savadde (no. 93); 5–7) Nadap (nos. 67–69); 8) Hallstatt (no. 2); 9) Nedilys'ka (no. 114); 10) Loučka (no. 16); 11) Witkovo (no. 101); 12, 13) Auvernier (nos. 108, 109); 14) Przemyśl (no. 99); 15) St. Lawrence, Jersey (no. 124); 16, 17) Lesenceistvand (nos. 64, 65); 18) Ochtendung (no. 57); 19) Falerii (no. 84); 20) Sulsted (no. 19); 21) Steinkirchen (no. 61). – Iron (8, 9, 19), all others Bronze. – M. 1:3

Сл. 7. Класа 1, йоūкласа 1b: наковњи у облику йирамиде; 8, 9, 19) – īвожђе; осūали – бронза, R 1 : 3

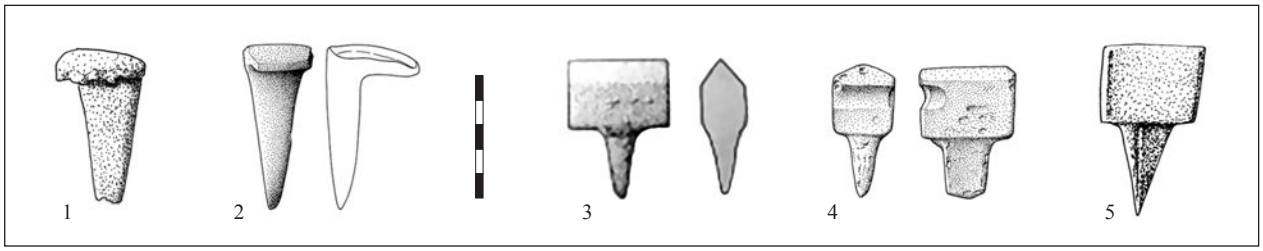

Fig. 8. Class 1, subclass 1c. Anvils with one lateral working surface: 1) Plainseau (Amiens) (no. 40); 2) Graville-Sainte-Honorine (no. 32). – Subclass 1d: Anvils with pentagonal body and a spike: 3) Valdevimbre (no. 105); 4) Lichfield (no. 117); 5) Netherhampton ("Salisbury Hoard") (no. 118). – Bronze. – M. 1:3

Сл. 8. Класа 1: 1–2) Потклаcа 1c: наковњи с једном радном површином; 3–5) Потклаcа 1d: наковњи пентагоналног пресека са усадником, бронза, R 1 : 3

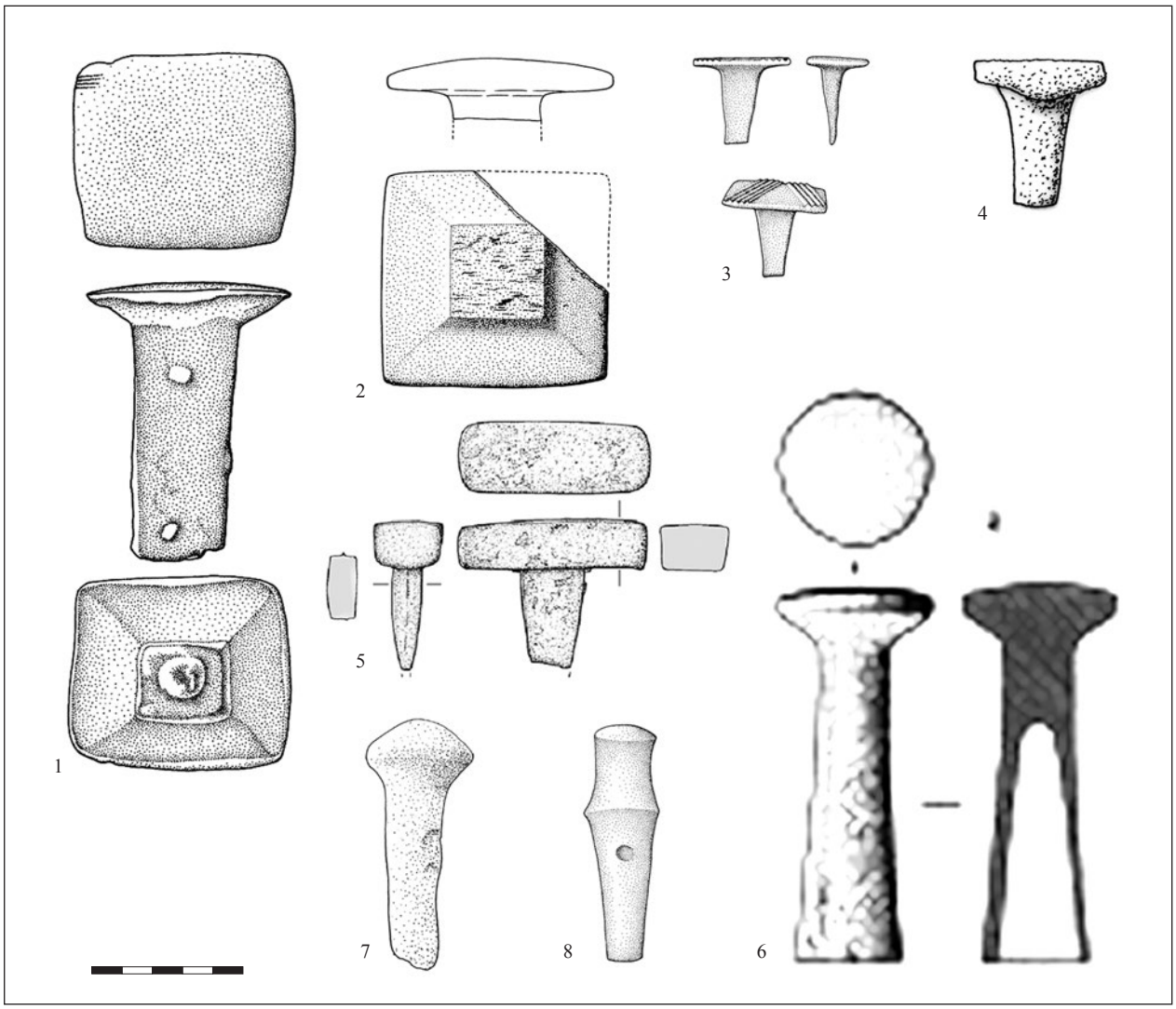

Fig. 9. Class 1, subclass 1e. Anvils with mushroom shaped working surface: 1) Contigliano (no. 83); 2) Bologna-San Francesco (no. 80); 3) Ruthen (no. 60); 4) Świnoujście-Międzyzdroje (no. 100); 5) Golchen (no. 50). – Subclass 1f. Anvils with plate shaped or hemispherical head: 6, 7) Génelard (nos. 31, 29); 8) Biharugra (no. 62). – Bronze. – M. 1:3

Сл. 9. Класа 1: 1–5) Потклаcа 1e: наковњи у облику печурке; 6–8) Потклаcа 1f: наковњи са равном или калоташтом главом, бронза, R 1 : 3

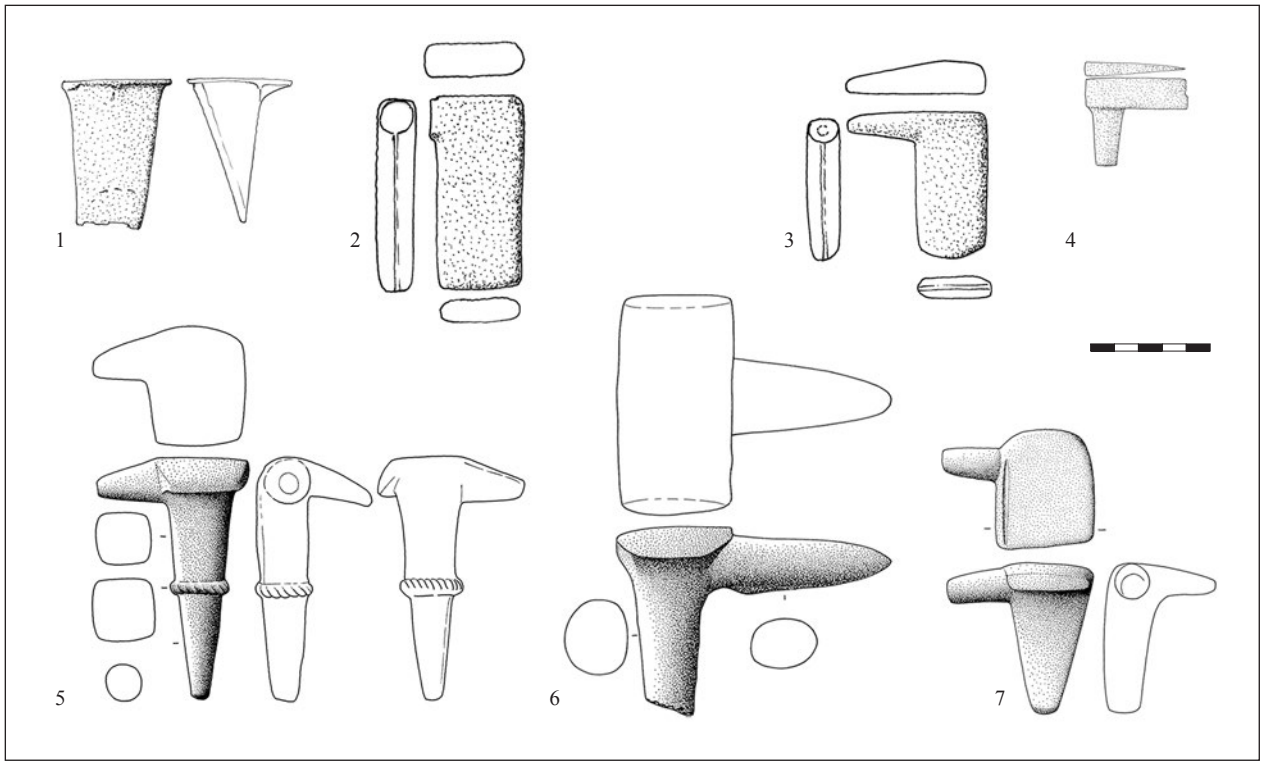

Fig. 10. Class 2, subclass 2a1: 1) St. Leonards, Marina (no. 119); 2, 3) Loučka (nos. 13, 15); 4) Velim (Bohemia) (no. 9); 5) Paris, La Villette/Pont du Flandre (no. 39); 6) Ouroux-sur-Saône (no. 38); 7) Mâcon (no. 36). – Bronze. – M. 1:3

Сл. 10. Класа 2, йошкласа 2а1: бронза, R 1 : 3

to be a „cushion stone" (Fig. 6/1). One block anvil has a gable shaped working surface (Fig. 6/4), and the flat anvil from Zürich-Wollishofen (no. 113) a horizontal feature for locking the anvil into a wooden surface (Fig. 6/3). Three other block anvils look like hammers. The anvil from Brno–Rečkovice (no. 11) has a rounded rectangular body with a punching hole (Fig. 6/5). Two Sardinian anvils (no. 92) have a cylindrical shape and two working surfaces (Lotzorai type according to Lo Schiavo) (Fig. 6/6). The two anvils (one with cylindrical, the other with a body like a hammer) with distinctive features from Tállya-Várhegy (no. 70–71) belong to this subclass (Fig. 6/8, 6/9).

Subclass 1b: Pyramidal (or frustum) anvils

Anvils of this kind have a truncated pyramid (frustrum) body with or without a shaft and mostly a square, flat or slightly convex working surface (one anvil with a gable-roofed working surface [Fig. 7/2]) (Fig. 7). The frustrum-anvil from Fratelia (no. 102) has a row of little bosses on two opposite faces of its body (Fig. 7/3). Two anvils have a punching hole in the body (Fig. 7/1. 6). In one anvil from Nadap (no. 68) a bronze wire is pulled through the punching-hole (Fig. 7/6). The Late Bronze Age anvil from Nedilys'ka (Niedszielska) (no. 114) was made from iron and is decorated with two lines (no swages) on one side (Fig. 7/9). The hornless anvil from the hoard of Pryzmyśl (no. 99) has half way up the body on two opposite faces two adjacent small projections, which could have served as a rest for a wooden stump or to carry the tool (Fig. 7/14).[55] The stone mould from Auvernier (no. 108) belongs to this class (Fig. 7/12). Some anvils have significant wear marks from extensive forging (Fig.7/1. 9. 14). The working surface of the small anvil from Steinkirchen (no. 61) is full of swages (Fig. 7/21). Three anvils (one in iron: from Falerii [no. 84]) are very similar to modern (German) *Steck-, Stock- or Stiftambosse* (Fig. 7/11. 18. 19).[56] The small (miniature?)

[55] Ohlhaver 1939: 23.

[56] Armbruster 2001: 17, fig. 12, 1.

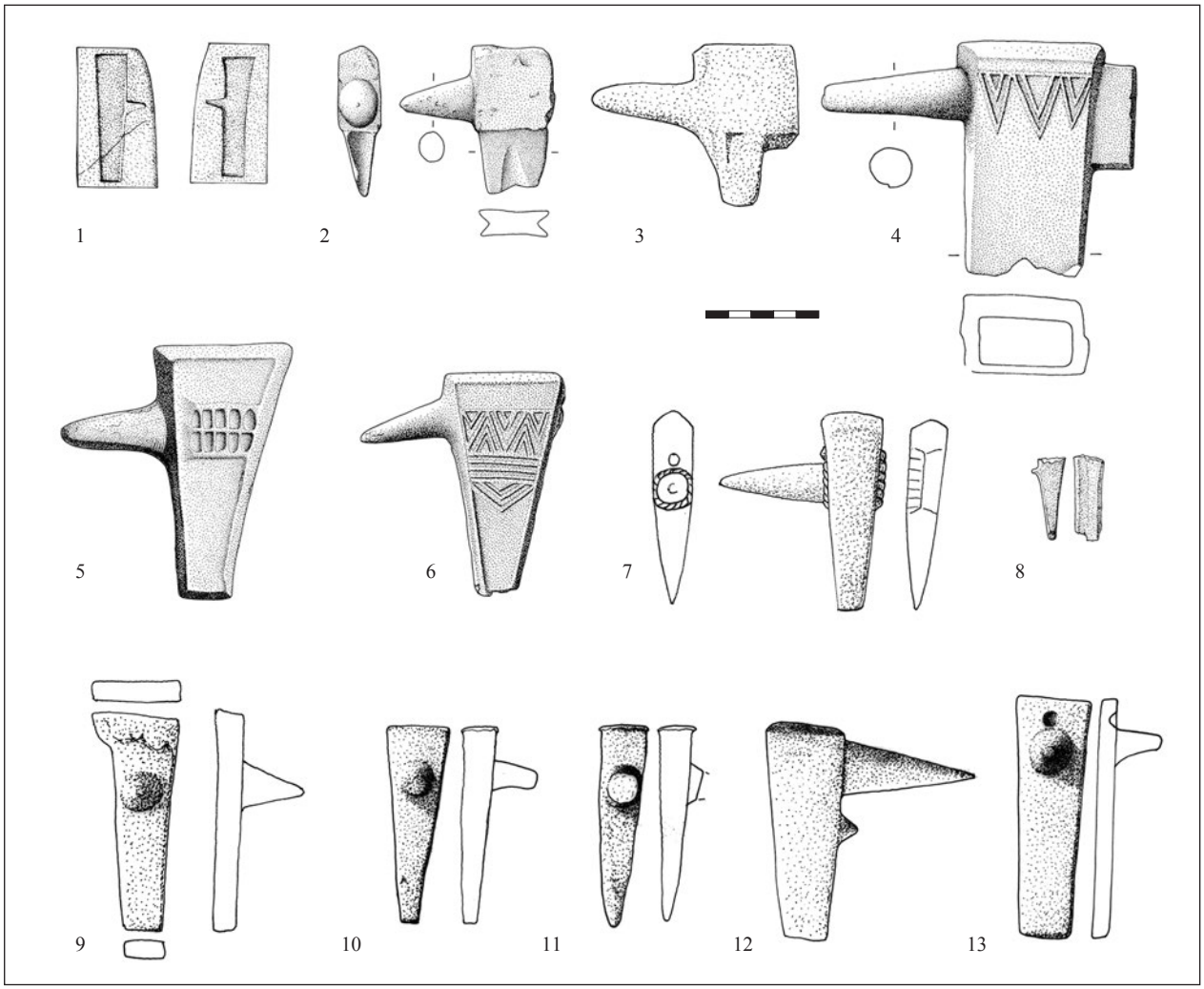

Fig 11. Class 2, subclass 2a2: 1) Omagh (no. 123); 2) Inshoch Wood (no. 121); 3) "Angerville" (no. 21); 4) La Tour de Langin (no. 35); 5) Plestlin (no. 59); 6) Zürich-Wollishofen (no. 114); 7) Seine between Corbeil/ Villeneuve-Saint-George (no. 45); 8) Murchin (no. 54); 9) Loučka (no. 14); 10) Nuragas-Forraxi Nioi (no. 96); 11) "Prov. unknown" (Sardinia?) (no. 96); 12) Flax Burton (no. 115); 13) Frattesina (no. 85). – Bronze. – M. 1:3

Сл. 11. Класа 2, йошкласа 2а2: бронза, R 1 : 3

anvil from Sulstedt (no. 19) has a pyramidal working surface with four crossing swages (Fig. 7/20).

Subclass 1c: Anvils with one lateral working surface

Two anvils of this subclass are characterised by one lateral working surface which is adjacent to the conical protrusion (Fig. 8/1. 2).

Subclass 1d: Block anvils with pentagonal body and a spike

Anvils without a beak have a spike for fitting and a pentagonal body with a gable-roofed working surface (Fig. 8/3–5).

Subclass 1e: Anvils with a mushroom-shaped working surface

These anvils have a flat rectangular body with a mushroom-shaped working surface[57] and a hollow-based and tapered shaft (Fig. 9/1–5). The anvil from Ruthen (no. 60) has two arrangements of grooves, shaped like chevrons, which are incorporated into the working surface of the anvil, probably for making plastic decorations on thin sheets (Fig. 9/3).

[57] Jantzen 2008, 330 (A 1): German: *pilzförmige Ambosse*.

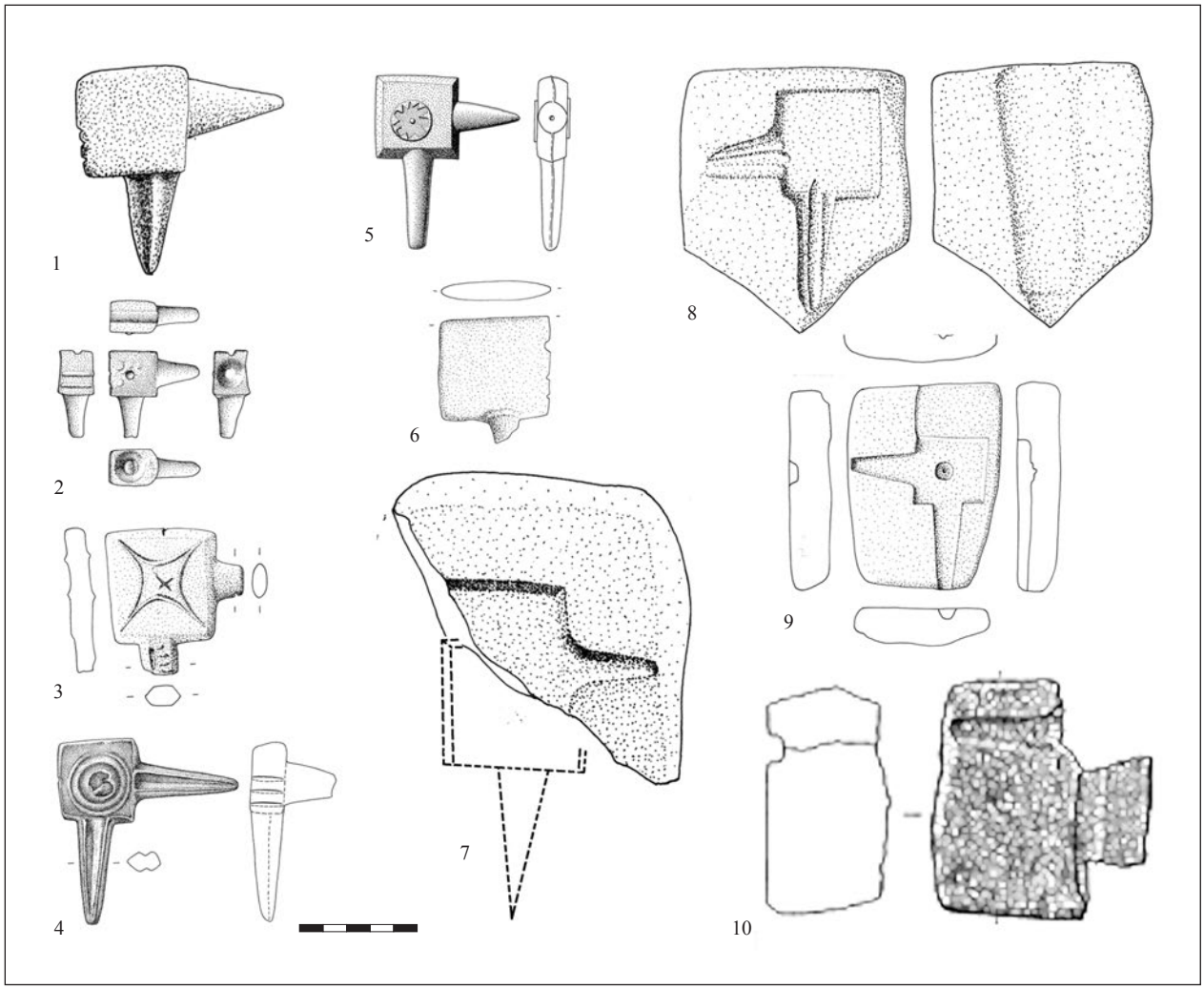

Fig. 12. Class 2, subclass 2b: 1) Ochtendung (no. 58); 2) Sengløse (no. 18); 3) Boljanić (no. 4); 4) Riddes (no. 111); 5) Porcieu-Amblagnieu (no. 42); 6) Esztergom (no. 63); 7) Velebit (reverse) (no. 104); 8) Fort-Harrouard (no. 26); 9) La Lède-du-Gurp (no. 33); 10) Cuiry-lès-Chaudardes (no. 25). – Bronze. – M. 1:3

Сл. 12. Класа 2, йошкласа 2b: бронза, R 1 : 3

Subclass 1f: Anvils with a plate-shaped or hemispherical working surface

Anvils of this kind are characterised by a plate-shaped or hemispherical working surface and a socketed shaft or hollow-based shaft with a round cross section (Fig. 9/6–8).

Class 2: Anvils with one or more beaks (German: *Hornambosse*)

Subclass 2a1: Anvils with one lateral beak fixed on the same level as the working surface

Anvils of this subclass have a beak which is fixed on the same level as the working surface either at one corner (Fig. 10/5–7) or in the middle of the working surface. The anvil of Paris-La Villette/Pont du Flandre (no. 39) has a plastic rib, with twisted decorations for better hafting, in the middle of the round conical shaft (Fig. 10/5). The dimensions of the working surface range from approximately 4 to 8 cm.

Subclass 2a2: Anvils with one lateral beak fixed a little below the working surface

Anvils such as these have a long and narrow, usually gable shaped working surface and one lateral beak, fixed below the working surface. On the body of the anvil from the Seine between Corbeil/Villeneuve-Saint

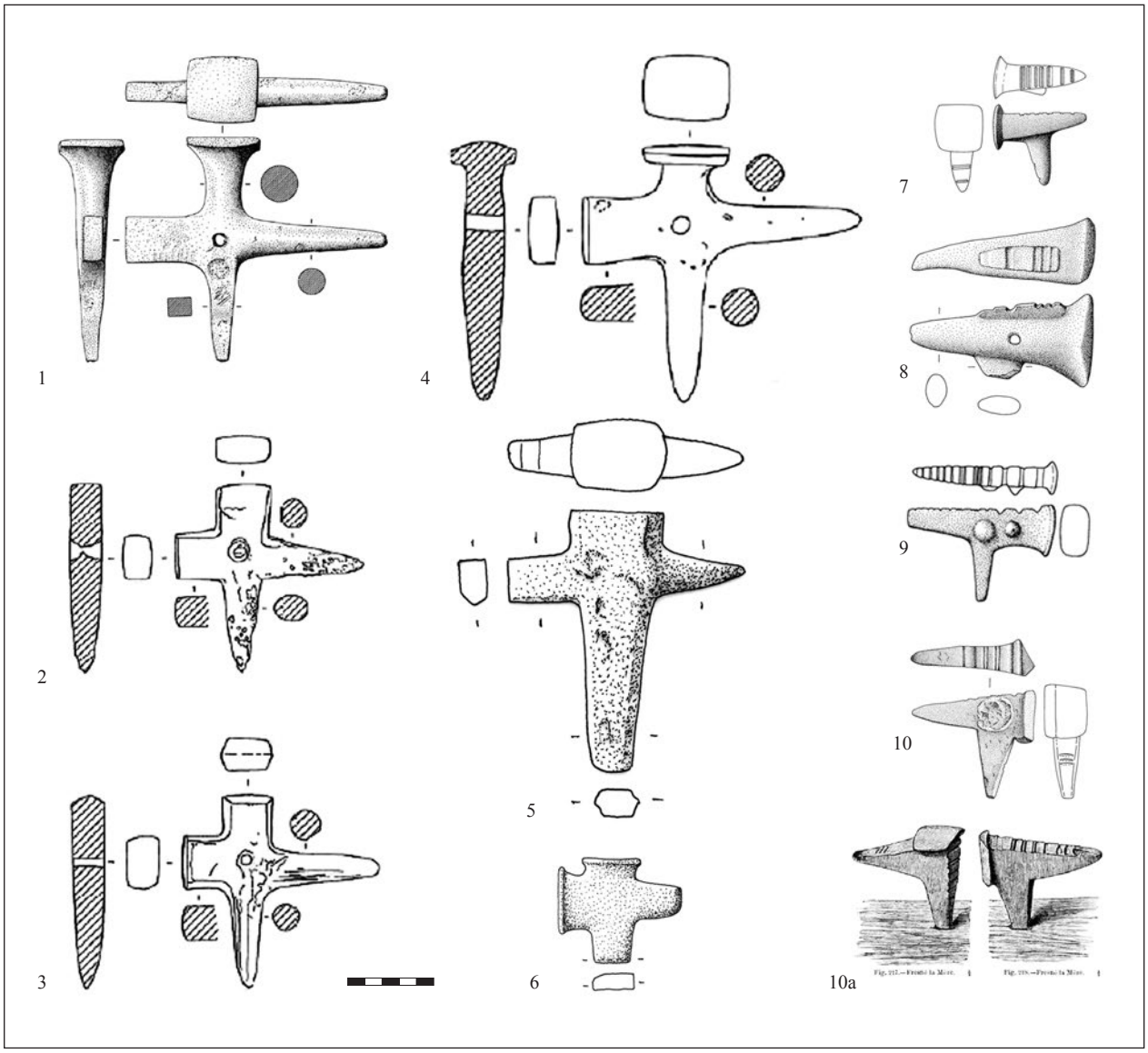

Fig. 13: Class 2, subclass 2c: 1) Génelard (no. 30); 2) Alise-Sainte-Reine/Laumes (no. 20); 3) Mus. Lyon (Prov unknown) (no. 48); 4) Saône near Chalon-sur-Saône/Gray (no. 44); 5) "Murnau" (no. 55); 6) Bishopsland (no. 75). – Subclass 2d: 7) Seine bei Bardouville (no. 22); 8) Kyle of Oykel (no. 122); 9) Coray (Keranfinit) (no. 24); 10) Fresné-la-Mère (no. 27) (10a hafting: Fresné [after Evans 1881, 182 fig. 217. 218]). – Bronze. – M. 1:3

Сл. 13. Класа 2: 1– 6) Поткласа 2c; 7–10) Поткласа 2d, бронза, R 1 : 3

George (no. 45) there is a ridge with swages (Fig. 11/7). The shaft is broad and has a rectangular cross-section. The anvil from La Tour de Langin (no. 35) has a socketed shaft instead of a solid shaft (Fig. 11/4). A remarkable feature is the plastic decoration some anvils have (Fig. 11/4–6). In that regard we can observe that both the hollow shaft and the plastic decoration are the result of casting using the lost wax technique.

Subclass 2b: Anvils with two lateral beaks fixed in the middle of the anvil block (Type Porcieu-Amblagnieu)

Anvils of this type (Type Porcieu-Amblagnieu) have an elongated, albeit relatively small, working surface (4 x 1.5–2.1 cm) and two conical beaks located in the middle of the rectangular or square block (Fig. 12). Some anvils are decorated with a cast plastic decoration

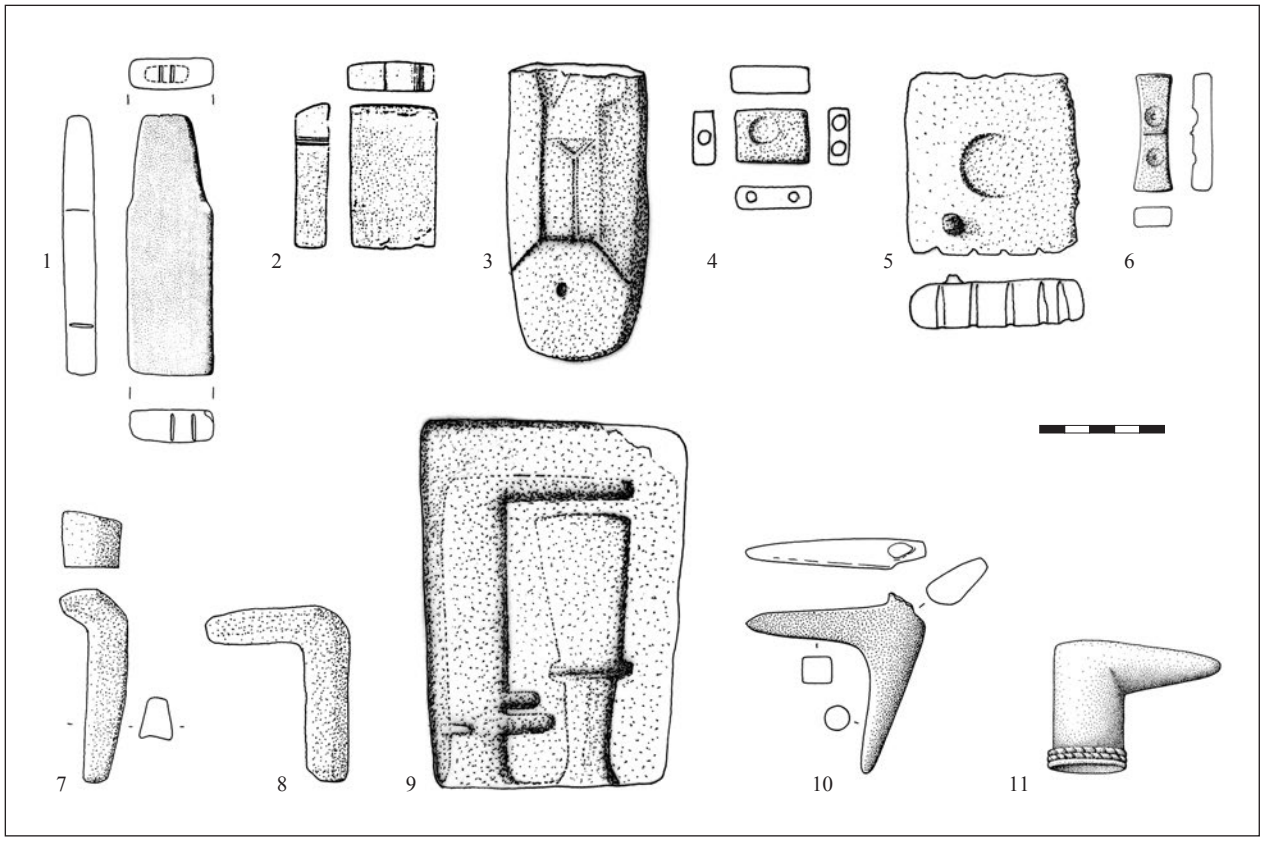

Fig. 14. Class 3. Bench anvils with swages and bosses: 1) Lachen-Speyerdorf (no. 51); 2) Génelard (no. 28); 3) Grandson-Corcelettes (no. 110); 4) Larnaud (no. 34); 5) Trégorf-sur-Surzur (no. 47); 6) Gorzano (no. 86). – Class 4. Bent anvils: 7) Sipbachzell (no. 3); 8, 9) Velem-Szentvid (nos. 72, 73); 10) Questembert (no. 43); 11) Jevičko (no. 12). – Bronze. – M. 1:3

Сл. 14. Класа 3: 1–6) Равни наковњи са удубљењима и исūуйчењима; 7–10) Савијени наковњи, бронза, R 1 : 3

on each lateral side of the body featuring knobs, concentric ribs, rosettes, or an X shape nestled in a pillow-shaped rib (Fig. 12/3–5). The four stone moulds from Velebit (no. 104), Cuiry-lès-Chaudardes (no. 25), Fort-Harrouard (no. 26) and La-Lède-du-Gurp (no. 33) all belong to this subclass.

Subclass 2c: Anvils with two working surfaces and two lateral beaks (T-shaped anvils / Type Chalon-sur-Saône/Gray)

Anvils of this subclass include three-armed anvils with a cruciform outline. They consist of a body with two working surfaces (1.5 to 4.5 cm) and two conical beaks. Swages are present only on the smaller working surface of the anvil from Murnau (no. 55) (Fig. 13/5). A common feature of four very similar anvils (Type Chalon-sur-Saône/Gray) is a punching hole in the middle of the anvil block (Fig. 13/1–4). It is plausible that the anvils from Alise-Sainte-Reine/Laumes (no. 20) and „Provenance unknown"/Mus. Lyon (no. 48) were cast in the same mould. This seems probable because of their identical features, dimensions and weights (Fig. 13/2.3) or another possibility is that the last one is a modern copy. We should also highlight that these multiple-armed anvils are multifunctional.

Subclass 2d: Anvils with one working surface, one beak as a shaft and one additional beak (Type Fresné-la-Mère)

The four very similar anvils of this subclass (Type Fresné-la-Mère) have one small rectangular working surface, a beak which can also be used as a shaft, as well as an additional beak (Fig. 13/7–10). It was possible to work on this anvil in two different positions (Fig. 13/10a). Several swages are on a ridge-shaped or comb-shaped elongation. One anvil has a punching hole (Fig. 13/8).

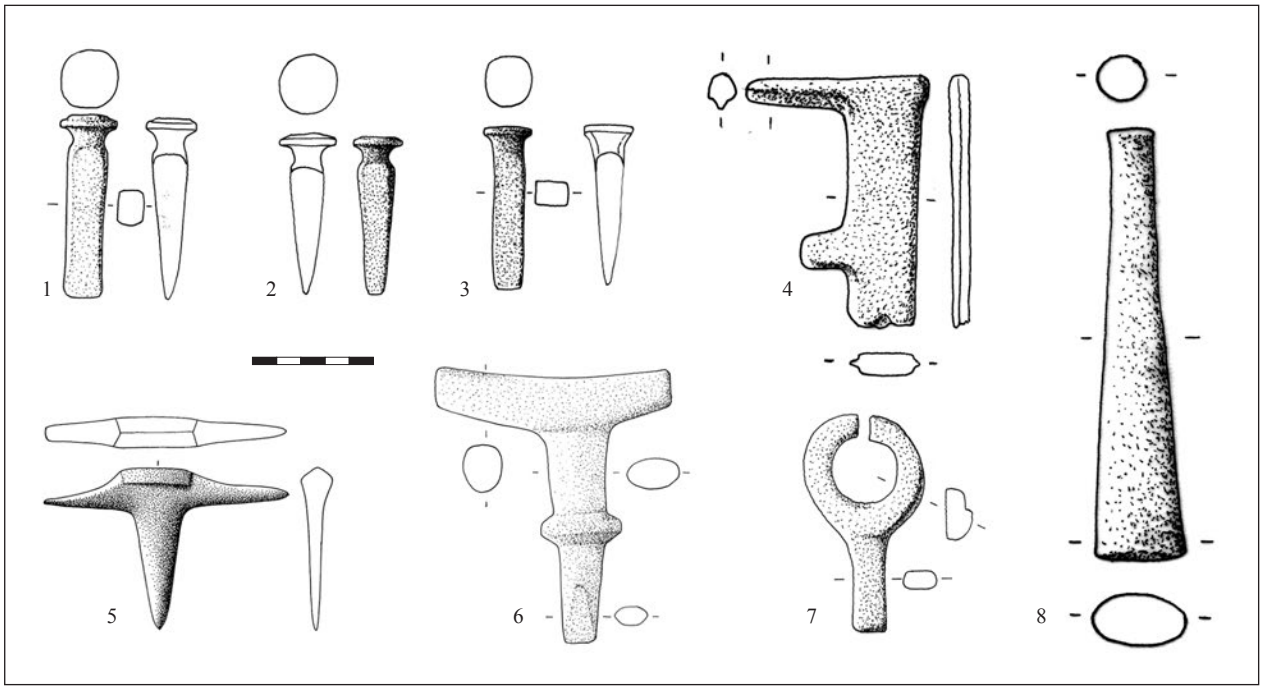

Fig. 15. Class 4. Beating fists: 1) Chiaramonti (no. 89); 2) "Prov. unknown" (Sardinia?) (no. 97); 3) Ozieri (no. 95). – Anvils with special features: 4) Blučina (no. 10); 5) Lusmagh (no. 78); 6, 7) Boljanić (nos. 5, 6); 8) Bor di Pacengo (no. 82). – Bronze. – M. 1:3

Сл. 15. Класа 4: 1–3) Наковњи за искуцавање; 4–8) Наковњи сйецифичних облика, бронза, R 1 : 3

Class 3: Bench anvils with swages and bosses

Some flat and rectangular bench anvils with an upper and lower working surface have one or more small sides with one or more swages (Fig. 14/1–6). These tools are named swage blocks (German: *Riefenanken*) (Fig. 14/1–3). The stone mould from Grandson-Corcelettes belongs to this group of anvils (Fig.14/3). The flat bench anvils could be mounted in different ways into depressions provided in a wooden stump. The flat anvil from Lachen-Speyerdorf has a broad shaft with two swages (Fig. 14/1). Another form, with massive flat plate-shaped bronze blocks with a rectangular or dovetail shape, is characterised by bosses and/or swages. These were used as swage blocks and doming blocks (German: *Kugelanken)* (Fig. 14/4–6).

Class 4: Bent anvils

Some anvils belong to the class of bent anvils (German: *Biegestöcke*) (Fig. 14/7–11). They are shaped as bent rods with a round, trapezoidal or D-shaped cross-section. Both parts of the bent rod could be used as a working surface. On the shorter part of the bent rod of the massive anvil from Sipbachzell (no. 3) there are two pronounced working surfaces (Fig. 14/7). From Velem-Szentvid (no. 73) a casting mould for a bent anvil is known. This mould has two casting negatives, one for an anvil and the second for a socketed hammerhead (Fig. 14/9). The bent anvil from Jevičko (no. 12) has a socketed shaft decorated with a cord-like twisted plastic decoration (Fig. 14/11).

Class 5: Beating fists (Fig. 15/1–3)

Three Late Bronze Age anvils from Sardinia are very similar to each other (nos. 89, 95 and 97) (Fig. 15/1–3). F. Lo Schiavo named them Type Chiaromonti.[58] The wedged-shape anvils have a conical form with a rectangular cross-section. The body changes its cross-section from the shoulder to a round neck. The working surface is disc-shaped. These anvils are quite long (ca. 17–20 cm) and the dimensions of the round-convex working surface ranges between ca. 5–7 cm. These tools look very much like modern beating fists (German: *Treibfäuste*).

[58] Lo Schiavo 2018.

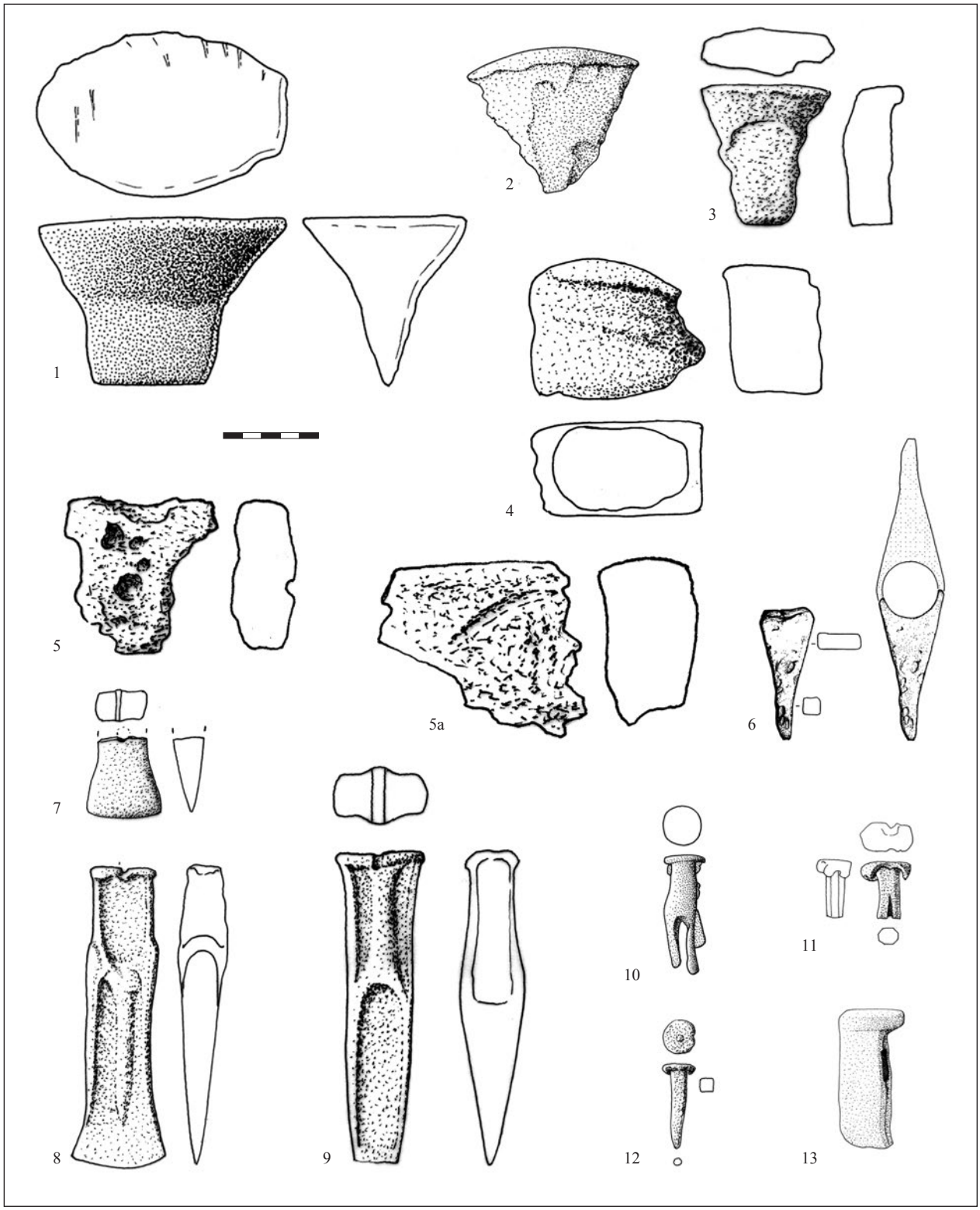

Fig. 16. Ad-hoc- *anvils: 1) Pontpoint (no. 41); 2) Jarpice (no. 7); 3) Guşteriţa (no. 103); 4) Maintal-Hochstadt (no. 53); 5, 5a) Oberwilflingen (no. 56); 6) Lachen-Speyerdorf (no. 52); 7) Damsholte (no. 17); 8) Bromma (no. 106); 9) Holmedal (no. 107); 10) Nantes-Prairie de Mauves (no. 37); 11) Bologna-San Franceso (no. 81); 12) Redù (no. 88); 13) Augsdorf (no. 1). – Bronze. – M. 1:3*

Сл. 16. Ad hoc *наковњи, бронза, R 1 : 3*

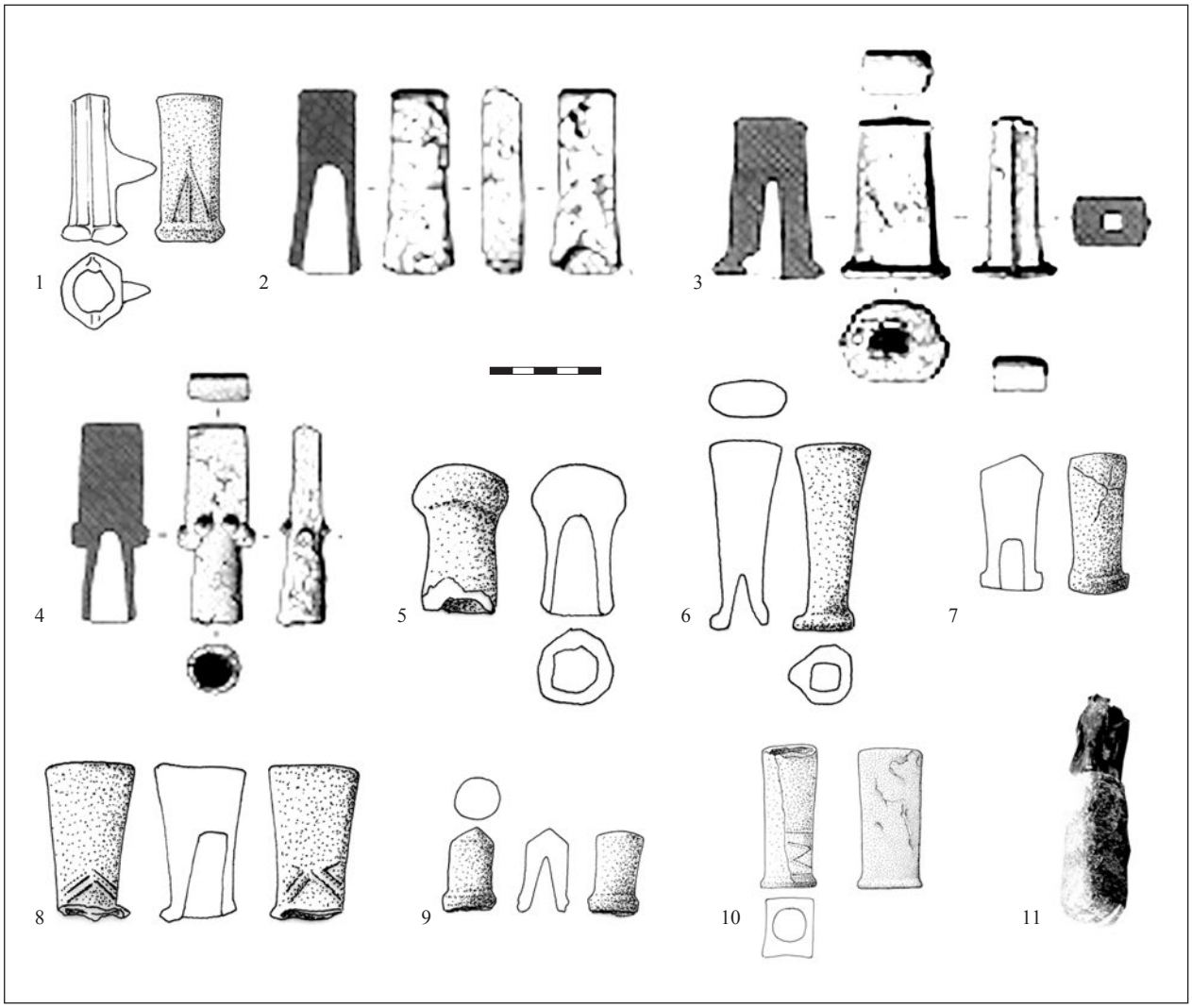

Fig. 17. Socketed hammerheads as anvils: 1) Trenčianske Bohuslavice; 2–4) Génelard; 5, 6) Rydeč; 7, 8) Schiltern; 9) Zoggendorf; 10) Hallstatt (Grave); 11) Tise. – Bronze. – M. 1:3

Сл. 17. Наковњи у облику чекића са усадником, бронза, R 1 : 3

Anvils with special features

Some anvils are characterised by special features Fig. 15/4–8). The anvil from Blučina (no. 10) with its long, small working surface and a lateral beak at the same level is similar to anvils of class 2a. In the middle of the rectangular shaft there is a short lateral beak, perhaps for better hafting (Fig. 15/4). The T-shaped goldsmith-anvil from Lusmagh (no. 78) of a narrow rectangular shape also has a long, small, gable-roofed working surface and two long beaks (one rectangular, the second one with a round cross-section) on the level of the working surface (Fig. 15/5). One anvil from „Sardinia" (no. 98, no illustration.) has a very similar outline. Both anvils look like the so called (German) *Sperrhaken*. The T-shaped anvil from Boljanić (no. 6) with a collared shaft for better hafting in a wooden stump is similar to the Sardinian anvil (Fig. 15/6). The third exemplar from Boljanić (no. 7) looks like a clamp; and it was possible to work on the outside of the curved beaks (Fig. 15/7). A long (22.9 cm) and very heavy (1.8 kg!) bronze tool (composition with a high tin-content [13 %]) from the lake village of Bor di Pacengo (Upper Italy) (no. 82) has on both ends a round or oval working surface with clear traces of use. Perhaps it is an anvil or a pestle for a mortar to crush metal or other materials (Fig. 15/8).

Ad-hoc-anvils (Fig. 16)

Some Anvils were made from reused bronze material of different origin (Fig. 16). On the one hand, ingot fragments were used as flat anvils (plano-convex ingot: Maintal-Hochstadt [no. 53], Jarpice [no. 7], Pontpoint [no. 41], Gusteriţa [no. 103]; oxide-ingot:[59] Oberwilflingen [no. 56]; lead pick-ingot: Lachen-Speyerdorf [no. 53]) (Fig. 16/1(Fig. 16/1–7)). On the other hand, finished products were transformed for their use as anvils, like palstaves and flat axes (Damsholte [no. 17], Bromma [no. 106], Holmedal [no. 107]), a hammer (Augsdorf [no. 1]) or (probably) a full hilted chisel (Bologna-San Francesco [no. 81]; Redù [no. 88]) (Fig. 16/8–9. 11–13). A unique object is the so called bugle-shaped object reused as a small anvil from the Bronze Age final III-hoard of Nantes-Prairie de Mauves [no. 37] (Fig. 16/10).[60] Of course, the number of these so called *ad-hoc* anvils[61] will increase in the future if we pay more attention to this category, which is hard to find in Bronze Age metalwork.

Socketed hammerheads as anvils
(German: Tüllenambosse) (Fig. 17)

A specific group of socketed hammerheads were probably used as anvils.[62] The socketed hammerheads from Trenčianske Bohuslavice (Slovakia) and Deville-les-Rouen (France) have a short lateral beak in the middle of the body (Fig. 17/1). These objects combine features both of an anvil (beak) and a socketed hammer. The socketed hammerhead from Tise (Denmark) has a swage as a feature of an anvil on its working surface (Fig. 17/11). However, the best criteria to define socketed hammerheads as anvils are the much lower depth, the more irregular shape of the socket and/or the absence of a lateral loop. They were hafted over a straight wooden shaft.[63] Their body and their round, oval or square mouth is mostly rougher than in case of „normal" hammerheads. The flat, arched, hemispherical or gable-roofed striking surface (German: *Bahn*) of these tools is the same as that of the hammers for multi-purpose forging.[64] Hammerheads with a small flat, slightly rounded working surface could be used for hardening and sharpening blades of weapons (swords, daggers, spearheads, etc.) or tools (knives, razors, axes, sickles, etc.), for forging wires, belts, needles etc. or softer (organic) material (leather, bones or wood). For metalworking, especially to stretch, beat or thin sheet metal, socketed hammerheads with a gable-roofed or with a hemispherical striking surface (ball-peen hammer [German: *Kugelhammer*]; beating fist [German: *Treibfaust*]; reverse fixed) were especially suitable. In this study we present only a selection of these kinds of socketed hammerheads as anvils (German: *Tüllenamboss*) (Fig. 17 [all hammerheads Fig. 17 are in vertical reflection]).

Dating and Distribution

Dating

At the end of the European Early Bronze Age and the beginning of the Middle Bronze Age the rise copper-tin-technology laid the foundation for an almost explosive proliferation of all kinds of weaponry and tools. Casting provided the possibility of creating any individual form of objects. These include socketed implements and tools (spearheads, arrowheads, axes, hammers, chisels, etc.). Casting moulds for producing bronze tools and bronze anvils became specialised tools.

The history of metal anvils started in the Middle Bronze Age in different parts of Europe. One of the oldest bronze anvils, an anvil with a gable-roofed working surface (Fig. 8/3), was found in an early dated association from the hoard of Valdevimbre (no. 105) (Prov. Leon, Northwestern Spain) associated with a small saw, two argaroid flat axes, a socketed spearhead, a socketed ferrule and two dagger blades.[65] The hoard from Porcieu-Amblagnieu (no. 42) (Western Alps, France), which has also been dated to the advanced Middle Bronze Age (Bz B/C) includes an early Middle Bronze Age razor,[66] palstaves, knob-sickles, chisels, a socketed hammerhead and a plastic decorated complex anvil with a beak (Fig. 12/5). The anvil mould (for a similar anvil to that from Porcieu-Amblagnieu) from Cuiry-les-Chaudardes (no. 25) (Northern France) (Fig. 12/9) was associated with Late Early Bronze Age ceramic vessels and was dated into the early Middle Bronze Age.[67] The hoard of stone moulds from Omagh (no. 123) (Northern Ireland) includes moulds for Middle Bronze Age rapiers/dirks. On one mould a negative for casting a small pyramidal anvil with a beak is

[59] Lo Schiavo u. a. 2009.

[60] Jockenhövel 1972; Janas 2010: 391–394.

[61] Term after Jockenhövel 1983.

[62] Ohlhaver 1939: 25: Jockenhövel 1982; Gogâltan 2005; Nessel 2008; Dietrich/Ailincăi 2012; Dietrich/Dietrich 2013.

[63] See Tise (Fig. 17/11): Armbruster 2001: 11, fig. 2, a. b.

[64] Jockenhövel 1982.

[65] Monteagudo 1977: 98–99, no. 607 pl. 149, B 1; Armbruster et al. 2003: 258, fig. 1.

[66] Jockenhövel 1980: 55–56, no. 127, pl. 8.

[67] Letterlé 1982.

engraved. The small hoard with a fragment of a palstave and a complete small anvil with crossed swages on the small working surface from Sengeløse (no. 18) (Seeland, Denmark) can be dated to Period II of the Northern European Bronze Age (Fig. 12/2)[68]. The Serbian anvil from Velebit (no. 104) can be dated to the same time (Fig. 4/3; 5/4. 5; 12/7). The hoard from Velim (no. 9) (Bohemia) with an anvil (Fig. 10/4), three bronze moulds and gold jewellery can be dated to the late Middle Bronze Age, which is also the same period of the hoard from Oberwilflingen (no. 56) (Württemberg, Germany) with an *ad-hoc*-anvil reused from an oxide-ingot (Fig. 16/5. 5a). The anvils from Inshoch Wood (Scotland) (no. 121; Fig. 11/2,), Flax Bourton (England) (no. 115; Fig. 11/12) and Bishopsland (Ireland) (no. 75; Fig. 13/6) can be dated to the later Middle Bronze Age and/or the beginning of the Late Bronze Age in Western Europe (Jockenhövel 1975).[69] From that time, there are, for anvils, specific components of tool kits in many Late Bronze Age hoards, which were also found in settlements all over Europe:

BzD/Ha A-Dating: Augsdorf (no. 1); „Murnau" (no. 55); Golchen (no. 50); Sipbachzell (no. 3); Újezd (no. 8); Blučina (no. 10); Loučka (nos. 13–16); Jevičko (no. 12); Fratelia (no. 102); Gusteriţa (no. 103); Nadap (nos. 67–69)

Ha A-Dating: Génelard (nos. 28–31); Esztergom (no. 63); Lesenceistvánd (nos. 64 and 65); Tállya-Várhegy (nos. 70 and 71); Mátraszőlő-Kerekbükk (no. 66); Boljanić (nos. 4–6); St. Leonards (no. 119)

Ha A 2/B 1-Dating: Lachen-Speyerdorf (nos. 51 and 52); Steinkirchen (no. 61); Clos de La Blanche Pierre (Jersey) (no. 124); Fresné-la-Mère (no. 27); Nedilys'ka (Niedzielska) (no. 114); St. Denis-de-Pile (no. 46); Frattesina (no. 85); Contigliano (no. 83); Monte Cavanero (Chiusa di Pesio) (no. 87)

Ha B 3-Dating: Plestlin (no. 59); Ruthen (Holzendorf) (no. 60), Murchin (no. 54); Ochtendung (together with a Ha B1-bucket) (nos. 57 and 58), Witkovo (no. 101); Świnoujście-Międzyzdroje (no. 100); Przemyśl (no. 99); Graville-Sainte-Honorine (no. 32); Nantes-Prairie de Mauves (no. 37), Plainseau (Amiens) (no. 40); Bologna-San Francesco (nos. 80 and 81); Lusmagh (no. 117); Lichfield (no. 78)

Ha C/D-Dating: Hallstatt (no. 2)

Distribution

It should be noted that bronze anvils are an extremely rare class of tools in the European Bronze Age. To date only 124 bronze anvils have been recorded, mainly from hoards, some from settlements and, exceptionally, from funerary contexts (see list). Of course, regional and chronological differentiations have to be made because bronze anvils are found from the beginning of the Middle Bronze Age to the Earlier Iron Age, over an extended period of time of ca. 1,000 years.

In general, anvils have a dispersed distribution over a wide area of Europe (Map 2). The densest concentrations are found in Western Europe (The British Isles and Ireland), France (Burgundy and the Seine basin) and the western parts of Switzerland, due to an especially favourable situation of finding in hoards, settlements and rivers (or other wetland areas). Minor concentrations are known from Upper Italy, Sardinia, the Eastern Alps, from regions along the middle Danube (Lower Austria; Moravia,), from Slovakia, Hungary and from the Pannonian and Western Carpathian regions (Romania [esp. Transilvania], Vojvodina).[70] Further anvils are known from other parts of Central Europe (Bohemia, Poland, Bosnia and Herzegovina and Germany) and Southern Scandinavia.[71] The recently discovered Ha B1-hoard from Ochtendung (Middle Rhine) (Kr. Mayen-Koblenz, Rhineland-Palatinate) (nos. 57 and 58) with two anvils of different types (one beaked anvil and one block anvil [Fig 7/18; 12/1]) draws attention to regions which have long been considered rather empty of finds.[72] The stone mould from Velebit (no. 104) is the first example of casting a bronze anvil in Serbia and it is the oldest one in the Pannonian region (Fig. 4/3; 5/4. 5; 12/7). In many regions, however, there have been no finds of anvils from the European Bronze Age, though they must have been in use there.

Several anvil traditions can be distinguished. Firstly a pan European tradition includes most of the simple anvils of Class 1 (bench, block and pyramidal anvils), *ad-hoc*-anvils and socketed hammerheads/anvils with a distribution in all European Bronze Age regions. Anvils of Class 2 and its subclasses have a more limited distribution (Map 3). Cruciform anvils were

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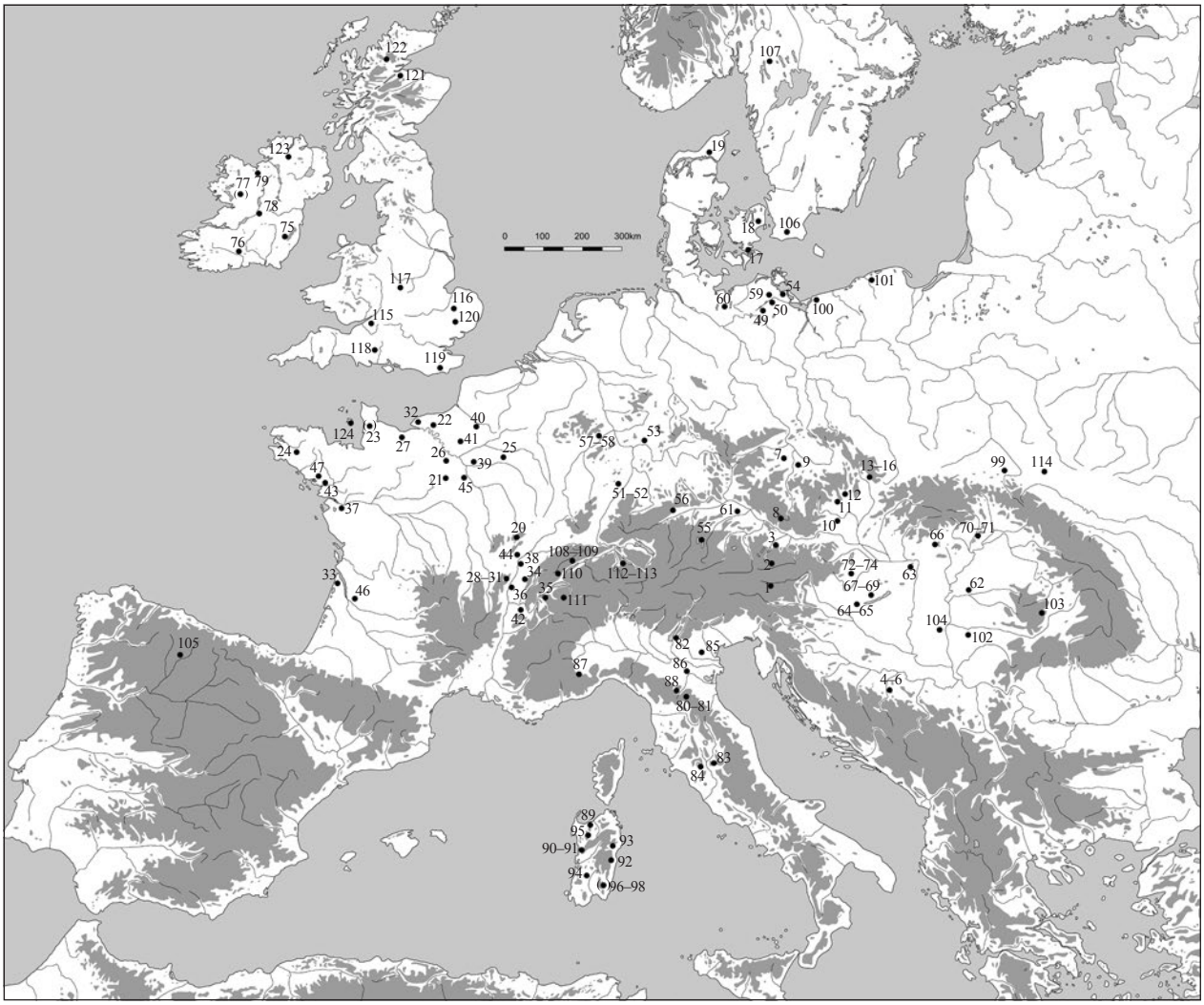
[68] Aner/Kersten 1973: 112 Nr. 339, pl. 59; Jantzen 2008: 256 Nr. 371.

[69] Jockenhövel 1975.

[70] Iaia 2014; Lo Schiavo 2018; Höglinger 1996; Girtler 1970; Salaš 2014; Pančiková 2008: 116–117, fig. 10, 1. 4; Mozsolics 1984: 42; Gogâltan 2005.

[71] Kytlicová 2007: 160–161; Gedl 2004: 72–73 160; König 2004; Jantzen 2008: 253–256

[72] von Berg 2005.



Map 2. Distribution of Bronze Age metal anvils in Europe (numbers correspond to the list)

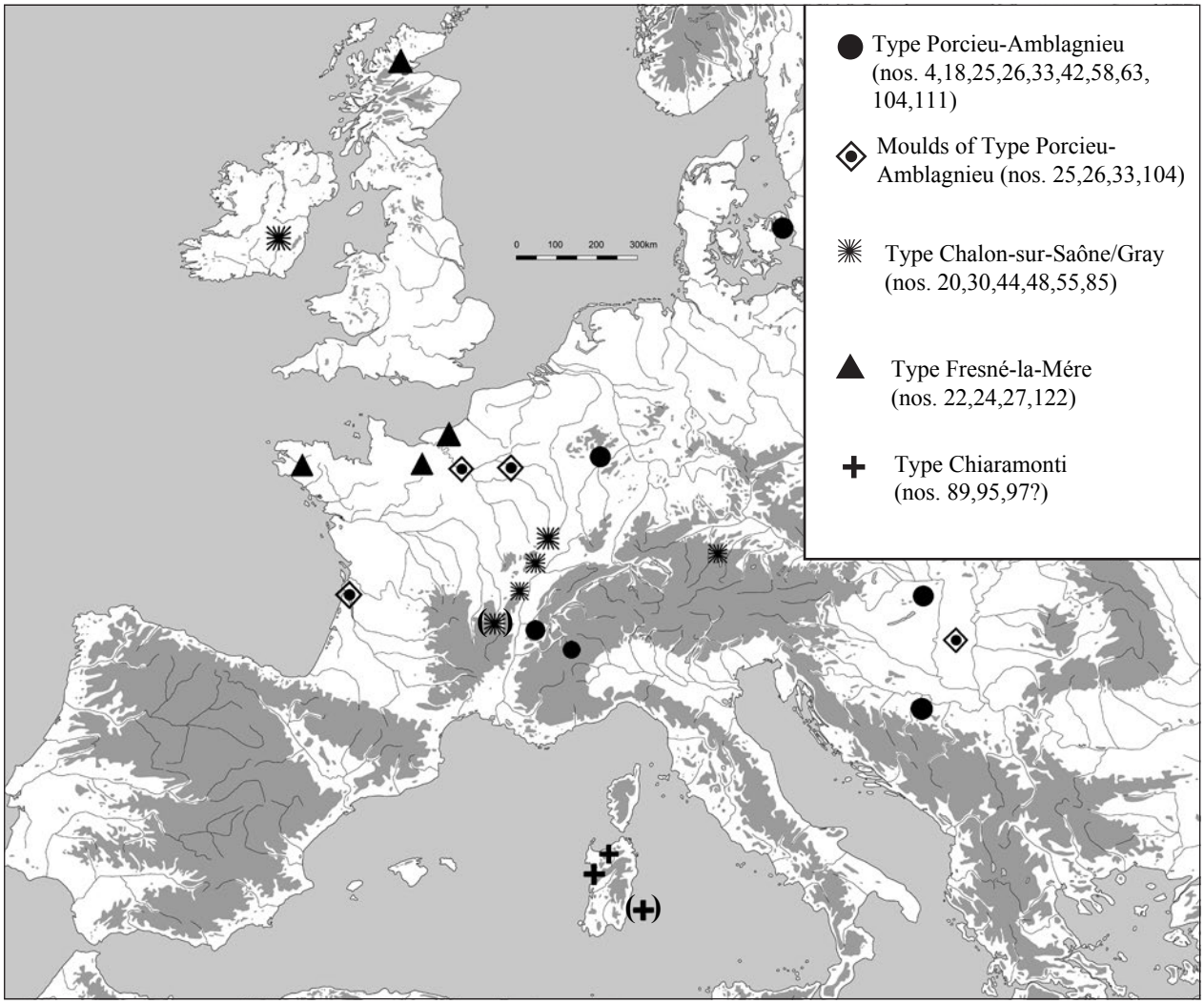
Карта 2. Распрострањеност металних наковања из бронзаног доба (бројеви одговарају приложеној листи у тексту)

distributed in Ireland, western France and, perhaps, in Southern Germany. Cruciform anvils of the type Chalon-sur-Saône/Gray were regionally limited to Burgundy (Eastern France)[73] and anvils of the type Chiaramonti were an endemic phenomena of the Sardinian island[74]. Anvils of the type Porcieu de Amblagnieu are common and were produced in France (see the three moulds in its western part). The second Western European anvil tradition is represented by the anvils of the type Fresné-la-Mère with finds from Scotland, Brittany, Normandy and the Seine basin. Bent anvils of Class 3 prevail in the middle Danube region. The mould for bent anvils and a finished bent stake from the hill fort of Velem-Szentvid (no. 72, 74; Fig. 14/8. 9) together with some other moulds and tools for metalworking indicate local production (workshops) on this prominent site.[75] The two beaked anvils from Loučka (no. 13. 15) are very similar to the third anvil, a block anvil (no. 10), from the same hoard, all probably made for a tool kit for a local metalworker. The anvils from Plainseau (Amiens) (no. 40) and Graville-Sainte-Honorine (no. 32) are also very similar (Fig. 8/1. 2).

[73] Nicolardot/Gaucher 1975: 33; „Saônnois“: Thevenot 1998: 128.

[74] Lo Schiavo 2018: 429.

[75] von Miske 1908.



Map 3. Distribution of some types of Bronze Age anvils in Europe

Карта 3. Расūросūрањеносūи ūојединих ūиūова меūалних наковања у бронзаном добу

They are regional anvil forms in North Western France as are the two mushroom-headed anvils from Ruthen (no. 60) and Świnoujście-Międzyzdroje (no. 100) (Fig. 8/3. 4) in the Southern Baltic Sea region. Also, the two Italian mushroom-headed anvils from Bologna-San Francesco (no. 80) and Contigliano (no. 83) look very similar (Fig, 8/1. 2).

In summary, the chronology and distribution patterns of the bronze anvils show that there is no evidence of a typological evolution from simple to complex forms/types.[76] On the contrary: to begin with (Middle Bronze Age) there were more complex anvil shapes, while later on (Later Bronze Age) more simple forms prevailed. This again underlines the relationship between the formal character and the specific work process. At the moment, any particular region of origin for metal anvils within a limited region in Europe cannot be identified.

The anvil mould from Velebit (no. 104) was discovered ca. 1,200–1,400 km from the next analogies in Western France (Map 3). The simultaneous emergence of the production and use of metal anvils demonstrates a supraregional innovation, a high mobility of people (perhaps also of „itinerant" metal workers) and a rapid exchange of technological knowledge and skills in the context of social, economic and religious networks. However, there is yet not enough evidence

[76] Ehrenberg 1981: 14.

to allow a final conclusion in this matter. The four moulds, probably all dating from the Middle Bronze Age, represent a standardised shape and unified workflow over a long distance. This might reflect a communication network of Bronze Age craftsmen and societies throughout Europe.

Function

Producing

The shape of metal anvils depends on their specific function in forging, and the desired shape of the final product. Therefore, generally, a great variety and diversity of anvils can be expected. Each artisan determined the final shapes („*The end justifies the means"*). In some cases, caster and smith might have been the same person.

All Bronze Age metal anvils were cast, most of them in two-piece stone moulds (sandstone, calcite etc.). Some socketed anvils (no. 31, 35: Fig. 9/6; 11/4) were been cast in multiple piece moulds, provided with a core, comparable with the casting of socketed hammerheads. To date, clay for anvils is unknown because the preservation conditions for fragile clay moulds are generally poor. Moreover, bronze moulds could have been melted down due to their high material value.

Compared to the number of ca. 120 metal anvils, only eight (!) casting moulds are known. This represents a very high ratio between finished anvils and their moulds (ca. 1:10). Stone moulds have been found in three lake villages in Central and Western Switzerland (Auvernier [no. 108]; Grandson-Corcelettes [no. 110]),[77] and a single find from South-Western France (La-Lède-du-Gurp [no. 33]),[78] from two Late Bronze Age settlements in Western and Northern France (Fort-Harrouard [no. 26]; Cuiry-lès-Chaudardes [no. 25]),[79] from a hoard of stone moulds in Ireland (Omagh [Ulster] [no. 123])[80] and from the a hill fort settlement in Transdanubia (Velem-Szentvid [no. 73]).[81] The Serbian stone mould from Velebit (no. 104) is the first mould for anvils outside Western Europe.

List of moulds for Bronze Age metal anvils

1. Auvernier (no. 108), canton Neuchâtel, Switzerland. – Late Bronze Age lake village (mostly Ha B). – One half of a two piece stone mould for a pyramidal anvil and a sickle (Fig. 7/12). – Rychner 1979: pl. 135, 3.

2. Cuiry-lès-Chaudardes (no. 25), dép. Aisne, France. – Middle Bronze Age (Bz D–C) settlement, structure 55. – Fragment of a half of a two piece stone mould for an anvil with two beaks/spikes (Fig. 12/10). – Letterlé 1982: fig. 5; Blanchet 1984: 186, fig. 99, 18.

3. Fort-Harrouard (no. 26), com. Sorel-Moussel, dép. Eure-et-Loir, France. – Middle /Late Bronze Age (Bz C–Ha B) hill fort; pit B 157 (associations: ceramic vessels, spindle whorl, perforated dent of a dog/wolf). – Fragment of a half of a two piece stone (calcite) mould for an anvil with two beaks/spikes; on the back a negative for a socketed object (spearhead?) (Fig. 12/8). – Mohen/Bailloud 1987:127, fig. 69; pl. 6, 11.

4. Grandson-Corcelettes (no. 110), canton Neuchâtel, Switzerland. – Late Bronze Age lake village (mostly Ha B). – Half of a two piece stone mould for a rectangular board anvil (?) (Fig. 14/3). – Gross 1883: pl. 29, 12.

5. La-Lède-du-Gurp (no. 33), com. Grayan-et-l'Hôpital, dép. Gironde, France. – Single find (1966) from beach of the Atlantic Sea. – One half of a two piece stone mould for an anvil with two beaks/spikes; traces of powder from the casting process (Fig. 12/9). – Moreau 1971: Gomez de Soto 1995: 101–102, fig. 32.

6. Omagh (no. 123), Co. Tyrone, Ulster/Northern Ireland. – Middle Bronze Age hoard of stone moulds. – Complete mould for a block anvil with a small beak on one side (Fig. 11/1); in combination with negatives for a rectangular ingot and bar-ingot; on the back a mould for a dirk. – Coghlan/Raftery 1961: 241–242, fig. 42.

7. Velem-Szentvid, Kom. Vas, Hungary. – Late Bronze Age (Ha B) settlement (hill fort). – Fragment of a half of a two piece stone mould for a bench anvil and a socketed hammer (Fig. 14/9). – von Miske 1908: pl. 22, 3.

8. Velebit, Serbia (Fig. 4/3; 5/4. 5; 12/7).

All metal anvils were cast in bronze. Some of them were made of a special alloy of copper with a high tin content ranging from 10 % to 30 %. This composition changes the mechanical and chemical properties of the alloy, such as hardness and colour, and makes the anvil harder than „ordinary" tin-bronze-alloy (10 % Sn). Hardness is required for percussion tools used for plastic shaping. A secondary effect of

[77] Wyss 1969: 10; Rychner 1979: pl. 135.3; Gross 1883: pl. 29, 12.

[78] Gomez de Soto 1995: 101–102, fig. 32.

[79] Mohen/Bailloud 1987: 127, fig. 69; pl. 6, 11; Blanchet 1984: 186, fig. 99, 18.

[80] Coghlan/Raftery 1961: 241–242, fig. 42.

[81] von Miske 1908: pl. 22, 3 (right negative).

this special alloy is its whitish-silvery shiny colour:[82] The Lachen-Speyerdorf (no. 51: Cu 76,81%, Sn 17,17%); Inshoch Wood (no. 121);[83] Kyle of Oykel (no. 122);[84] „Murnau" (no. 55);[85] La Tour de Langin (no. 35); [86] and the Clos de la Blanche Pierre, Jersey (no. 124) examples belong to this group.[87] The Late Bronze Age block anvil from Lichfield (no. 117) was made of a copper alloy containing lead (Pb 25%), antimony (Sb more than 5%) and „very little tin".[88] Further systematic analyses of the elementary alloy composition of Bronze Age anvils is necessary for a better understanding of the technical choices of the artisans.

There is little data available concerning the weight of the anvils: (e. g.) Génelard (no. 30: Type Gray [927 g]); Sipbachzell (no. 3: 912 g), Loučka 1–4 (no. 13–16: together ca. 800 g), Saône near Chalon-sur-Saône/ Gray (no. 44: 754 g), Fratelia (no. 102: 660 g), Boljanić 1–3 (no. 4–6: together > 430 g), Alise-Sainte-Reine/ Laumes (no. 20: 410 g), „Murnau" (no. 55: 348 g). All metalworking tools (anvils, socketed hammerheads) from the Génelard hoard have a total weight of about 3 kg of bronze (Fig. 18)! When these tools are melted down (in a recycling process) a complete cuirass or ca. 300 pins could be gained. It can be presumed that anvils contained a large amount of bronze!

Hafting

Anvils were inactive percussion tools that had to be fitted in a wooden stump. This fitting had a twofold function: On the one hand, the wooden support provided a means to absorb the shock of the percussion. On the other hand, it served the fixing of the inactive tool during the striking of the active hammer. Some details of the mounting methods can be deduced. Bench and block shaped anvils which were not equipped with a spike could be inserted into a block of wood provided with a depression corresponding to the block's dimensions. Anvils with beaks/spikes were also fitted in a wooden stump. The multiple use of certain complex anvils was possible: alternately on the beaks and/or on the working face (Fig.13/10a).

Use

The generally small-size working surfaces of these anvils were mostly rectangular or square, rarely round-spherical or round-oval. The dimension of the working surfaces ranged from ca. 3 cm to 8 cm. According to the specific working purpose, the surfaces were flat, slightly domed or gable-roofed. Each surface shape had, in combination with the working face of the hammer, a precise impact on the work piece that was to be deformed and shaped. The surfaces correlated largely with the striking faces of their counterparts, the bronze socketed hammerheads or other active percussion tools.[89] The working surfaces of the anvils had to be as smooth as possible, because even the slightest damage on them – as well as on the smith hammer – left a mark on the hammered object.

On the working surface or projecting beak there are sometimes slight or fine incised grooves or swages (German: *Sicken*) which appear in different shapes (half-round, V-shaped etc.), widths and depths. They were apparently intended for the shaping of bronze pins, needles, awl, rods or wire of round, quadrangular or triangular section, and probably also for small gold objects.

Some anvils have a perforation through the centre of their body, so-called punching holes (Fig. 6/1. 6; 13/1–4. 8). Their diameter ranges between 1–8 mm. Despite the term „punching hole", the function of this hole might rather have been to bend rods and wires than to perforate objects. The frustrum-anvil from Fratelia (no. 102) has a row of little bosses on two sides of its body (Fig. 7/3).

Due to the size and different nature of the working surfaces, of the beaks/spikes and swages, a differentiated use of the anvils can be postulated. It ranges from coarser to finer forging.[90] Some anvils have clear traces of a long lasting use in the form of deformation (German: *Bart*), hammer marks and scratches (par example: Fig. 7/1. 6. 9. 11. 14; 8/1; 10/1; 11/11; 16/3. 4. 10–13).[91]

Anvils as an essential element of the Bronze Age metalworker's tool kits

It can be assumed that anvils (of stone or metal) were part of the basic equipment of every specialised metalworker's tool kit or workshop. Anvils can be found wherever forging of metal objects was practiced on a

[82] Salaš 2014: 73–74, fig. 21. 23 for eight anvils (range: 78–88% Cu, 10, 5–20, 2% Sn) (one anvil of copper!).
[83] Childe 1945/46 (70% Cu, 30 % Sn).
[84] Smith 1881: 24: (70, 4% Cu; 26, 4% Sn).
[85] Silvery shining: Nessel 2009: 56.
[86] Ohlhaver 1939, 110 (B 52 „Genf") (84% Cu, 16% Sn).
[87] Coombs 1988: 325 (Cu ca. 79%; Sn 19,04%).
[88] Needham/Meeks 1993: 127.
[89] Jockenhövel 1982.
[90] Ohlhaver 1939: 23; Armbruster 2001: 17.
[91] Loučky (Moravia): Salaš 2014: 71 fig. 18.

Fig. 18. Génelard (Burgundy, France). Late Bronze Age tool kit (Photograph B. Armbruster)

Сл. 18. Génelard (Бургундија, Француска): група алатки из касног бронзаног доба (фото: B. Armbruster)

smaller or larger scale. It is impossible to mention all finds in our study, especially all hoards with elements of a metalworker's tool kit. Mainly in large European hoards with numerous objects there is often a combination of anvils with socketed hammerheads and other tools for metalworking.[92]

The most complete tool kit is known from the Ha A 2-hoard of Génelard (no. 28–32) (Burgundy, France). It consists of anvils of different kinds, socketed hammer heads, a swage block, chisels, a set of five punches with concentric circles (German: *Ringpunzen*) and four other punches, one half of a little bronze mould for small rings and some other tools.[93] In addition to the bronze tools, a stone hammer that might also have been used as an anvil was associated to this outstanding assemblage (Fig. 18). Another significant eastern French tool assemblage, belonging to the Larnaud hoard (Jura, France), consists of a doming block (no. 34) (Fig. 14/4), a socketed hammerhead and several punches for plastic decorations. Assuming that it is a closed find, in the Bz D-hoard from „Murnau" (Upper Bavaria) an anvil (no. 55) (Fig.13/5) is associated with 18 punches, also specialised punches for sheet decoration (German: *Ringpunzen*, *Faulenzerpunzen* [„faineant"-punches], a wheel-shaped punch) and two small hammers for fine forging.[94] From the West Balkans, in the Ha A-hoard from Boljanić (no. 4–6) (Bosnia and Herzegovina) are incorporated three anvils of different shapes which are associated with three socketed hammerheads, a small blade of a saw, two chisels (for wood-working) and five metal cores for casting socketed tools.[95] We can also mention

[92] Hansen 1994:127–129. 140, fig. 77; Nessel 2009; Medeleț 2005; Jockenhövel 2019.

[93] Thevenot 1998; Armbruster 2008.

[94] Nessel 2008.

[95] König 2004.

the combination of three anvils (no. 13–15) and three socketed hammerheads from the Ha A-hoard of Loučka (Moravia) (Fig. 10/2. 3; 11/9).[96] Some other hoards with an anvil and its counterpart, the socketed hammerhead, are known from the Danube Region, e. g. Fratelia (no. 102) (Romania), Nadap (no. 67–69) (Hungary), and Schiltern (Austria), from Central and Western Europe, e. g. Porcieu-Amblagnieu (no. 42) (Eastern France), Fresné-la-Mère (no. 27) (Normandy), Inshoch Wood (no. 121) (Scotland), Lusmagh (no. 78) and Bishopsland (no. 75) (both Ireland). The Middle Bronze Age casting stone moulds from Omagh (no. 123) (Northern Ireland) demonstrate which objects could be cast together: a small beak anvil, a dirk blade, a bar and a flat piece of metal (probably another bar). This is a combination of weapons and semi-finished products or crude metal.

Anvils and gold working

Bronze Age anvils are typical tools for copper, bronze and gold working. Consequently, these small fine metal working tools could have been used for both precious metals and copper based alloys (bronze).[97] Their use in gold working[98] has been evidenced in several cases, as on the working face of some anvils tiny gold particles were detected: „North Sligo" (no. 79); Lusmagh (no. 78) (both Ireland); Lichfield (no. 117) (England) and Fresné-la-Mère (no. 27) (Normandy, France).[99] On the surfaces of the bronze bench block with a high content of tin from Lachen-Speyerdorf (no. 51) (Southwestern Germany) traces both of gold and bronze were found (Fig. 14/1). In the Bronze Age hoards from Fresné-la-Mère (Normandy) and Velim (no. 9) (East Bohemia, Czechia) anvils are associated with gold jewellery.[100] This combination suggests the use of some anvils by goldsmiths as well. The socketed hammerhead and the anvil provided with a work face angle below 90° from the Fresné-la-Mère hoard (fig. 13/10) are particularly well suited to producing flange twisted gold torcs, the large ornament they were associated with. A special investigation of anvils by means of a high-resolution microscope might increase the number of Bronze Age anvils for gold and silversmiths in the future.

Summarising we can realise that Bronze Age bronze anvils were mainly used for lightweight fine metalworking of small objects (i.e. ornaments, rods, wire, thin plates or sheets, plastic decoration, etc.) of bronze, gold or silver. Larger anvils might also have been used for hammering and sharpening blades of weapons (i.e. swords, daggers, spearheads) or tools (i.e. sickles, knives or razors). However, these bronze anvils with mostly very limited working surface tools seem to be less appropriate for shaping larger and heavier bronze sheet objects (i.e. helmets, shields, cuirasses and vessels).

Social context

Almost all Bronze Age anvils were found in bronze hoards and settlements. Some of them were river finds, perhaps offerings. In the contexts of many hoards, anvils represent an integral component of a metalworker's tool kit. In some settlements, they were found together with other archaeometallurgical tools (moulds, hammerheads, chisels, punches, etc), and thus represent more or less workshops. Only six anvils were found in graves.

Which persons owned these anvils?

Graves with bronze anvils

Hallstatt, Pol. Bez. Gmunden, Upper Austria, Austria. – Grave 469; incineration. – Bronze socketed hammerhead (anvil); bronze alloy with high content of tin (white-shiny), ribs on the mouth, marks on one side (owner marks?); flat rectangular working surface (Fig. 17/10). – Associations: *bronze* – parts of a cuirass, file/rasp, two pins, six small rings; *iron* – long sword, short sword, three socketed spearheads, two socketed hammerheads, socketed chisel, knife, fragments of unidentified iron objects. – Dating: Ha C. – Kromer 1959: 110, fig. 91, pl. 82–84.

Lachen-Speyerdorf (nos. 51. 52), com. Neustadt an der Weinstraße, Rhineland-Palatine, Germany. – Grave 3; cremation. – Two anvils; *anvil 1 (no. 51)*: bench shaped anvil; fahlore-based bronze with high content of tin (Cu 76.81%, Sn 17.17%; Pb 1.15%, As 0.57%; Ni 0.34%, Sb 0.60%, Co 0.04%, Zn 0.07%, Au <0.01, Bi<0.025%, Cd <0.001); swages (German: *Sicken*) on three (of four) working faces; length 6.9 cm; weight 155 g; on four sides traces of forging; after REM-investigation traces of *gold* (on one working face) *and bronze* (on another surface) (Fig. 14/1). *Anvil 2 (no. 52)*: Half of a „pick-ingot"; lead (!); length 13.2 cm

[96] Salaš 2014.

[97] Jockenhövel 2003.

[98] Oldeberg 1943: 16–17; Eluère 1987: 19–20; Armbruster 1995: 181; idem 2001.

[99] Ehrenberg 1981: 15; Maryon 1938: 249, fig. 17; Meeks/Needham 1993; Taylor 1980: 12.

[100] Eluère 1987: 20; Kytlicová 2007: 312 Nr. 251, pl. 159. 160).

(Fig. 16/7). – Associations (only metal objects preserved): two knives, fragments of two razors (Type Eschborn after Jockenhövel 1971: 145). – Dating: Ha B 1. – Müller-Karpe 1959: 316, pl. 11, K; Jockenhövel 1971: 146, no. 274. 279; Jockenhövel 1973: 23, fig. 2; Sperber 2000; Bachmann u. a. 2003: 92, fig. 12.

Steinkirchen (no. 61), Lkr. Deggendorf, Lower Bavaria, Germany. – „Steinfeld"; grave 10, cremation. – Bronze block-anvil with three swages on the working face; length 1.6 cm (Fig. 7/21). – Associations: razor, fragment of a knife, shaft of a pin, five ceramic vessels. – Dating: Ha A 2. – Müller-Karpe 1969; Jockenhövel 1971: 100, no. 132, pl. 70, A.

Graves with iron anvils

Hallstatt (no. 2), Pol. Bez. Gmunden, Upper Austria, Austria. – Grave 283; cremation. – *Iron* block anvil; length 7 cm (Fig.7/9). – Associations: *bronze* – five *phalerae* (from a cuirass?), pins; *iron* – socketed spearhead, winged axe, four fittings; ceramic sherds, animal bones. – Dating: Ha C. – Kromer 1959: 82, fig. 50, pl. 44, 1–8.

Falerii (no. 84), Civita Castellana, Viterbo, Lazio, Italy. – Mazzano Romano; from a grave (unknown associations). – *Iron* pyramidal (frustrum-) anvil; length ca. 10.5 cm (Fig. 7/19). – Montelius 1905/1910: pl. 329, B.

Boddin, Lkr. Güstrow, Mecklenburg-Vorpommern, Germany. – Grave 4; cremation (woman? [ca. 30–40 years old]). – *Iron* block anvil; length 2.7 cm (no illustration). – Assocations: small iron belt hook. – Dating: Early Jastorf Culture (ca. La Tène A/B). – Keiling 1972.

The grave of Lachen-Speyerdorf can be addressed as a metalworker's grave.[101] Both anvils show intense traces of use (fig. 14/1; 16/). The tin-rich bronze anvil was used for forging bronze *and* gold. Apart from the two anvils, this grave is characterised by the association of two razors and a knife. Razors are considered typical adult-male accessories.[102] As pointed out by H. Müller-Karpe, the small anvil with swages on the working surface (fig. 7/21) from the razor/knife-grave of Steinkirchen (Lower Bavaria) could have be used as a „*Toreutengesenk*" i.e. a special tool used to produce plastic ribs on sheet bronzes, like the ribs on buckets or vessels.[103] If a bronze vessel as a finished product had been included in this grave, it would undoubtedly have been one of the most important and highest ranking graves in Lower Bavaria during the earlier Urnfield period.

Grave No. 469 at Hallstatt is characterised by the extraordinarily rich warrior equipment and can be compared with other similar graves of the well known Early Iron Age (Ha C) salt miner cemetery. The anvil there is associated with other tools: a file/rasp and a chisel. The union of a warrior's and a metalworker's or other craftsman's (wood-worker?) profile is comparable with that of other rich warrior graves in the Eastern Alpines.[104] In contrast, grave No. 283 at Hallstatt is different from grave No. 469 as it contains only a spearhead and a winged axe, whereas the fittings (phalera) of a cuirass (?) connect this grave with other Eastern Alpine warrior graves of Hallstatt nobility. These male graves have their counterparts in some rich female graves with utensils from the extensive textile production of that time.[105]

The very small iron block anvil of Boddin (Mecklenburg) was the burial gift for a 30–40 year-old person, probably a woman. If the anthropological investigation was correct – based on weak muscle marks on the long bones and skull – it would be one of the few female graves to include a metalworking tool.[106] However, on the anvils of the Northern German Jastorf Culture, according to H. Keiling, „delicate iron objects were made, such as the small tongue belt hooks from the same grave or the characteristic bronze *Segelohrringe* earrings and iron pins" (translation: A. J.).[107]

However, similarly to other tools, anvils as grave goods deviate from the canonical associations special gifts have in Bronze Age graves. They emphasise the special position of the deceased and/or the significance of the craftsmanship. Regardless of whether the anvil was the property of a craftsman or a general sign of his community's appreciation of that profession, represented by anvils and their physical characteristics (form and weight), metal anvils were held in high esteem, which was conferred on their owners –craftsmen working with copper, bronze and gold.

This may explain why they are very rarely encountered as grave goods. Such special tools, and perhaps even the associated complementary tools (the

[101] Sperber 2000.
[102] Jockenhövel 1971: 247.
[103] Jacob 1995: 98.
[104] Teržan 1994; idem 2003.
[105] Eibner 2005; idem 2014.
[106] Jockenhövel 2018, 274–275.
[107] Keiling 1972, 179.

counterpart socketed hammerheads), were likely handed on to successors, within the family, clan or tribe, or they were melted down when their usability had significantly diminished.

Anvils and symbolism

Like other tools, some of the anvils are decorated with plastic decorations (Fig. 10/5; 11/2–7. 9; 11/3. 5; 13/10; 14/11). This relates them to comparable ornaments on socketed hammerheads and socketed axes. The plastic decoration in the form of a rosette („belle marguerite")[108] on the body of the Early Middle Bronze Age anvil from Porcieu-Amblagnieu (no. 42) (Eastern France) makes it a singular object (Fig. 11/5). The outline and plastic decoration on the socketed hammerhead/anvil of Génelard has female features (Fig. 17/8; 18). This pattern underlines a symbolic embedding of this special type of metalworking tool.

Translated by Stefan Milošević

[108] Moreau 1971, 267.

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The moulds from Velebit and European Bronze Age metal anvils (139–182)

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ЛИВАЧКИ КАЛУПИ ИЗ ВЕЛЕБИТА И МЕТАЛНИ НАКОВЊИ ИЗ БРОНЗАНОГ ДОБА У ЕВРОПИ

Кључне речи – Бронзано доба, Карпатски басен, Култура гробних хумки, наковњи, калупи, накит, металургија

Пре скоро пола века изведена су систематска истраживања некрополе из бронзаног доба и касне антике / раног средњег века на једном локалитету који се налазио на улазу у село Велебит код Кањиже. Том приликом откривена је једна праисторијска остава камених калупа за ливење предмета од бронзе, међу којима се издвајао један тип за који је професор А. Јокенховел потврдио да припада калупу за израду наковања.

Старији хоризонт сахрањивања на овој некрополи припадао је Култури гробних хумки средњег бронзаног доба у централној Европи, а наведени калуп из тог контекста представља за сада једини налаз који се повезује с постојањем наковања на територији централног Балкана у бронзаном добу, тако да је циљ овога рада да укаже на везе које је овај простор имао са развојем продукције бронзаних предмета на целој територији Европе.

Историја истраживања наковања из праисторије почиње у 19. веку првим радовима на ту тему чији је аутор В. Г. Чајлд, а настављају је својим радовима Ј. Николард, Г. Гушер, М. Р. Еренберг и Д. Јанцен. Испрва су наковње представљали примерци од камена, као уосталом и остале алатке за обраду бронзаних полупроизвода током периода Културе звонастих пехара и раног бронзаног доба у Европи, као и у Çukuriçi Höyük у Анадолији, а њихова употреба се продужава кроз целокупно трајање бронзаног доба. Чак се у појединим контекстима заједно може наћи камени и метални алат за обраду метала, као што је пример на локалитету Génelard у Француској.

Због терминолошких разлика у називу за наковње, у овом раду је коришћен термин *anvil*, који подразумева различите врсте статичних подлога, сачињених од дрвеног и металног дела, које се користе у процесу искуцавања. Наковње смо поделили у следеће категорије и поткатегорије:

Категорија 1: Пљоснати и пирамидални наковњи (frustrum) – равни наковњи Brett-, Blockambosse);

Поткатегорија 1a: Пљоснато-равни наковњи (Brettambosse), сл. 6;

Поткатегорија 1b: Пирамидални (frustum) наковњи (сл. 7);

Поткласа 1c: Наковњи с једном радном површином (сл. 8);

Поткласа 1d: Пљоснати наковњи петоугаоног пресека са усадником (сл. 8);

Поткласа 1e: Наковњи у облику „печурке" (сл. 9);

Поткласа 1f: Наковњи са равном или калотастом главом (сл. 9);

Класа 2: Наковњи с једним или два рожаста испупчења (Hornambosse);

Поткласа 2a1: Наковњи с једним латералним клинастим испупчењем које се налази на истом нивоу са радном површином (сл. 10);

Поткласа 2a2: Наковњи с једним латералним клинастим испупчењем које се налази близу радне површине (сл. 11);

Поткласа 2b: Наковњи са два латерална клинаста испупчења која су фиксирана на средишњем делу (сл. 12);

Поткласа 2c: Наковњи са две радне површине и са два латерална клинаста испупчења (наковњи у облику слова „T" / тип Chalon-sur-Saône/Gray), сл. 13/1–6;

Поткласа 2d: Наковњи с једном радном површином, једним клинастим испупчењем и једним усадником (тип Fresnè-la-Mère), сл. 13/7–10;

Класа 3: Равни наковњи са испупчењима и удубљењима (Riefenanken, Kugelanken), сл. 14/1–6;

Класа 4: Наковњи савијени под углом Biegestöcke), сл. 14/7–11;

Класа 5: Наковњи за искуцавање (Treibfäuste), сл. 15/1–3;

Наковњи специфичних облика (сл. 15/5–8);

Ad hoc наковњи (сл. 16);

Наковњи у облику чекића са усадником (Tüllenambosse), сл. 17.

До сада је констатовано око 124 предмета што су имала функцију наковња, и то претежно у бронзаним оставама, док су поједини налажени и на локалитетима као и у контексту сахрана. Највећа количина ових предмета потиче са британских острва и из Ирске, Француске као и појединих делова Швајцарске. Мање количине су констатоване у Италији, Источним Алпима, Подунављу, Панонији и западном Карпатском басену. Калуп за израду наковања са Велебита представља први примерак у Србији и најстарији у Панонији, док у многим крајевима Европе такви калупи нису уопште нађени. Занимљиво је да се слични типови наковања налазе тек на удаљености од 1200 км до 1400 км на западу у Француској. Хронолошки гледано, најсложеније форме јављају се током средњег бронзаног доба, док на крају тог доба доминирају једноставнији облици. Сви су изливени од бронзе (CuSn), а поједини су направљени од

посебне легуре бакра с високом концентрацијом калаја од 10% до 310%, док су неки садржали и олово (Pb 25%), антимон (Sb мање од 5%%) или веома малу количину калаја.

Из претходне расправе можемо закључити да су наковњи представљали незаобилазне делове ковачке опреме за израду металних предмета мањих или већих димензија. Најбоља илустрација за опрему једног ковача јесте остава Génelard из Француске (Fig. 18), са сетом алата за израду различитих врста употребних предмета и накита. У суседству Србије најзначајнија је остава Бољанић (БиХ), а нашу везу са Подунављем представљају оставе Nadap (у Мађарској) и Fratelia (у Румунији).

Током бронзаног доба наковњи су такође били неопходни и приликом стварања и обраде предмета од злата, о чему у неколико случајева сведоче налази: „North Sligo" (no. 79); Lusmagh (no. 78, Ирска); Lichfield (no. 117, Енглеска) и Fresné-la-Mère (no. 27, Нормандија). То потврђују трагови златних честица откривени на наковњу из Lachen-Speyerdorf-a (no. 51, Југозападна Немачка), али се сматра да су примерци из остава Fresné-la-Mère (Нормандија) и Velim (no. 9, Источна Чешка) такође имали везе са обрадом злата.

На крају можемо закључити да су представљени наковњи из бронзаног доба претежно коришћени за обраду мањих предмета, израду орнамената и за моделовање предмета у облику жице, трака и пластичне декорације од бронзе, сребра и злата. На њима су се могле не само правити оштрице алата и оружја већ и додатно оштрити. Највећи број наковања нађен је у оквиру остава, а само шест у контексту гробова. Они су услед веће количине бронзе, од које су морали да буду направљени, вероватно имали већу вредност, па су се преносили наследством са оца на сина. У том би смислу требало посматрати и налаз са некрополе Велебит, односно – да је са ковачем из бронзаног доба похрањен само фрагментовани калуп, а не цео наковањ.

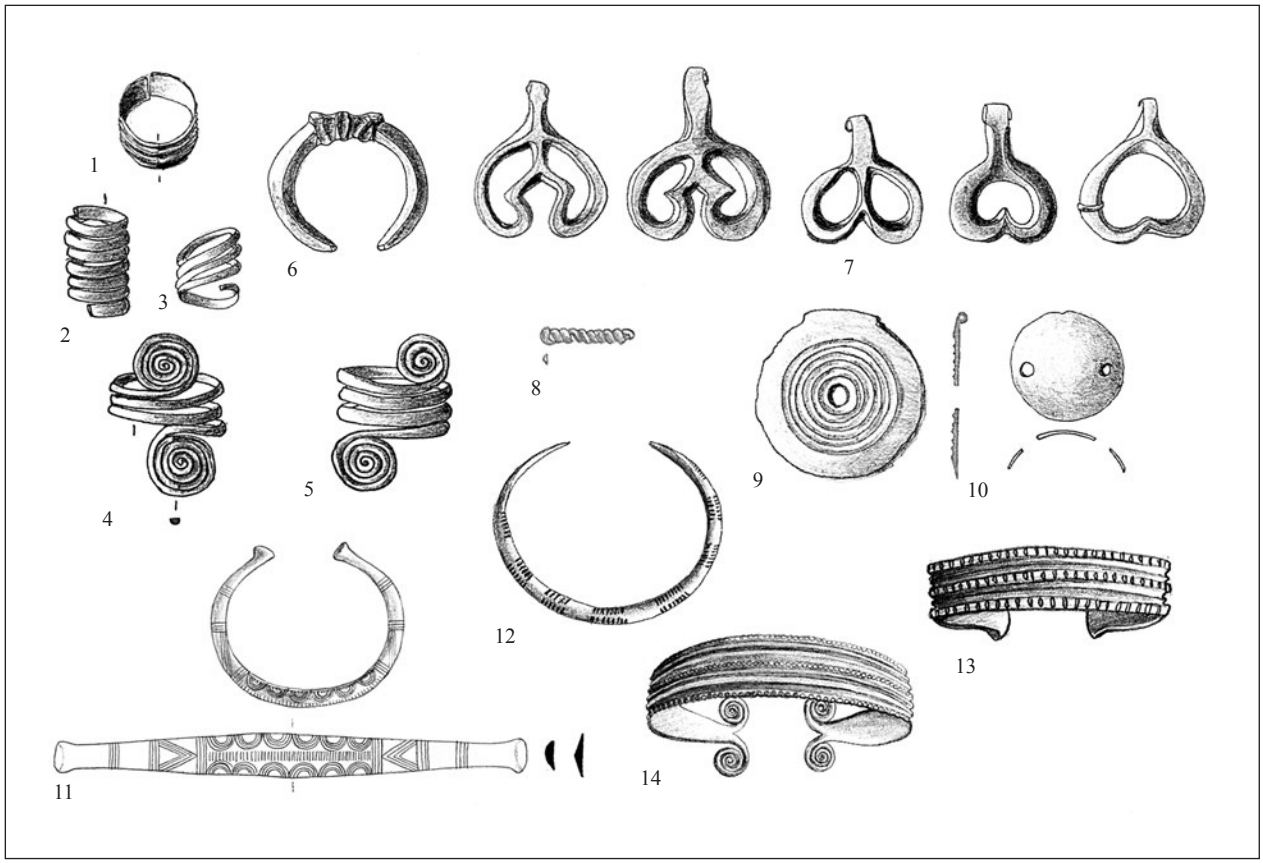

Plate I – Velebit. Bronze finds from the cemetery

Табела I – Велебит: налази бронзе са некрополе

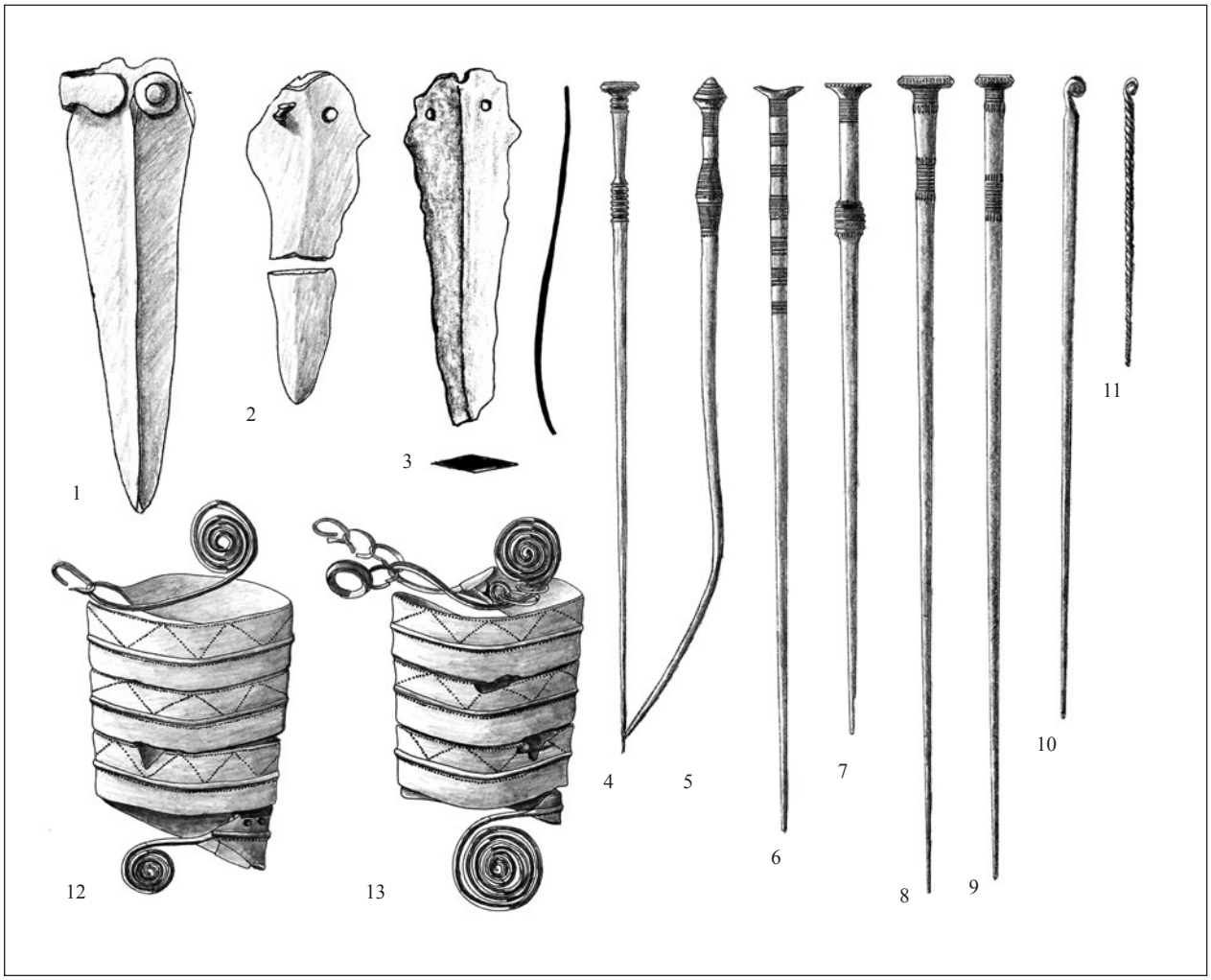

Plate II – Bronze finds from the Velebit necropolis

Табела II – Велебит: налази бронзе са некрополе

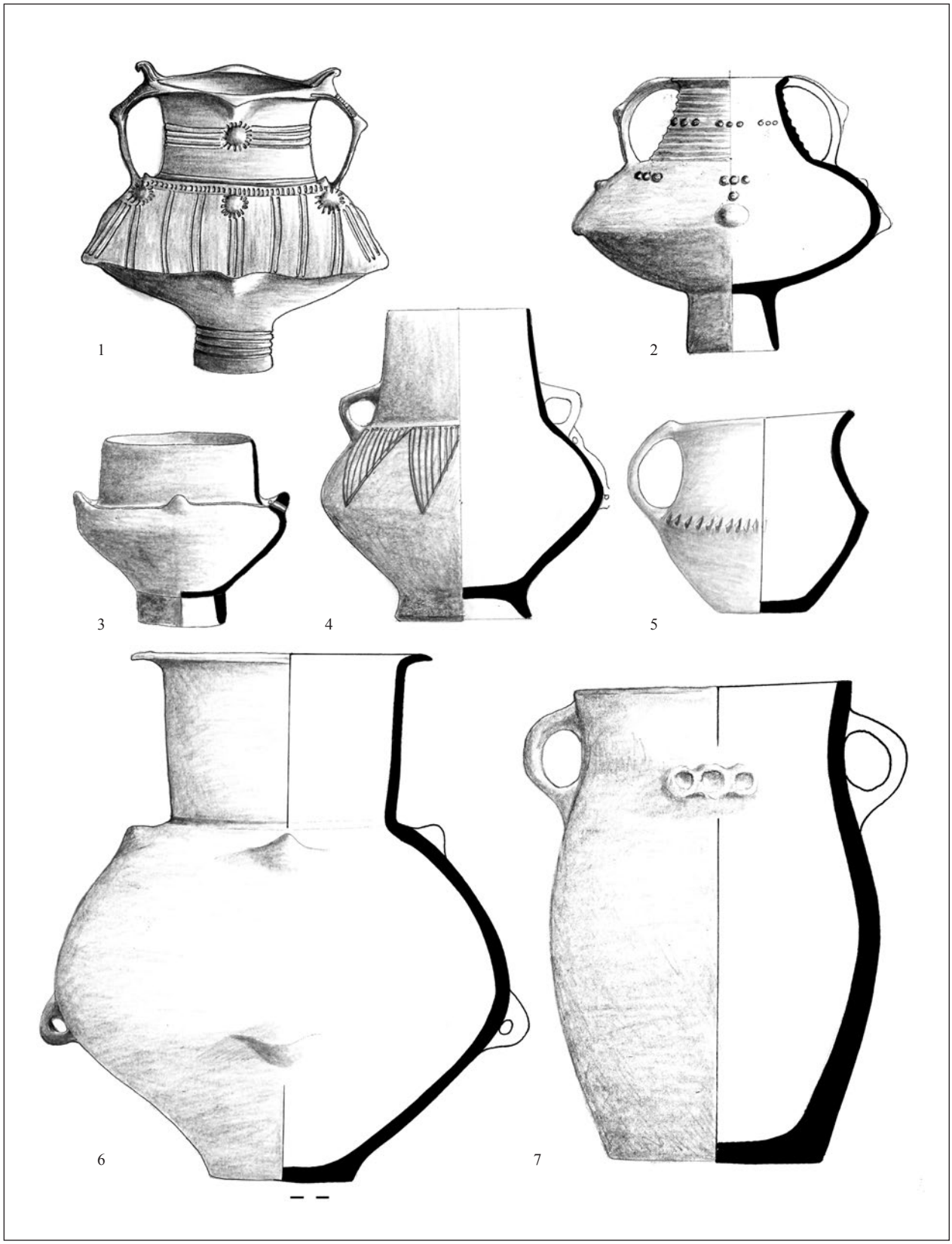

Plate III – Pottery finds from the Velebit necropolis

Табела III – Налази керамике са некрополе Велебит

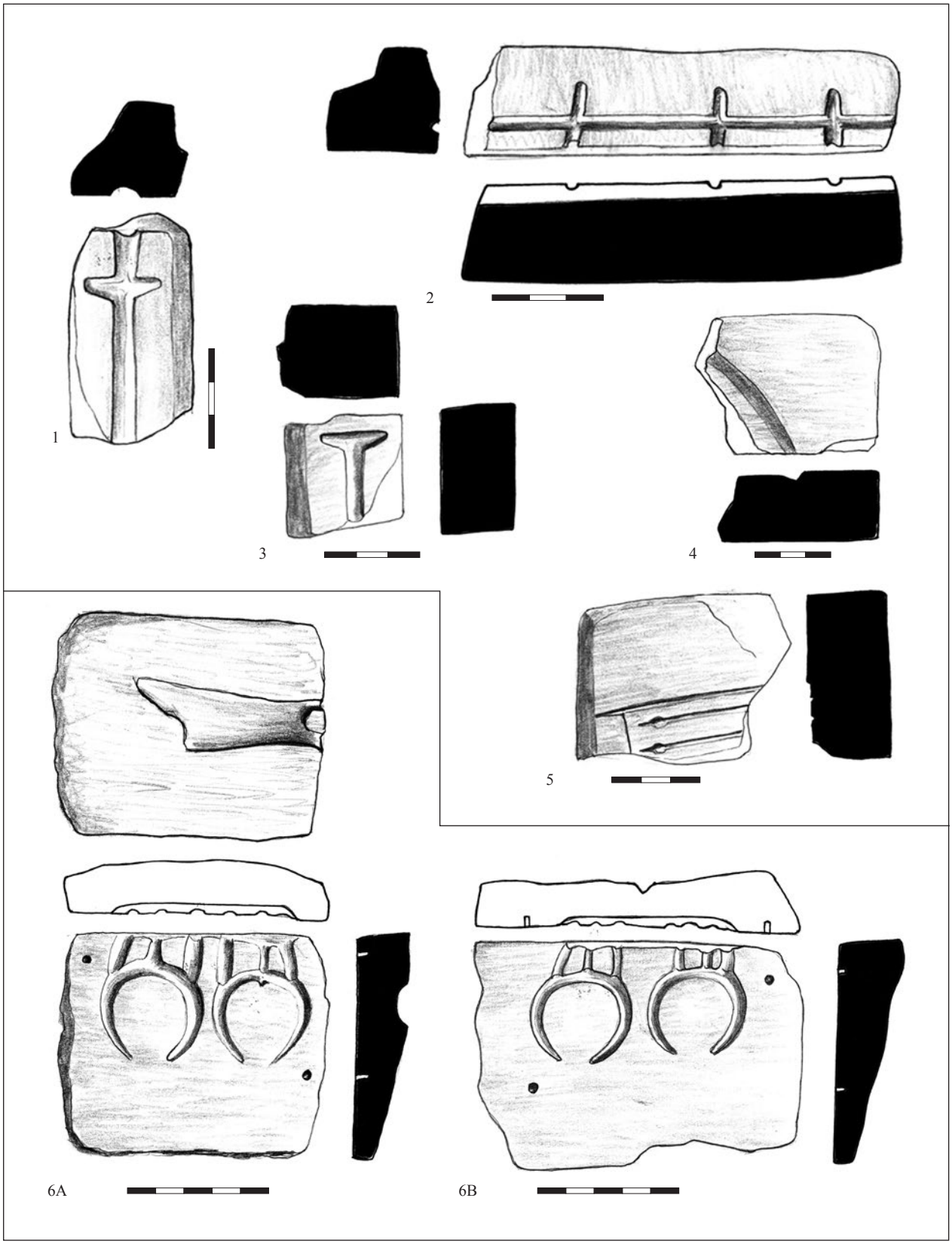

Plate IV – Moulds from the Velebit necropolis

Табла IV – Велебит: камени калупи са некрополе

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902.2(497.11)
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AD PALATINAS ACIPENSEM MITTITE MENSAS: FISH REMAINS FROM VIMINACIUM

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Abstract – The paper presents the results of archaezoological analysis of fish remains from three locations at Viminacium (the Amphitheatre, Nad Klepečkom and Pirivoj), discussed jointly with finds of fishing equipment and relevant written sources on the subject. Albeit small and biased due to the hand-collection of animal bones, the fish faunal assemblage from Vimincium provides valuable data on the choice of exploited species, fishing and fish transportation practices, and patterns of consumption and deposition in the city and its surroundings. In addition to remains of locally available freshwater fish, occurring at all three sites, the Amphitheatre sample contained the remains of large anadromous sturgeons, possibly obtained from the downstream, Iron Gates area. Their size, contextual provenance, as well as their exceptional status according to written sources, indicates that there had been notable differences in access to high-quality fish among the different social classes at Viminacium.

Key words – Viminacium, Amphitheatre, Nad Klepečkom, Pirivoj, fish remains, fishing equipment, fish trade, sturgeons

INTRODUCTION

The location of the Roman city and legionary camp of Viminacium, situated in the vicinity of the rivers Mlava and Danube (Fig. 1), suggests that fish must have contributed (at least to some degree) to the diet of its inhabitants. Nevertheless, relatively little is known about Roman fisheries in this part of the Danube, and determining the scale of fishing activities and the dietary role of fish is often elusive. This is mainly due to the selective, hand-collection of faunal remains, biased against small and fragile fish bones, which remain underrepresented even in large faunal assemblages.[1] For instance, in the faunal assemblage from Viminacium, fish remains are represented by as little as several dozen bones, as opposed to several thousands of mammal bone specimens. However, although much fewer in number, they warrant attention and provide unique insights into fishing and fish consumption in Viminacium and, consequently, in the Upper Moesian frontier, as the faunal assemblage from this site is the only one that has been analysed from this part of the *limes*. In this paper, we present and discuss the results of archaezoological analysis of fish remains recovered

[1] Wheeler, Jones 1989; Bartosiewicz, Bonsall 2004.

This paper results from the projects *Viminacium, Roman city and military camp – research of the material and non material culture of inhabitants by using the modern technologies of remote detection, geophysics, GIS, digitalization and 3D visualization* (III 47018) and *Bioarchaeology of Ancient Europe – humans, animals and plants in the prehistory of Serbia* (III 47001), funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia. We wish to thank Il Akad, Jelena Cvijetić and the reviewers for their constructive comments and suggestions.

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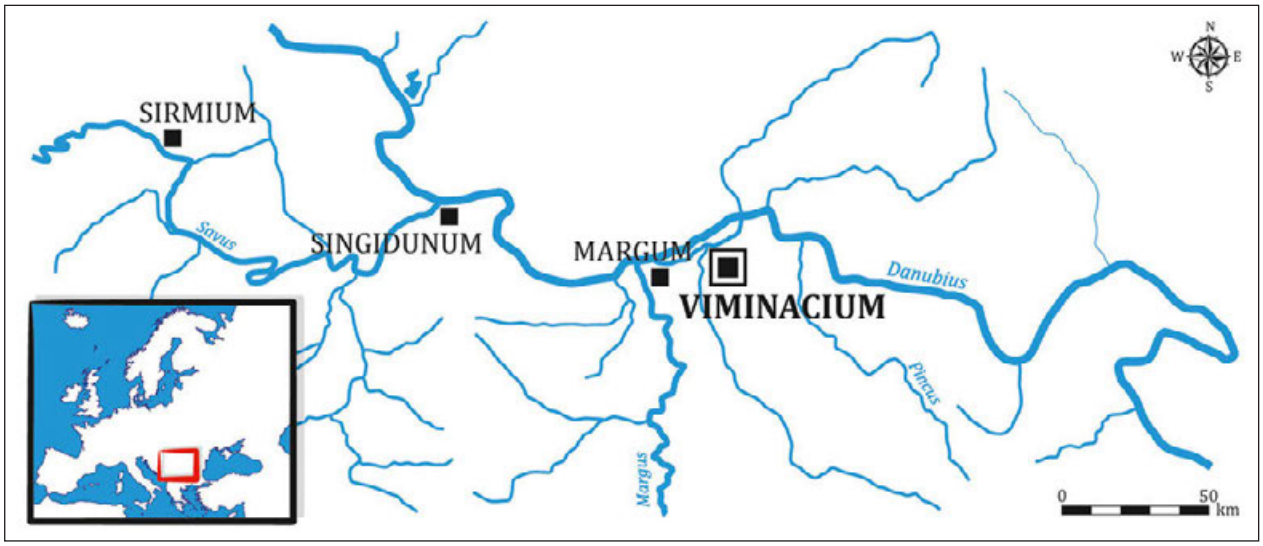


Fig. 1. The location of Viminacium

Сл. 1. Локација Виминацијума

from three different locations at Viminacium (the Amphitheatre, Nad Klepečkom and Pirivoj) (Fig. 2), provide a brief overview of fishing tools and equipment from the site, and look into relevant written sources on the subject. Albeit small and biased, the analysed sample (cross-referenced with archaeological and historical data) sheds more light on the choice and size of exploited species, fishing and fish procurement and transportation practices, and patterns of consumption and deposition across the wider city area. Moreover, the paper explores the possible meanings attributed to specific kinds of fish, the ways they could have constructed and expressed particular identities, and their role in defining and maintaining social relationships.

ARCHAEOLOGICAL BACKGROUND

Viminacium

Viminacium is located in eastern Serbia, on the right bank of the River Mlava, close to its confluence with the River Danube (Fig. 1). Initially it was a fortress, where the VII Claudia legion was stationed from the second half of the 1st century AD. Next to the fortress, a city arose and became the capital of the province *Moesia Superior*, and later of the province *Moesia Prima*. Based on archaeological and historical data, Viminacium achieved great prosperity at the end of the 2nd and the beginning of the 3rd century AD. It was destroyed by Huns in 441 AD and consequently, after the collapse of the Hunnic reign, the area was populated by Germanic tribes. In the early Byzantine Period, Viminacium was renewed, and it was ultimately destroyed during the invasions of Slavs in the 7th century AD.[2]

Archaeological research at Viminacium commenced in 1882, and since then salvage excavations have been focused on the areas surrounding the city and the fortress, where mostly cemeteries have been investigated.[3] However, just a small portion of the city has been explored. More recently, large scale systematic excavations of the legionary fortress started.[4] The faunal remains (including the fish remains that were the object of this study) uncovered so far at Viminacium originate from three different sites: from the area of the Roman amphitheatre, from the area of the eastern necropolis (Pirivoj) and from the industrial-economic zone (Nad Klepečkom) (Fig. 2).[5]

The sites

The amphitheatre was built at the beginning of the 2nd century AD, 60 m from the legionary fortress (Fig. 2). Over time, the city walls were built and the amphitheatre was incorporated into the city area, situated in its

[2] Mirković 1968; Поповић 1968; Спасић-Ђурић 2015.

[3] Mrđić 2009; Спасић-Ђурић 2015.

[4] Nikolić et al. 2018.

[5] The excavations at the mentioned locations have been conducted by the Institute of Archaeology in Belgrade, directed by dr M. Korać.

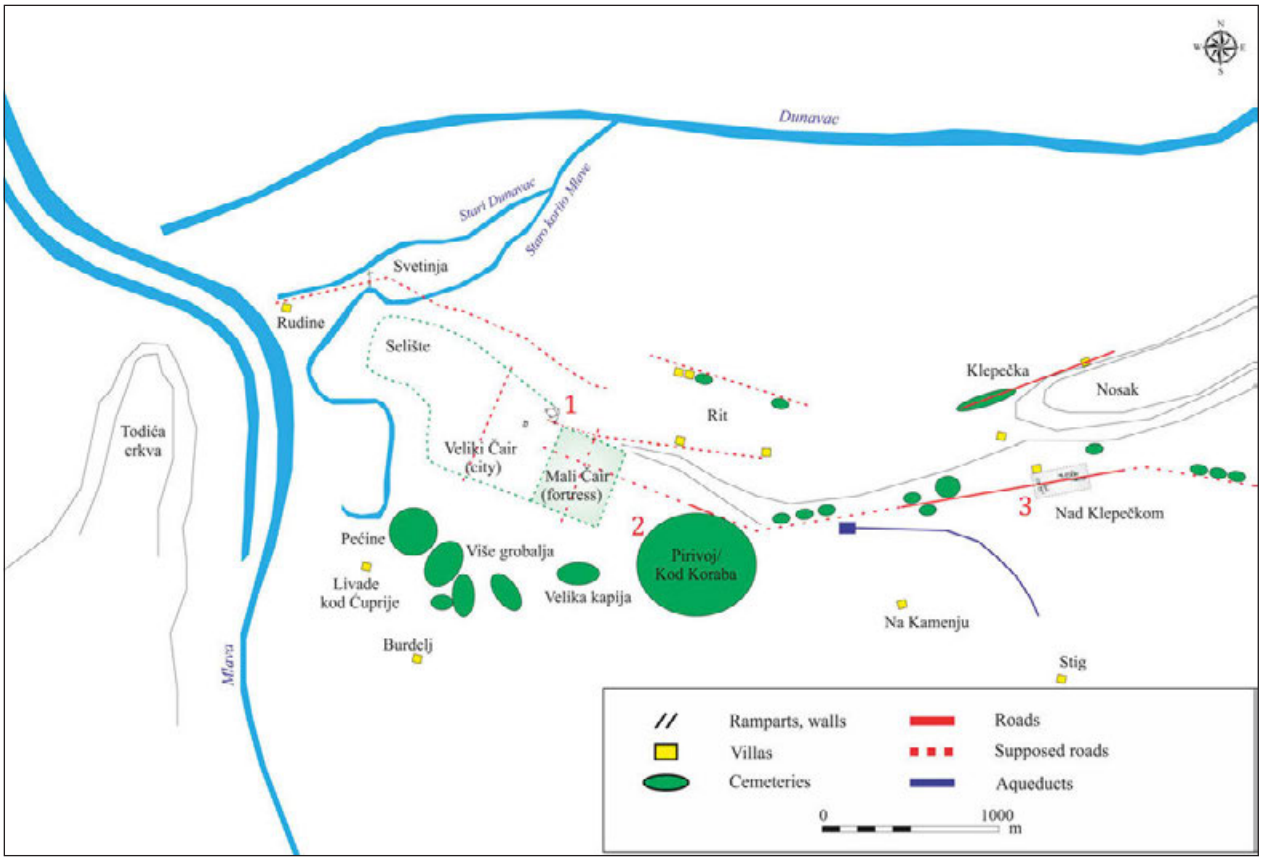


Fig. 2. Plan of Viminacium: 1) Amphitheatre; 2) Pirivoj; 3) Nad Klepečkom

Сл. 2. План Виминацијума: 1) Амфитеатар; 2) Пиривој; 3) Над Клепечком

north-eastern corner. It remained in use until the first half of the 4th century AD, after which it was abandoned. The building was damaged and the whole surface of the amphitheatre was filled up in the second half of the 4th century. By the end of the 4th century AD this area was used as a cemetery.[6]

The Pirivoj site is part of the eastern necropolis, located c. 450 m southeast of the legionary fortress (Fig. 2). The cemetery, which was in use from the 2nd to the 4th century AD, was set along the road leading from the *porta principalis dextra*. Apart from burials, a brick kiln and a dump were discovered during the excavations of this area.[7]

The Nad Klepečkom site is located c. 2.5 km to the east of the legionary fortress and is situated on the right bank of the small river Klepečka that used to flow into the Danube branch (Fig. 2). At this site, archaeological features indicative of human occupancy spanning from the Aeneolithic to the Medieval period have been discovered. Features from the Roman period date back to the 2nd and 3rd centuries AD. They include villas and a cemetery, as well as a partly excavated settlement that has been interpreted as an industrial-economic zone.[8]

ARCHAEOZOOLOGICAL DATA

The largest faunal assemblage (which is still being analysed) originates from the amphitheatre and its surroundings.[9] One portion of the assemblage (NISP[10] = 12,325), related to the period during which the amphitheatre was in use, was found in the area of timber

[6] Nikolić, Bogdanović 2015; Bogdanović, Nikolić 2017; Богдановић et al. 2018.

[7] Raičković, Milovanović 2010; Vuković 2010; Golubović, Korać 2015; Jovičić, Milovanović 2017.

[8] Mrđić, Jovičić 2012; Redžić, Danković 2012; Jovičić, Redžić 2014; Redžić et al. 2014.

[9] Vuković 2015.

[10] Number of identified specimens.

TAXON	AMPHITEATRE		NAD KLEPEČKOM		PIRIVOJ		TOTAL per taxon	
	NISP	W (g)	NISP	W (g)	NISP	W (g)	NISP	W (g)
Acipenser gueldenstaedtii Russian sturgeon	1	0.4	/	/	/	/	**1**	**0.4**
Acipenser ruthenus sterlet	4	7.3	/	/	/	/	**4**	**7.3**
Acipenser stellatus stellate sturgeon	1	9.6	/	/	/	/	**1**	**9.6**
Huso huso beluga sturgeon	16	356.6	/	/	/	/	**16**	**356.6**
Aspius aspius asp	/	/	1	0.7	/	/	**1**	**0.7**
Cyprinus carpio common carp	8	21.8	21	13.2	1	1.7	**30**	**36.7**
Cyprinidae indet.	2	1.8	/	/	1	0.8	**3**	**2.6**
Esox lucius pike	2	11.5	/	/	/	/	**2**	**11.5**
Sander lucioperca pike-perch	1	2.1	/	/	/	/	**1**	**2.1**
Silurus glanis Wels catfish	11	133.2	/	/	2	7.1	**13**	**140.3**
Pisces indet.	2	1.4	/	/	/	/	**2**	**1.4**
TOTAL per site	**48**	**545.7**	**22**	**13.9**	**4**	**9.6**	**74**	**569.2**

Table 1. Taxonomic composition of the fish faunal assemblage from three locations (the Amphitheatre, Nad Klepečkom and Pirivoj) at Viminacium

Табела 1. Таксономски састав рибље фаунистичке скупине са три локације (Амфитеатар, Над Клепечком и Пиривој) на Виминацијуму

stands/earth mound, entrances to the building and the adjacent areas related to the object, whereas the other portion (NISP = 7,221) was found in the infill of the amphitheatre, accumulated during the 4th century AD. The faunal assemblage from the Nad Klepečkom site (NISP = 2,080)[11] originates mostly from the area of the settlement – the economical industrial zone of the city, and the smallest assemblage comes from the Pirivoj site (NISP = 419)[12], more precisely from the dump area located within the eastern cemetery of Viminacium. The latter was associated with funerary practices and the deposition of leftovers of food offerings related to the nearby necropolis[13], although, in addition to food waste, the Pirivoj assemblage also included several articulated and semi-articulated horse, dog and cat skeletons.[14]

Archaeozoological analyses[15] suggest that beef consumption was the dominant dietary pattern in Viminacium, as remains of cattle constitute up to 48% of the assemblages. They are followed by pig, sheep and goat, whose meat was also consumed within the city and its surroundings. The remains of other domestic animals – equids (horses, mules and donkeys), camels, dogs, cats and fowl were also common. On the other hand, remains of wild animals (mainly red deer, roe deer, wild boar and hare) were fairly negligible (c. 3% in the Amphitheatre sample and less than 1% in two other assemblages). The main differences between the three studied faunal assemblages, i.e. between those originating from the Amphitheatre and the surrounding areas, are reflected in the greater taxonomic diversity observed in the Amphitheatre sample. This is especially related to the presence of wild animals (bears, big cats and wolves), most likely participants in the amphitheatre spectacles, but also wild game which was probably considered a luxury food item, primarily available to the inhabitants of the city. Furthermore, the differences in the taxonomic composition of domestic animals, their size and butchery patterns suggest that particular areas in the periphery (mainly the settlement at Nad Klepečkom) served as production centres, which supplied the city of Viminacium with animal products.[16] In addition to mammal bones, the Viminacium assemblages also included mollusc shells (mainly those of Mediterranean oysters), wild birds and fish; the latter are analysed in more detail within this study.

[11] Vuković-Bogdanović *in prep*.
[12] Vuković 2010.
[13] Raičković, Milovanović 2010.
[14] Vuković 2010.
[15] Vuković-Bogdanović 2018.
[16] Vuković-Bogdanović 2018.

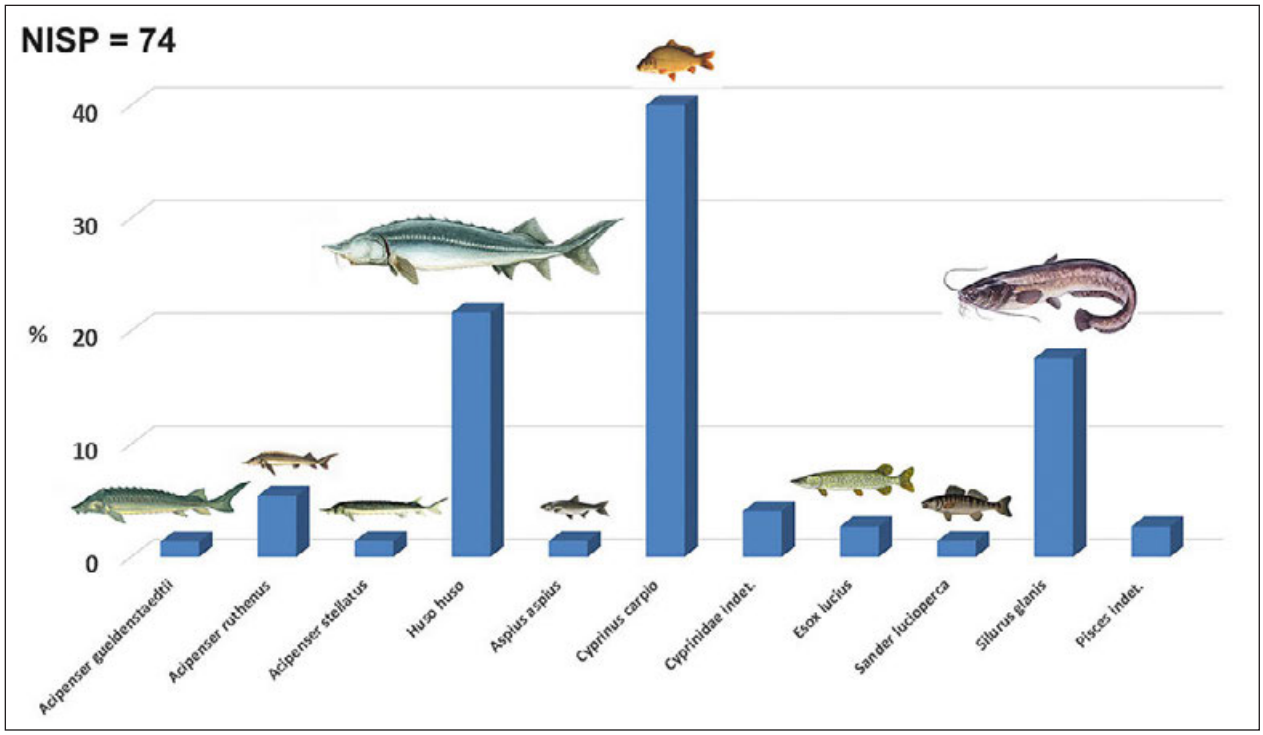


Fig. 3. Taxonomic composition of the fish faunal assemblage from Viminacium

Сл. 3. Таксономски састав рибље фаунистичке скупине са Виминацијума

FISH REMAINS FROM VIMINACIUM

The fish faunal assemblage from the three sites at Viminacium comprises 74 identified specimens (NISP) (Table 1**;** Fig. 3). Albeit small and biased against smaller bodied fishes, the analysed sample offers valuable insights into the choice of exploited species, fishing and fish procurement and transportation practices, and patterns of consumption and deposition in the city and its surroundings. As expected, given the vicinity of the Mlava and the Danube, the analysed sample contained the remains of freshwater fishes native to these rives: cyprinids (common carp *Cyprinus carpio* and asp *Aspius aspius*) (Fig. 4), pike (*Esox lucius*) (Fig. 5), pike-perch (*Sander lucioperca*) (Fig. 6) and Wels catfish (*Silurus glanis*) (Fig. 7). Due to their size and robusticity, bones of these species generally predominate in hand-collected assemblages from (Roman and other) sites in the area.[17] At Viminacium, fish remains were somewhat more abundant in the Amphitheatre area (NISP = 48) (Table 1), with carp and catfish bones occurring in contexts related to both the use of the amphitheatre and its abandonment, whereas pike and pike-perch bones were found solely in contexts related to its use. A couple of catfish bones from the Amphitheatre were burnt (a pectoral spine from sq. BC/6 and two abdominal vertebrae from sq. F/6), and one catfish pectoral spine from sq. D/7 bore numerous diagonal cuts, indicative of decapitation. As for the other two sites, only asp and carp bones (NISP = 22), and carp and catfish bones (NISP = 4) have been uncovered at Nad Klepečkom and Pirivoj respectively (Table 1). The latter originated from the dump area, representing either food waste or leftovers of offerings intended for the dead at the necropolis in the vicinity.

In several cases (all related to the fish faunal assemblage from the Amphitheatre area), the size of caught specimens could be estimated on the basis of bone measurements and regression equations[18] (Table 2). Most measured specimens originated from large individuals, as expected given the recovery bias. Nonetheless, even though smaller-bodied fish were certainly

[17] Bökönyi 1984; El Susi 1993; Takács, Bartosiewicz 1998; Bartosiewicz, Bonsall 2004.

[18] *cf.* Brinkhuizen 1989; Radu 2003.

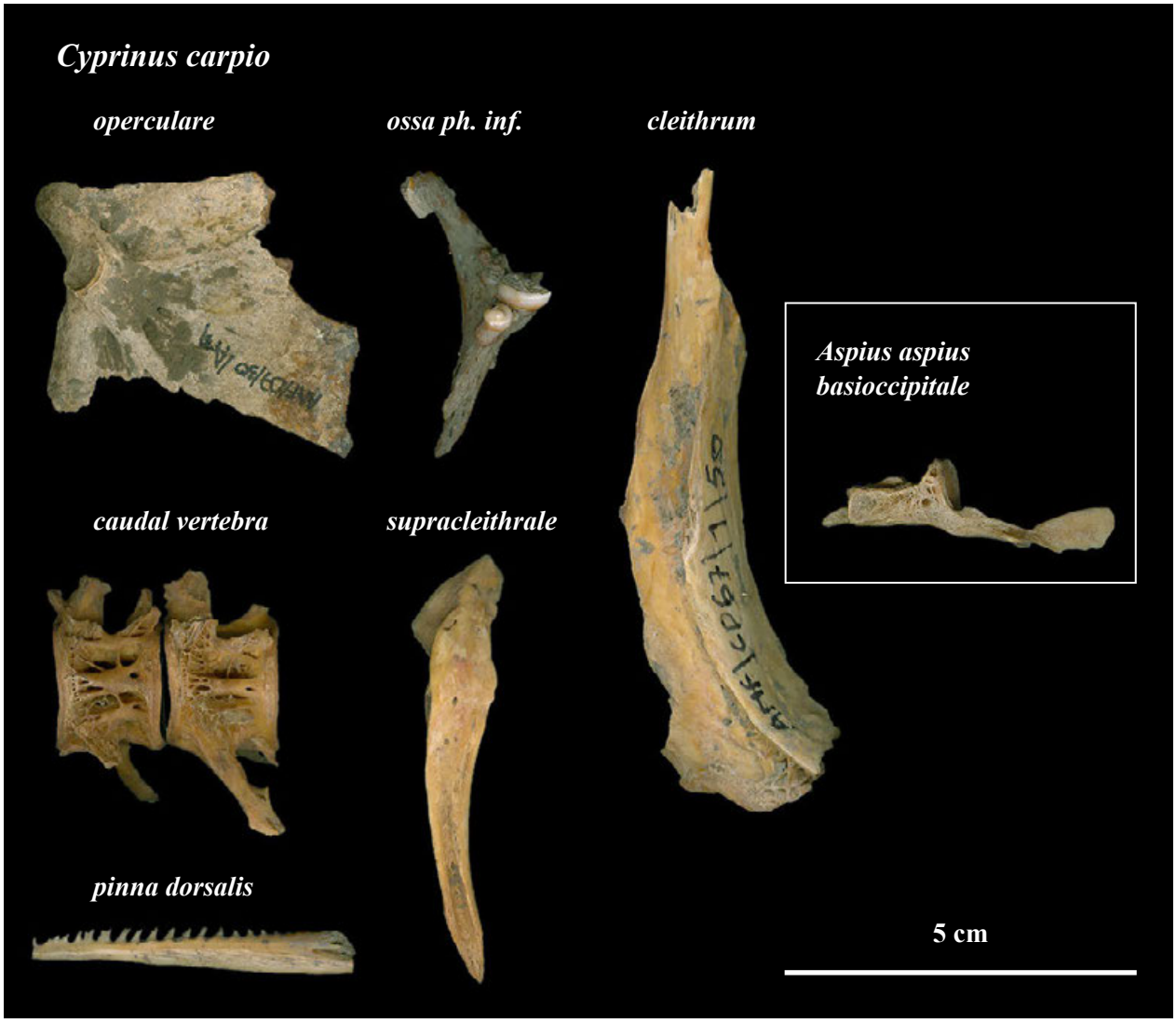


Fig. 4. Carp (Cyprinus carpio) and asp (Aspius aspius) remains

Сл. 4. Оста̄ци шарана (Cyprinus carpio) и буџова (Aspius aspius)

consumed as well, the occurrence of large specimens is testimony that probably the best catch from the nearby rivers was selected for consumption at Viminacium. Fishing most likely took place in different seasons, coinciding with fish spawning patterns: winter to early spring (pike), spring (pike-perch) and spring to early autumn (carp, asp and catfish).[19]

Although often representing an amalgam of facts, fancy, legends and anecdotes, classical natural history and literary works provide insights into the ways some of these fishes could have been perceived. For example, in his extensive collection of short stories on natural history Περὶ Ζῴων Ἰδιότητος (*De Natura Animalium*), envisaged as allegorical moral lessons and curiosities, Roman author Claudius Aelianus (Aelian, c. 170–235 AD) mentions several species of fish which dwell in the Ister (i.e. the Danube) – including carp and Sheatfish (catfish).[20] According to Aelian, carp fishing took place in late winter and early spring, by hacking through ice in order to create a circular hole, so that "multitudes of fish wishing to escape from the ice… and longing for the light, swim joyfully up to the opening

[19] *cf.* Петровић 1998; Ristić 1977; Simonović 2001.

[20] Aelian 1959a, 171–183.

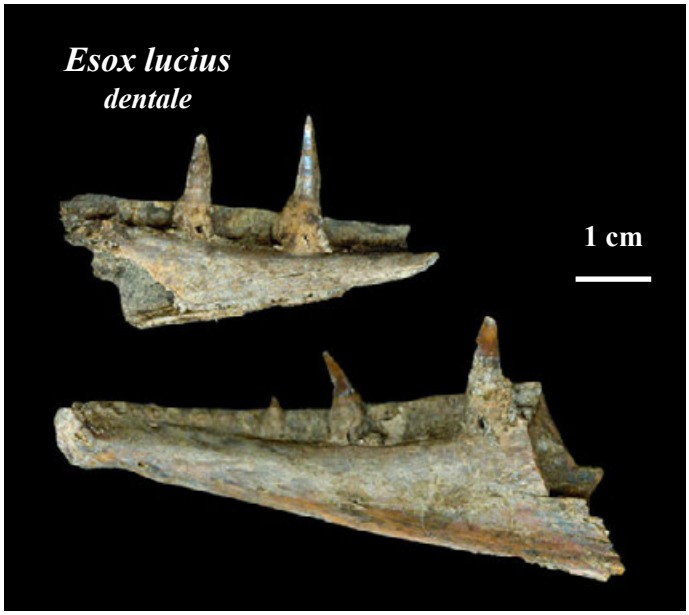
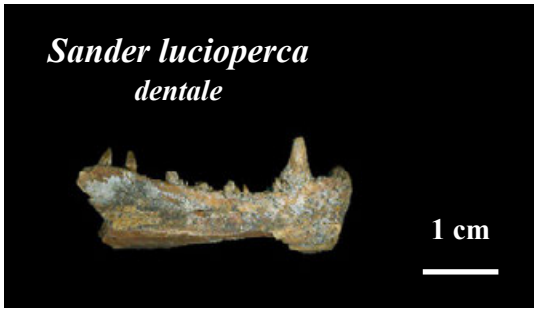


Fig. 5. Pike (Esox lucius) remains

Сл. 5. Остаци штуке (Esox lucius)

Fig. 6. Pike-perch (Sander lucioperca) remains

Сл. 6. Остаци смуђа (Sander lucioperca)



that has been made… and being in a confined hole are easily captured".[21] The catfish is described as a "glutton" and a "monster", lured by beef ("its favourite food") on a strong hook, which is attached to a rope pulled by a pair of oxen or horses in order to haul the fish ashore – "in a trial of strength".[22]

Decimus Magnus Ausonius' poem *Mossella* (c. 371 AD), a celebration of the Rhine tributary and its aquatic life, describes catfish in a more sympathetic manner, with admiration even:

"Now, creature of the surface, shall thy praise be sung, O mighty Sheat-fish, whom, with back glistening as though with olive-oil of Attica, I look on as a dolphin of the river" (*Nunc, pecus aequoreum, celebrabere, magne silure: quem velut Actaeo perductum tergora olivo amnicolam delphina reor*).[23]

On the other hand, he considered pike (even if known by a Latin, i.e. human name – Lucius) as a lesser quality fish:

"…he, chosen for no service at banquets, is fried in cookshops rank with the fumes of his greasy flavor" (*hic nullos mensarum lectus ad usus fervet fumosis olido nidore popinis*).[24]

The occurrence of bones of these freshwater species at Viminacium and other sites, as well as their mention in written sources indicate that they had been well known in the Roman world. Moreover, given that cyprinid and catfish bones occurred not only in the Amphitheatre but also in the peripheral areas, it might be assumed that these fishes were commonly consumed both by the inhabitants of the city and its surroundings, and possibly served as food offerings at the necropolis at Pirivoj.

In addition to freshwater fish, the Amphitheatre sample contained the remains of anadromous[25] sturgeons (Acipenseridae): the Russian sturgeon (*Acipenser gueldenstaedtii*), stellate sturgeon (*Acipenser stellatus*) (Fig. 8), and the largest representative of this family – the beluga sturgeon (*Huso huso*) (Fig. 9). Remains of sterlet (*Acipenser ruthenus*), the only freshwater acipenserid in the Danube, have also been identified (Fig. 8). Sturgeons were consumed at Viminacium during the use of the amphitheatre as well as after its abandonment: the majority of beluga bones and a Russian sturgeon bone were found in contexts contemporaneous with the amphitheatre, and a smaller number of beluga bones, a stellate sturgeon bone and sterlet bones originated from subsequent infill layers. Given that the skeleton of the Acipenseridae species is predominantly cartilaginous, and only a few bony elements (bony scutes, elements of the branchiocranium (i.e. the jaw, mouth cavity and branchial arches), *hyomandibulare*, *ceratohyale*, *fulcrum* and the first pectoral spine)

[21] Aelian 1959a, 187.
[22] Aelian 1959a, 179–183.
[23] Ausonius 1921, 234–235.
[24] Ausonius 1921, 232–233.
[25] I.e., fish migrating from the sea to rivers to spawn.

Fig. 7. Catfish (Silurus glanis) remains

Сл. 7. Остаци сома (Silurus glanis)

Fig. 8. Russian sturgeon (Acipenser gueldenstaedtii), sterlet (Acipenser ruthenus) and stellate sturgeon (Acipenser stellatus) remains

Сл. 8. Остаци руске јесетре (Acipenser gueldenstaedtii), кечиге (Acipenser ruthenus) и пастругге (Acipenser stellatus)

are likely to survive in the archaeological record[26], sturgeon remains on archaeological sites tend to be significantly underrepresented.[27] Even though the analysed sample from Viminacium is far from representative, the fairly high number of sturgeon bones (occurring solely in the amphitheatre area) is indicative of their importance, and their possible status as luxury food items intended exclusively for consumption in the city.

Similarly to other fishes in the Viminacium sample, sturgeons were represented by particularly large individuals.[28] The estimated total length (TL) of a stellate sturgeon specimen was c. 1.6 m, however the most impressive catches were certainly beluga sturgeons. The majority of elements originated from individuals whose estimated TL ranged between 3 and 3.5 meters, but even larger specimens (c. 5.7 meters TL) were caught occasionally (Table 2; Fig. 10). Given the occurrence of ossified elements of the branchiocranium (*dentale*, *maxillare*, *palatopterygoideum*, *suboperculare*) and the pectoral girdle (*cleithrum*), and a number of butchery marks indicative of decapitation and mouth/ cheek removal (Fig. 9), these large fishes were most likely transported to Viminacium whole (possibly smoked or salted, or perhaps even alive[29]) and processed locally. In addition to butchery marks, a single beluga *dentale* (sq. A/7) bore traces of burning.

[26] Brinkhuizen 1986, 21.

[27] Bartosiewicz, Bonsall 2008; Bartosiewicz et al. 2008.

[28] Size estimated *cf.* Živaljević et al. *in press*.

[29] In his 1764 work *Tractatus de rustica Hungarorum* (quoted in Bartosiewicz, Bonsall 2008, 41; Bartosiewicz et al. 2008, 51), Hungarian naturalist Mátyás Bél describes how sturgeons were sometimes kept alive tethered to trees or strong poles on the shore, before being towed by boats to the markets in Buda and Vienna.

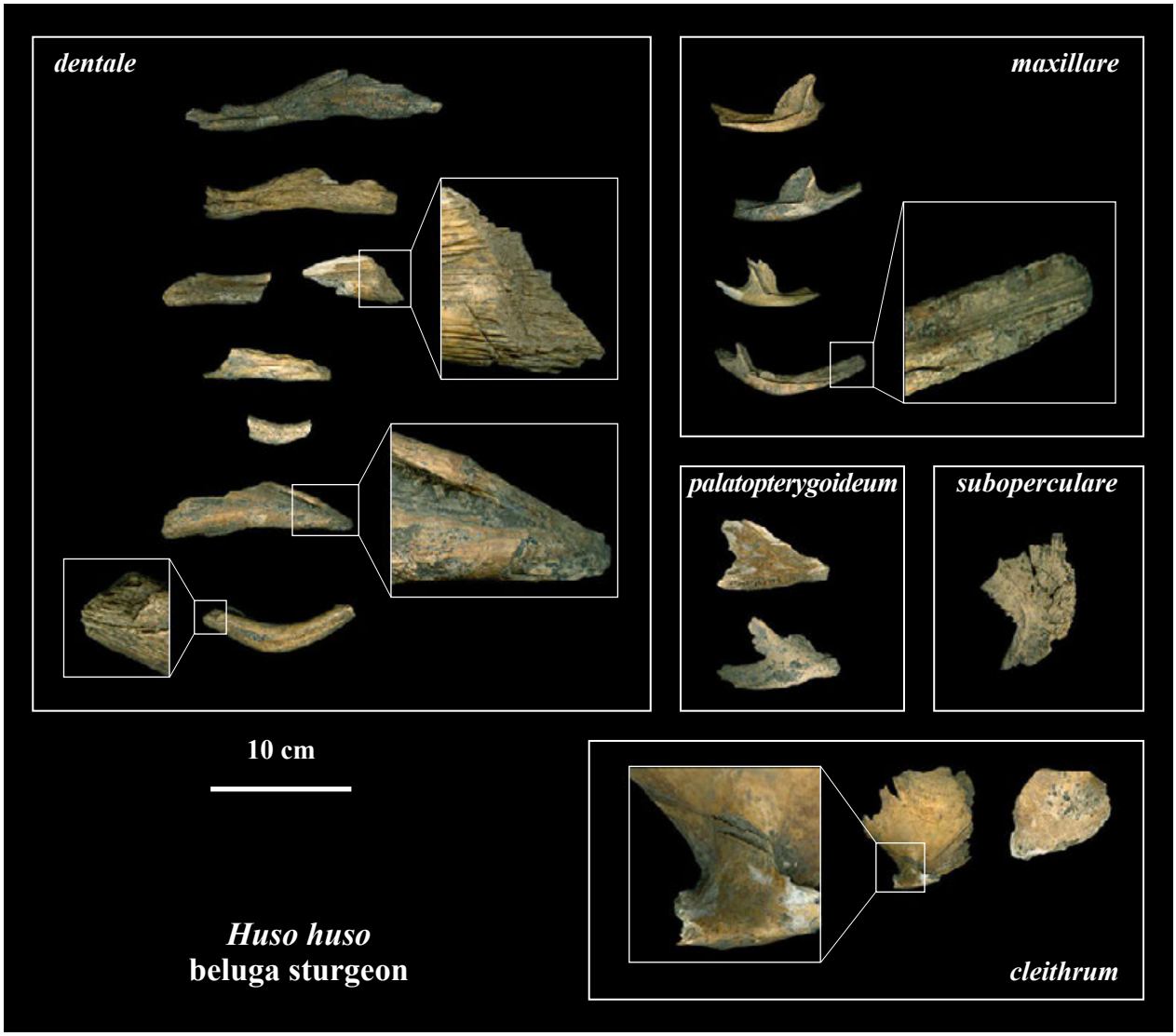


Fig. 9. Beluga sturgeon (Huso huso) remains with traces of butchery magnified

Сл. 9. Остаци моруне (Huso huso), са увеличаним траговима касапљења

Prior to the construction of the first of the Iron Gates dams in 1971, sturgeons used to undertake bi-annual spawning migrations from the Black Sea to the Danube in early spring and in autumn. From prehistory[30] to more recent times[31], some of the best sturgeon fishing spots in the area were located about 100 km downstream of Viminacium, in the Iron Gates (Fig. 1). In Roman times, this area was part of the military frontier (*limes*), reinforced with numerous watchtowers, legionary camps and forts.[32] At the same time, the Iron Gates environment (consisting of four narrow gorges interspersed by river valleys) provided optimal fishing conditions due to abrupt changes in the riverbed, river currents, islets, protruding rocks and strong whirlpools that channelled the movement of migratory fish and drove them to specific locations in the shallows.[33] According to more recent (18th century and onward) written sources[34], various strategically placed fishing devices

[30] Borić 2003; Bartosiewicz, Bonsall 2004; Bartosiewicz et al. 2008; Živaljević 2017.

[31] Петровић 1998; Zega 1927; Амедоски 2006.

[32] Mirković 1968.

[33] Петровић 1998.

[34] Marsigli 1726; Antipa 1916; Zega 1927; Петровић 1998.

TAXON	n	TL range (cm)	MEAN TL (cm)
Cyprinus carpio common carp	2	39.5 - 61.9	50.7
Esox lucius pike	1	90.9	90.9
Sander lucioperca pike-perch	1	76.7	76.7
Silurus glanis Wels catfish	2	82.3 - 86.1	84.2
Acipenser ruthenus sterlet	3	51.1 - 86.3	64.9
Acipenser stellatus stellate sturgeon	1	161.7	161.7
Huso huso beluga sturgeon	11	307.3 - 570.6	364.0

Table 2. Size estimations of fish specimens from Viminacium.
n = the number of measured elements used in size reconstruction;
TL = fish total length (size estimations following measurements and regression equations in Brinkhuizen 1989; Radu 2003; Živaljević et al. in press)

Табела 2. Процена величине рибљих јединки са Виминацијума:
n = број измерених примерака који су коришћени у реконструкцији величине;
TL = тотална дужина рибе (процене величина на основу мера и регресивних једначина датих у: Brinkhuizen 1989; Radu 2003; Živaljević et al., in press)

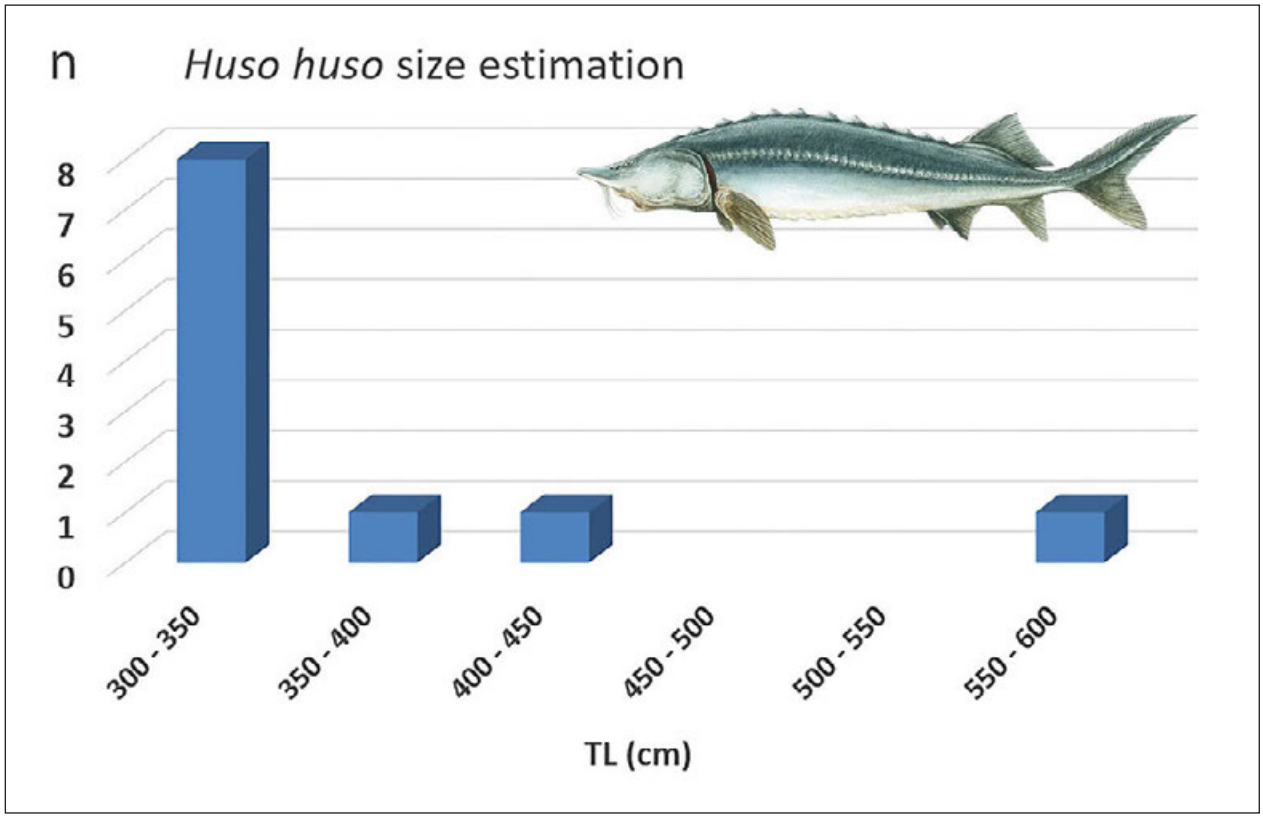


Fig. 10. Size estimations of beluga sturgeons from the Viminacium Amphitheatre area.
n = the number of elements used in size reconstruction; TL = fish total length

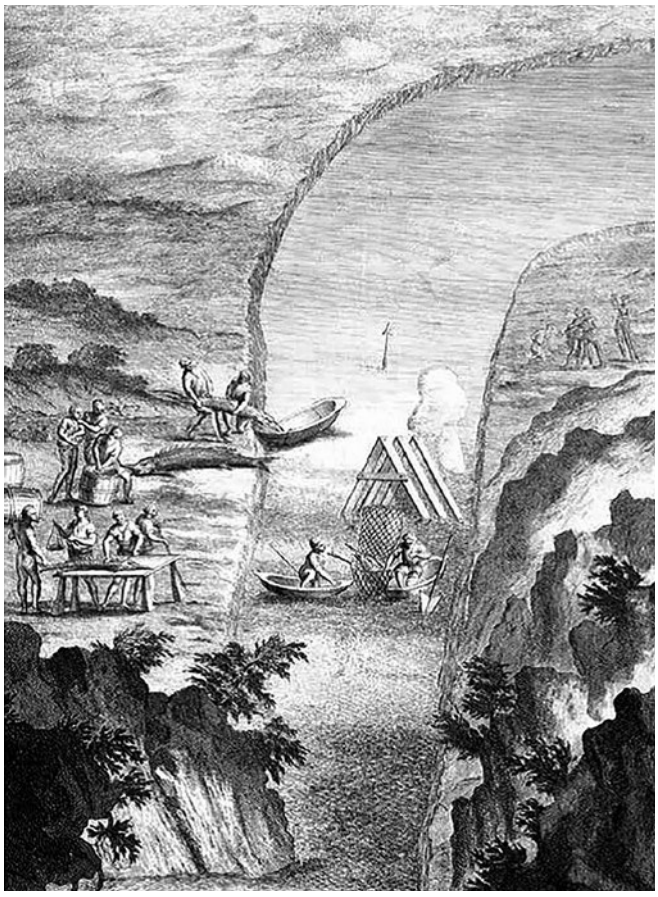
Сл. 10. Процена величина моруна са подручја амфитеатра на Виминацијуму:
n = број елемената коришћених у реконструкцији величине; TL = тотална дужина рибе

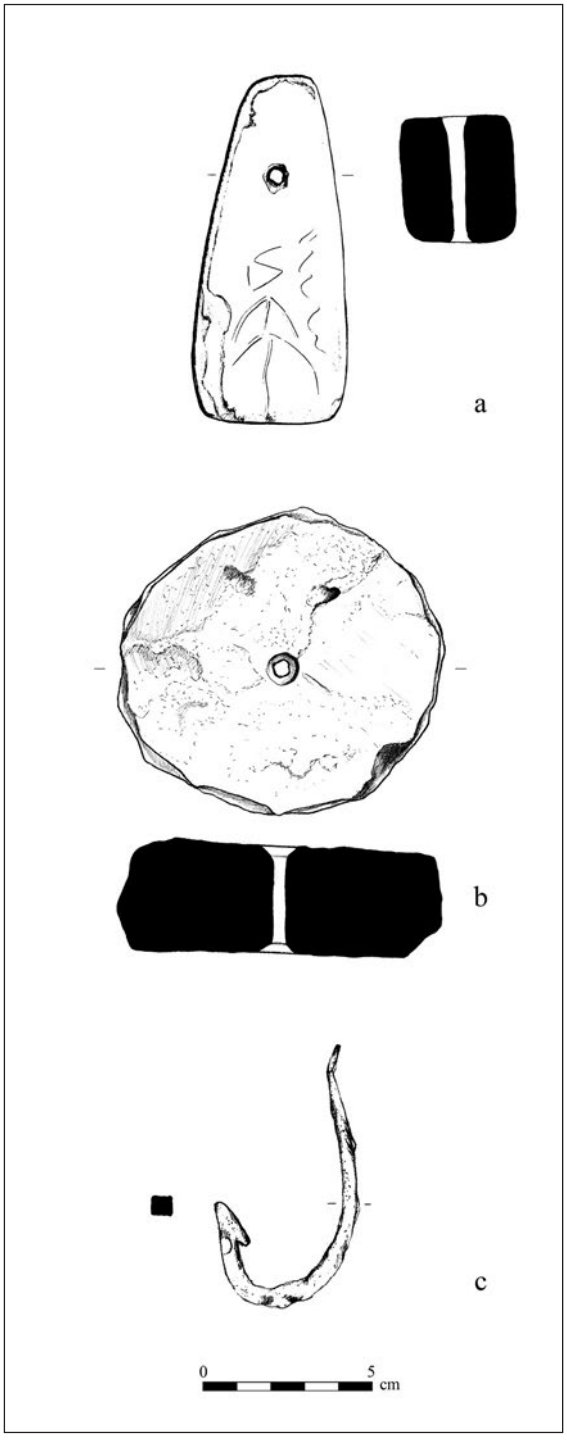
(nets, traps, enclosures and sturgeon weirs, Fig. 11) were therefore only an extension of the natural traps abundant in the local landscape.

Sturgeon fishing on the Danube were also described in the aforementioned *De Natura Animalium*. Nevertheless, Aelian's accounts need to be taken with caution, as he never travelled outside of the Italian Peninsula, utilised a number of older (mainly Greek and often unnamed) sources, combined facts and fables, and often merged descriptions of various regions and places into one.[35] One particular description, however, bears a striking resemblance to the Iron Gates landscape, which could suggest that Aelian drew information from a source with first-hand knowledge of the area:

Fig. 11. Sturgeon fishing at the exit of the Danube Gorges, from L. F. Marsigli's Danubius Pannonico-Mysicus (1726)
Fig. 12. Fishing equipment from Viminacium, a) clay weight in the shape of a truncated pyramid (the Amphitheatre, C-8); b) clay weight in the shape of a trimmed disc with a central perforation (the Amphitheatre, C-613); c) iron hook (Nad Klepečkom, C-574)

Сл. 11. Риболов јесетровки на изласку из Ђердапске клисуре, из Л. Ф. Марсиљијевог дела Danubius Pannonico-Mysicus (1726)
Сл. 12. Опрема за риболов са Виминацијума: а) керамички тег у облику зарубљене пирамиде (Амфитеатар, С-8); b) керамички тег у облику диска са кружном перфорацијом у средини (Амфитеатар, С-613); c) гвоздена удица (Над Клепечком, С-574)





"There is also in the Ister a bay of immense depth and like the sea in its wide compass. …merchant vessels which cross the sea put in to this bay, and, when the bay is angered by the winds that blow and lash it into waves and drive it mad, are just as afraid of it as they are of the sea. And there are also islands in it, and even creeks along the shore into which one can run for safety. There are besides, promontories and capes running out, on which the waves in their fury dash and burst whenever the river at its very fullest is… forced into a narrow space as it presses on to the sea."[36]

Aelian states that the winter season in the region was particularly harsh; with ice imprisoning merchant ships, and sailors and passengers abandoning them to fetch wagons to transfer the cargo. At the same time, late winter and early spring represented optimal seasons for catching sturgeons, described by Aelian as:

"…the large ones of mature age may be the size of the biggest tunny. The Sturgeon is extremely fat along the sides and the belly; you might say they were the dugs of a sow that was suckling its young. It has a rough skin and spear-makers actually polish their spear-shafts on it. …When however the fish has grown to its full size one would not see it emerging from the ice… but either it slips beneath some all-sheltering rock or buries itself in deep sand and is only too glad to keep warm. And at the time it needs no vegetation, no other fish to eat, but prefers to remain inactive while the frost lasts, and is happy to be idle and consumes its own fat… But when the winter is over and spring is beginning and the Ister is flowing freely, it hates to be inactive and, swimming up to the surface, takes its fill of the foam of the water, and there is foam in abundance as the stream roars and boils in violent tumult. Then is the time when it is easily captured as the fishermen lie in wait for it and let down hook and line into the foam. The whiteness of the foam conceals the hook and the bright sheen of the bronze is invisible to the fish; hence, as it opens its jaws and takes a heavy draught of the aforesaid food, it swallows the bait and meets its death from the very thing that before sustained it".[37]

Given that sturgeon fisheries in the Iron Gates were particularly lucrative in later historical periods, and possibly referenced as early as in Aelian's writings, it seems plausible that the sturgeons consumed at Viminacium were also obtained from this area, although towing upstream by boats would have been difficult due the turbulent waters.

Apart from their meat output and tasty flesh, sturgeons are particularly valued for their delicious roe used in caviar production. These impressive creatures, often larger and heavier than humans, seem to have been highly prized throughout the Roman world as well. Speaking of sturgeons in the Eastern Mediterranean (Pamphylia), Aelian describes them as "sacred fish", and in the rare occurrences when they are caught

"…the fishermen deck themselves with garlands to celebrate their good luck; they garland the fishing boats as well, and put into port, as with cymbals and flutes they summon people to bear witness to their catch."[38]

Various written sources praise sturgeons as luxurious foodstuffs, available primarily to particular social classes. According to the Roman poet Marcus Valerius Martialis, they were considered a great commodity, worthy of elite feasting. In his *Epigrams*, published in Rome between 86 and 103 AD, he states:

"Send sturgeon to Palatine tables; let rare offerings adorn ambrosial[39] feasts" (*ad Palatinas acipensem mittite mensas: ambrosias ornent munera rara dapes*).[40]

In Ambrosius Theodosius Macrobius' 5th century work *Saturnalia*, a medley of various topics (from the divinity of the Sun to human digestion) discussed by eminent historical personalities at a fictional banquet, sturgeons are mentioned on more than one occasion – both as delicacies and displays of wealth and prestige. The banquet guests quote Plautus, who described feasting on this elusive fish with great gusto:

"What mortal was ever graced with good fortune as great as mine is now, when this procession is brought forth for my belly? Now the sturgeon that hid from me in the sea before this – my teeth and hands will see that its flesh is hidden away for good" (*Quis est mortalis tanta fortuna adfectus umquam Qua ego nunc sum, cuius haec ventri portatur pompa? Vel nunc, qui mihi in mari accipenser latuit antehac, Cuius ego latus in latebras reddam meis dentibus et manibus*).[41]

In another instance, Cicero is quoted, i.e. his anecdote regarding sturgeon as a delicacy too precious to be shared:

"For when Scipio was at home with Pontius in his property at Lavernium a sturgeon happened to be

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35 Scholfield 1959.

36 Aelian 1959a, 183.

37 Aelian 1959a, 187–189.

38 Aelian 1959b, 215–217.

39 I.e. of the emperor (comment by Kerr, in Martialis 1920, 423).

40 Martialis 1920, 422–423.

41 Macrobius 2011, 108–109.

brought to him – quite a rare catch, but a fish, they say, that's *la crème de la crème*. But when he had invited to dinner a couple of those who had come to greet him, and it looked as though he was going to invite still more, Pontius said in his ear, 'Be careful, Scipio: that sturgeon of yours doesn't like a crowd'" (*Nam cum esset apud se ad Lavernium Scipio unaque Pontius, adlatus est forte Scipioni accipenser, qui admodum raro capitur, sed est piscis, ut ferunt, inprimis nobilis. Cum autem Scipio unum et alterum ex his qui eum salutatum venerant invitavisset, pluresque etiam invitaturus videretur, in aurem Pontius: Scipio, inquit, vide quid agas, accipenser iste paucorum hominum est*).[42]

Perhaps most picturesque in *Saturnalia* is Serenus Sammonicus' mockery of lavish ceremonies accompanying the presentation of sturgeon at the banquet of the Emperor Septimius Severus:

"…the fish used to be held in such reverence that it was served by garlanded servants to the song of the flute, as if it were the procession, not of a delicacy, but of a god" (*…venerationem qua piscis habebatur, ut a coronatis inferretur cum tibicinis cantu quasi quaedam non deliciarum sed numinis pompa*).[43]

Although Martialis and Macrobius do not explicitly mention sturgeons from the Danube, it seems likely that these impressive fishes would have been held in similar regard in the city of Viminacium – as luxury foodstuffs, possibly even as "royal" animals. Sturgeon bones have also been reported further upstream, at sites in the Danube Bend area in the Roman province of Pannonia (Transdanubia)[44], as well as at the site of Sirmium[45] located on the banks of the Sava (tributary of the Danube), suggesting that they were in great demand in Danubian provinces.

FISHING AT VIMINACIUM

Apart from fish remains, sporadic finds of fishing equipment provide additional insights into fishing techniques, and the role of fishing in the economy of Viminacium. It should be noted, however, that only a small number of objects related to fishing was identified within the huge assemblage of Viminacium finds. Fishing equipment included net weights for throwing and dragging nets (Fig. 12a, b) and hooks (Fig. 12c). The existence of harpoons, spears, and tools for making and repairing nets is still debatable, since these objects have not been recognised yet, while nets, fish traps, and floaters for keeping the nets afloat would not normally have survived in the archaeological record. Similar fishing equipment is attested at other Roman sites on the Danube (Singidunum, Saldum, Pontes, Rtkovo–Glamija)[46], and it represents a continuation of techniques used in pre-Roman times. The reliance on local fishing techniques could have been particularly influenced by specific features of the landscape. Moreover, some of the local species such as catfish would have been unknown in the Italian peninsula, as this fish was introduced to its waters from the provinces.[47]

Fishing in the Viminacium area was most likely undertaken from the shore and from boats, as demonstrated in Ancient sea fishing.[48] Persons engaged in such activities must have been professional fishermen, whose task it was to supply the city with necessary food and make their own living in so doing.[49] Moreover, the observed butchery marks on beluga and catfish bones allow for the possibility of specialised fishmongers, responsible for selecting, purchasing, gutting, boning and filleting fish.

Apart from locally available freshwater fish and anadromous sturgeons (most likely obtained from the Iron Gates area), the presence of Mediterranean Sea molluscs at Viminacium[50] suggests that certain members of the society also had access to "exotic" raw materials, objects and foodstuffs brought from greater distances. Also, a specific type of amphorae discovered during the excavations of Viminacium and within the fortresses on the Moesian part of the Danube *limes* most likely represented transportation equipment used in the long-distance trade of fish products[51], such as processed fish, salt-fish (*salsamentum* or *ταν*ρ*ιχος*) and fish sauces (*garum*, *liquamen*, *allec* and *muria*). Furthermore, the usage of various objects depicting fish[52], even if not manufactured locally, is another testimony to the significance of the aquatic domain and creatures which dwell in it.

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[42] Macrobius 2011, 108–111.

[43] Macrobius 2011, 112–113.

[44] Bartosiewicz 1989; Takács, Bartosiewicz 1998; Galik et al. 2015.

[45] Živaljević, unpublished data. Access to this assemblage was kindly provided by D. Nedeljković.

[46] Ilić 2012, 62, and references therein.

[47] Bökönyi 1984, 100

[48] Bekker-Nielsen 2005, 85–86; Beltrame 2010.

[49] Anderson 1985, 22.

[50] Спасић-Ђурић 2015, 22; Vuković-Bogdanović 2018.

[51] Bjelajac 1996.

[52] Спасић-Ђурић 2015.

CONCLUSIONS

Albeit small, the fish faunal assemblages from three locations at Viminacium provide important data on the fish supply of the city and legionary fortress. Corroborated with finds of fishing equipment, amphorae probably used in the transportation of processed fish products, and fish-related imagery, it indicates that aquatic resources contributed to the diet and the economy to a greater degree than originally presumed. Freshwater species such as carp and catfish, available locally and for most of the year, were consumed both by the inhabitants of the city and its surroundings, and possibly served as food offerings for the dead. On the other hand, several pike and pike-perch bones and more numerous bones of large sturgeons have been found solely in the city area (i.e. the Amphitheatre) so far. The latter could have been targeted during their early spring and autumn migrations, possibly in the Iron Gates fisheries. Even if consumed irregularly, on specific occasions and festivities, or by particular members of the society, these fishes certainly played a significant part in social life and in the display of status and prestige. This is particularly related to the challenges and costs of their transportation, their impressive size, tasty flesh and possibly their caviar, which could have produced a stunning effect for the eyes as well as on the tongue. Imported fish products obtained from even greater distances would have been highly prized as well, however, so far, there is only indirect evidence of their consumption at Viminacium. Nevertheless, a greater role of smaller, locally available fish (whose steady supply would have provided more animal protein than occasionally obtained large specimens) should not be excluded, especially since these are generally underrepresented or completely missing in hand-collected assemblages.

Translated by the authors

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Ad Palatinas acipensem mittite mensas: Fish remains from Viminacium (183–202)

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AD PALATINAS ACIPENSEM MITTITE MENSAS: ОСТАЦИ РИБА СА ВИМИНАЦИЈУМА

Кључне речи – Виминацијум, Амфитеатар, Над Клепечком, Пиривој, рибљи остаци, опрема за риболов, трговина рибом, јесетре

Положај Виминацијума, римског града и легијског логора смештеног у близини ушћа Млаве у Дунав (сл. 1), указује да су његови становници имали директан приступ речним изворима хране, те је риба највероватније чинила део њихове исхране. Међутим, релативно се мало зна о риболову у римском периоду у овом делу Подунавља, а риболовачке активности често остају археолошки мање видљиве или недовољно проучене. Ова околност се може објаснити слабијим могућностима очувања рибљих костију, њиховом порозношћу и генерално малим димензијама, што доводи до тога да се по правилу превиде (посебно у случају ситнијих врста) приликом ручног сакупљања материјала. Тако су у великој фаунистичкој збирци са Виминацијума рибље кости заступљене са свега неколико десетина примерака, за разлику од костију сисара чији број износи више од 20.000. Међутим, иако малобројни, рибљи остаци са Виминацијума представљају важан извор података о исхрани и снабдевању рибом, риболовачким праксама, одабиру врста и величини улова, као и о потенцијалним разликама у прехрамбеним навикама и приступу квалитетнијој риби у граду и у његовој околини. У овом раду су приказани резултати археозоолошке анализе рибљих остатака који су до сада констатовани на три различите локације на Виминацијуму: на подручју амфитеатра, који се налази у ужем градском језгру, у отпадном простору, који се налазио у оквиру источне некрополе, удаљене око 450 м од легијског утврђења (локалитет Пиривој), и у насељу, које је представљало економско-индустријски центар, удаљен око 2,5 км од легијског утврђења (локалитет Над Клепечком) (сл. 2). Осим археозоолошких података, у раду су приказани и налази риболовачке опреме са Виминацијума, који пружају ширу слику о рибарским техникама, као и релевантни историјски извори у циљу бољег сагледавања могућих значења која су придавана различитим врстама риба.

Рибљи фаунистички узорак са Виминацијума чине 74 примерка костију, а од тога 48 потиче са простора амфитеатра, 22 са локалитета Над Клепечком и 4 са Пиривоја (табела 1; сл. 3). У узорку су заступљене слатководне рибе, које су по свој прилици ловљене у Млави и Дунаву: врсте из породице шаранки (шаран *Cyprinus carpio* и буцов *Aspius aspius*, сл. 4), штука (*Esox lucius*, сл. 5), смуђ (*Sander lucioperca*, сл. 6) и сом (*Silurus glanis*, сл. 7). Од тога се једино кости шаранки и сома јављају и изван градског језгра, што би могло указивати на то да су се тим рибама хранили становници града и околине, али и да су се оне могле користити у оквиру погребних ритуала на простору источне некрополе Виминацијума. У случају узорка са амфитеатра, кости шарана, штуке, смуђа и сома биле су очуване у довољној мери, те је било могуће измерити их и реконструисати величину примерака (табела 2). Већином су у питању биле крупне јединке, што се могло и очекивати будући да остаци ситнијих риба вероватно нису сакупљени. Поред тога, може се претпоставити да је најбољи улов из оближњих река вероватно стизао на трпезу становника града и легијског логора.

Поред слатководних врста, у узорку са амфитеатра идентификовани су и остаци крупних риба из породице јесетровки, које су све до изградње ђердапских брана мигрирале у Дунав из Црног мора. У питању су остаци руске јесетре (*Acipenser gueldenstaedtii*), паструге (*Acipenser stellatus*), кечиге (*Acipenser ruthenus*) (једине слатководне јесетровке) (сл. 8) и посебно бројни остаци моруне (*Huso huso*, сл. 9), највећег представника ове породице. Прилично велики број костију јесетровки у узорку, њихове импресивне димензије (табела 2), као и контекст налаза (искључиво простор амфитеатра) указују на то да су те рибе биле посебно цењене и вероватно намењене одређеним слојевима градског становништва. Најимпресивнији улов представљале су свакако моруне, будући да је већина измерених костију потицала од примерака који су били дуги између 3 м и 3,5 м, али су ловљени и крупнији примерци, дуги и преко 5 м (сл. 10). Посебан куриозитет је то што су те огромне рибе допремане у комаду, будући да већи број трагова касапљења на костима (сл. 9) указује да су припремане за конзумацију у самом граду. Овај податак постаје још значајнији ако се узме у обзир и то да су се од праисторије до изградње брана најбоља места за риболов на јесетровке налазила на подручју Ђердапа (сл. 11), низводно око 100 км од Виминацијума. Иако Елијаново дело *De Natura Animalium* не представља извор из прве руке, у њему описани риболов на дунавске јесетровке, у оквиру пејзажа који подсећа на Ђердап, наводи на претпоставку да је ово рибарско подручје било у употреби и током римског периода. Могло би се стога претпоставити да су и јесетровке које су се конзумирале у Виминацијуму стизале из ове области, могуће сушене, усољене или чак и живе.

Одређени писани извори додатно указују на статус које су јесетровке уживале у римском периоду – и као посластице на гозбама, али и као статусни симболи. Марцијал у *Εὐιγράμιμα* (*Epigrammata*) наводи да су ове рибе достојне царске трпезе, а Макробије их у свом делу *Saturnalia* (наводећи речи различитих античких аутора) описује као ретке посластице, превише вредне да би се делиле с другима, па чак и као божанства чије су изношење на трпезу пратиле слуге и звуци фруле. Иако се Марцијал и Макробије не осврћу конкретно на јесетровке из Дунава, може се претпоставити да су ове крупне рибе и доживљаване на сличан начин и у Виминацијуму, као и у другим подунавским градовима.

Поред рибљих остатака, одређен увид у риболовне технике пружају и спорадични налази риболовачке опреме са Виминацијума – тегови за мреже и удице (сл. 12). Осим на Виминацијуму, такви предмети познати су и са других локалитета на дунавском лимесу.

Поред локално доступне и миграторне рибе, која је вероватно допремана са Ђердапа, одређени становници Виминацијума су се по свој прилици снабдевали и морском храном набављеном из удаљених области. Директна сведочанства о трговини из медитеранских области представљају љуштуре мекушаца, а она индиректна јесу одређени типови амфора које су вероватно садржале производе од прерађене морске рибе и рибље сосеве.

Иако малобројни, остаци риба са Виминацијума, као и налази риболовачке опреме и амфора коришћених вероватно за транспорт рибљих производа пружају важне податке о исхрани и снабдевању рибом на простору главног града провинције и његове околине. Локално доступне слатководне врсте, попут шарана и сома, конзумирале су се по свој прилици и у граду и у његовој околини, а могуће је и да су коришћене у оквиру погребних ритуала. Међутим, квалитетнија риба (попут јесетровки) вероватно је конзумирана у одређеним приликама и/или круговима, представљајући важан део друштвеног живота у граду и начин за истицање статуса. Не треба искључити ни могућност да су се ситније, локално доступне рибе, чији се остаци генерално превиде приликом ручног сакупљања, конзумирале много чешће и међу свим слојевима друштва.

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A CASE OF *MYOSITIS OSSIFICANS TRAUMATICA* ON ONE SKELETON FROM VIMINACIUM

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Abstract – The Roman city and military camp of Viminacium is situated between the villages of Stari Kostolac and Drmno, 12 kilometres north-east of Požarevac, close to the confluence of the Mlava and the Danube. During its history, it became the biggest urban settlement and the capital of the province of Upper Moesia (*Moesia Superior*), later First Moesia (*Moesia Prima*). In one of the necropoles of Viminacium, Pećine, in grave No. 5785, skeletal remains of a juvenile male individual were discovered. The burial took place in Late Antiquity. Anthropological analyses revealed a fracture of the right femur followed by *myositis ossificans traumatica*. The trauma to the bone can damage the overlying muscle and, occasionally, the muscle tissue will respond to the trauma by producing bone directly in the muscle tissue itself. This condition is known as *myositis ossificans traumafica* (post-traumatic *myositis ossifican*s or *myositis ossificans circumscripta*) and is most likely to occur in response to trauma in young male individuals, and in the femoral (the quadriceps muscles) or humeral region (brachium muscles).

Key words – Viminacium, Late Antiquity, site of Pećine, *myositis ossificans traumafica,* bone fracture

The Roman city and military camp of *Viminacium* is situated between the villages of Stari Kostolac and Drmno, 12 kilometres north-east of Požarevac, close to the confluence of the Mlava and the Danube (Map 1). During its history, it became the biggest urban settlement and the capital of the province of Upper Moesia (*Moesia Superior*), later First Moesia (*Moesia Prima*). It represented one of the most important military strongholds, not only in Upper Moesia, but it also represented the area from which Roman legions operated in other provinces as well.

MATERIAL AND METHODS

In one of the necropoles of Viminacium, Pećine, in grave No. 5785, skeletal remains of a juvenile male individual were discovered. The burial took place in Late Antiquity. The deceased juvenile was laid on the back with hands clasped on his stomach. The deceased's skull was not found. The orientation of the grave was West–East (Fig. 1).

Standard anthropological analysis was conducted at the Institute of Archaeology in Belgrade. The analysis included the estimation of sex and age at the moment of death, paleopathological and dental analyses, and a macroscopic examination of entheses.

For sex determination on the skeletal material of this individual we adopted a combination of morphological and metrical methods. Specific attention was paid to morphological elements of the pelvis (*sulcus praearicularis, incisura ischiadica s. ischialis major,*

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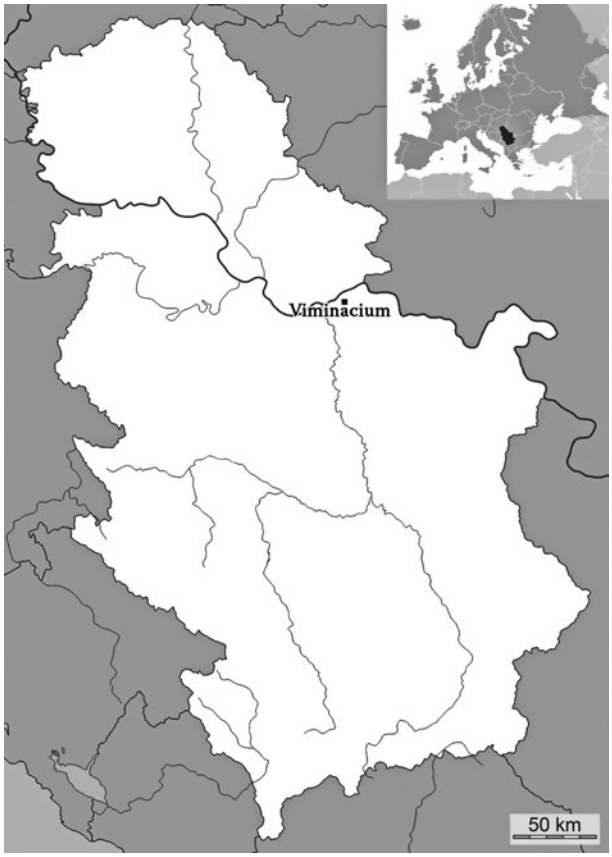

Fig. 1. Viminacium, site of Pećine, Grave 5785 (photo taken from Documentation Centre, Viminacium)

Сл. 1. Виминацијум, локалитет Пећине, гроб 5785 (фотографија је преузета из Документационог центра Виминацијум)

Map 1. Location of Viminacium on the map, with the position of the Republic of Serbia in Europe (the map was drawn by M. Radmilović)

Карта 1. Локација Виминацијума на карти, са положајем Републике Србије у Европи (карту је нацртао М. Радмиловић)

arc compose, the appearance of *os coxae, crista iliaca, fossa iliaca*), and the method of operation was adopted from a group of European anthropologists,[1] and Buikstra and Ubelaker.[2] Morphological and metric elements were observed during the analysis of other postcranial bones as well (Table 3). The morphological elements that caught our attention most were the degrees of development of: *tuberositas deltoideae, tuberositas radii* and *margo interosseus* (of the radius), *tuberositas ulnae* and *margo interosseus* (of the ulna), *linea aspera* and *tuberositas tibiae.* Bone appearance, body curvature and *facies auricularis* were morphological elements observed in the sacrum.[3] Metric elements played a more significant role in sex determination based on the postcranial skeleton, and were given additional attention.

Individual age was established based on: degree of ossification of the epiphysis-diaphysis connections (table with time scales (in years) during which epiphysis-diaphysis connections ossificate);[4] morphological changes in sternal ends of ribs (metamorphoses of depth, joint cavities, shape, edges and ridge configuration were examined, together with overall state of bone, based on ten (0–8) phases of progression covering the period from 18 to over 70 years);[5] sacroiliac region (individual age of adult individuals was determined using models defined by Lovejoy and his associates; they classified the changes in this region in eight stages, from late adolescence to old age phase, with most attention directed to the observation of position, edge *lipping* and porosity of the bone in this region).[6]

Stature was calculated using Trotter and Gleser's formulas.[7]

RESULTS

The anthropological analysis revealed that in grave No. 5785 a juvenile male individual, aged 20–25 years (medium stature: 163 ± 4 cm, Tables 1 and 2), was buried.

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[1] Ferembach *et al.* 1980, 519–527.
[2] Buikstra, Ubelaker 1994, 15–21.
[3] Mikić 1978, 18, 19; Bass 1995, 114.
[4] Ferembach *et al.* 1980, 531.
[5] Işcan *et al.* 1984a; idem. 1984b; idem. 1985.
[6] Lovejoy *et al*. 1985.
[7] Trotter, Gleser 1952.

GRAVE 5785					
POSTCRANIAL SKELETON					
right humerus	-	P1/3	M1/3	D1/3	D.E.
left humerus	-	P1/3	M1/3	D1/3	2/3D.E.
right radius	P.E.	P1/3	M1/3	D1/3	-
left radius	P.E.	P1/3	M1/3	D1/3	-
right ulna	P.E.	P1/3	M1/3	-	-
left ulna	1/2P.E.	P1/3	M1/3	D1/3	-
right femur	P.E.	P1/3	M1/3	D1/3	D.E.
left femur	P.E.	P1/3	M1/3	D1/3	D.E.
right tibia	-	P1/3	M1/3	D1/3	dec.D.E.
left tibia	P.E.	P1/3	M1/3	D1/3	dec.D.E.
right fibula	-	P1/3	M1/3	D1/3	D.E.
left fibula	P.E.	P1/3	M1/3	1/2D1/3	-
33 bone fragm. of postcr. skeleton	0.4–4.5 cm in length				
right and left clavicle	both 75–100%				
manubrium	75%				
corpus sterni	100% dec.				
right and left scapula	25–50%				
sacrum	75%				
number of sacral vetrebrae	3 + 1/2				
promontorium	100%				
right iliac bone	100% dec.				
right ischium bone	75–100%				
right pubic bone	25–50%				
left iliac bone	100% dec.				
left ischium bone	75–100%				
left pubic bone	50–75%				
left patella	75%				
one cervical vertebra					
nine thoracic vertebrae, 10 body fragments and 12 fragment of processes of thoracic vertebrae					
one lumbal vertebra, one body fragment and three fragment of processes of lumbal vertebrae					
35 ribs fragments	3.05–14.1 cm in length				
I right *os metacarpale*	P.E.	P1/3	M1/3	D1/3	D.E.
I right *os metacarpale*	P.E.	P1/3	M1/3	D1/3	D.E.
III left *os metacarpale*	P.E.	P1/3	M1/3	-	-
a phalanx of hand	3				
right and left talus	both 100%				
right calcaneus	75–100%				
left calcaneus	100%				
right and left *os naviculare*	both 50%				
II right *os metatarsale*	P.E.	P1/3	M1/3	D1/3	D.E.
IV right *os metatarsale*	P.E.	P1/3	M1/3	D1/3	-
a phalanx of foot	1				

Table 1. List of preserved bones

Табела 1. Сйисак очуваних коспшју

Stature (cm) – calculation based on the length of	**GRAVE 5785**
Femur	162 ± 4
Tibia	163 ± 4
Fibula	163 ± 4
Medium stature	163 ± 4

Table 2. Stature

Табела 2. Телесна висина

The paleopathological analysis showed a healed fracture on the upper half of the body of the right femur (Plate I/1–4). It was most probably a spiral fracture, with anteversion (?), followed by *myositis ossificans traumatica* on the posterior side of the body, on the *linea aspera* (exostosis had spread to the medial side (Plate I/1–4)). Aside from the fracture, mild osteoarthritis was also noted on the tarsal bones, as well as *osteochondritis dissecans*, i.e., post-traumatic subarticular necrosis, with a diameter of 1.7 cm, on the medial condyle of the left femur (the mini-fracture is surrounded by a sclerotic repair zone, with the newly created formation in the centre (Plate I/5)). On the right scapula, a dislocation of the glenoid cavity can be seen, beneath the very cavity, above the *m. triceps brachii – Caput longum* (Plate II/4, 5). On the posterior part of the sacrum, a dislocation of one of the segments was noted (Plate I/6). On both iliac bones, a prominent sulcuses above both the auricular surfaces was noted (Plate II/6, 7). On the left calcaneus, the *facies articularis talaris media* and *facies articularis talaris anterior* are separated, while they are merely doubled on the right one.

Very prominent muscular, ligamentous and tendinous entheses were visible: on both humeri (*m. deltoideus, m. pectoralis major, m. latissimus dorsi, m. teres major, m. biceps brachii – Caput longum, m. anconeus, m. extensor carpi radialis longus, m. extensor carpi radialis brevis, m. extensor digitorum, m. extensor digiti minimi, m. extensor carpi ulnaris, m. supinator* (Plate II/3)), on both ulnae (*m. supinator, m. brachialis* (only on the right ulna, the left one was damaged), *m. anconeus, m. flexor carpi ulnaris, m. triceps brachii* (on the right ulna)), on both radii (*m. biceps brachii, m. pronator teres, m. extensor digitorum, m. extensor indicis* (the right one), *m. extensor pollicis longus* (the right one)), on both clavicles (*lig. conoideum, m. subclavius, m. deltoideus* (only on the right one, the left one was damaged)), on two ribs (*Mm. levatores costarum*), on both scapulae (*m. triceps brachii – Caput longum*), on both innominate bones (*ligg. sacroiliaca interossea*), and the right femur (prominent insertions at P1/3 and around the *linea aspera* (fracture), *m.iliopsoas, m.gluteus medius*), left femur (less prominent than those on the right one, the bone was damaged)), and on both femurs (*lig. cruciatum anterius, lig. cruciatum posterius*).

Also, lateral curvatures of the body can be noted on the ulnae, especially on the posterior side, in the upper part of the body (Plate II/1, 2).

DISCUSSION

Fracture/Trauma

The term fracture is used to describe any traumatic event that results in partial or complete discontinuity of a bone. Fractures can be traumatic or pathological, they can be closed or open, but also in the form of a complete or incomplete fracture (an incomplete fracture is when the break does not go through the entire bone; if the bone is broken entirely into separate segments, it is called a complete fracture).[8] Traumatic fractures are most commonly caused by a strong direct or indirect force applied onto one or more bones, thus causing the bone to be broken, crushed or cracked. Pathological fractures are those caused by diseases (osteoporosis, bone tumours, etc.), and those caused by changes in bone tissue, which would have made them fragile and sensitive to the effects of minimal traumatic forces.[9] Stress in bone results from the application of one or more of the following types of force: tension, compression, torsion or twisting, flexion or bending, and shearing.[10]

After the break, a phase of regeneration of the bone tissue begins, whose speed and success depends on the level of damage of the bone tissue and also the surrounding soft tissue, the place in which the bone was broken, whether the break occurred on a healthy or pathologically changed bone and whether it was a closed or an open fracture. Just one week later, in the place where the fracture occurred and around it, new bone tissue is formed (callus), which keeps growing in the following weeks and forms a thickening of the bone. The modelling of the structure of the callus comes later, because of the impact of static load.[11]

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[8] Ђурић-Срејић 1995, 311; Ortner 2003, 120.

[9] Ђурић-Срејић 1995, 311.

[10] Ortner 2003, 120.

[11] Ђурић-Срејић 1995, 311.

POSTCRANIAL SKELETON (CM)	GRAVE 5785	POSTCRANIAL SKELETON (CM)	GRAVE 5785
CLAVICLE*		**FEMUR***	
Circumference at middle of bone	4.20 4.10	Maximum length	41.60 43.00
SCAPULA*		Physiolocical length	41.20 42.70
Glenoid cavity length	4.25 -	Subtrochanteric anterior-posterior diameter	2.70 2.70
SACRUM		Subtrochanteric mediolateral diameter	3.70 3.60
Maximum anterior breadth	11	Anterior-posterior diameter of the midshaft	2.90 2.60
STERNUM		Mediolateral diameter of the midshaft	3.15 2.90
Manubrium height	5.5	Maximum diameter of the head	4.65 4.65
Corpus sterni length	9.5	Circumference of the midshaft	9.40 8.70
Corpus sterni breadth	3.9	Bicondylar width	- 7.75
Width of I sternebra	2.4	*Robusticity* *index*	15.53 14.75
Width of II sternebra	3	*Pilastric* *Index*	72.97 75.
HUMERUS*		*Platymeric* *idex*	92.06 89.65
Maximum diameter midshaft	2.20 2.25	**TIBIA***	
Minimum diameter midshaft	1.90 1.90	Maximum length	- 33.6
Least circumference of the shaft	6.40 6.30	Physiolocical length	- 32.6
Biepicondylar width	6.40 -	Anterior-posterior diameter at the nutrient foramen	3.50 3.40
Articular width	4.80 -	Mediolateral diameter at the nutrient foramen	2.40 2.15
Cross section *Index*	86.36 84.44	Circumference at the nutrient foramen	9.60 9.30
RADIUS*		Proximal breadth	- 7.50
Anterior-posterior diameter of the midshaft	1.20 1,20	Distal breadth	5.10 5.00
Mediolateral diameter of the midshaft	1.80 1.65	Least circumference of the shaft	7.60 7.50
Least circumference of the shaft	4.30 4.40	*The Length-Breadth* *Index*	- 22.32
ULNA*		*Platycnemic* *Index*	68.57 63.23
Least circumference of the shaft	- 3.9	**FIBULA***	
Bones marked with * have two measurements, upper is for the right, and lower is for the left side of the body. * вредности су дате прво за десну, а потом и за леву страну		Maximum length	- 33.5
		Least circumference of the shaft	3.40 3.30
		The Length-Width *Index*	- 9.85

Table 3. Measurements and indices of postcranial skeleton

Табела 3. Мере и индекси на пост̄кранијалном скелет̄у

Complications of fractures include: infection, tissue necrosis and loss of innervation, inadequate fusion of the fracture, bone deformity, traumatic arthritis, joint fusion, and *traumatic myositis ossificans*.[12]

Myositis ossificans traumatica

Evidence of trauma in archaeological populations is restricted to visible changes in the skeletal remains, unless, of course, soft tissue is preserved. Therefore, most of the soft-tissue injuries of archaeological populations remain invisible. Bone trauma can damage the overlying muscle, producing a hematoma, and *myositis ossificans traumatica* occurs as a response to that trauma.

Myositis ossificans (also called: *traumatic myositis ossificans*, heterotopic ossification, ectopic ossification, neurogenic ossifying fibromyopathy, reactive Mesenchymal proliferation, ossifying hematoma, or pseudomalignant osseous tumour of soft tissues) was first described by Guy Patin in 1692 and later named by Von Dusch, in 1868.[13] It represents localised, non-neoplastic, reparative extra-osseous lesions that are comprised of reactive hypercellular fibrous tissue, cartilage, and/or bone in muscle or soft tissue.[14] It usually represents one of the complications of fractures (as in this case), trauma (acute or chronic), a blunt injury that causes deep tissue bleeding, although it may also occur without any history of skeletal injuries.[15] Repeated minor trauma – sometimes seen on the inside of the thighs of horseback riders – can also result in *myositis ossificans*. In modern populations' surgery, especially when it comes to hip replacements, sports injuries or accidents, people who have paraplegia can also develop *myositis ossificans*.

Myositis ossificans can be sub classified into four subtypes, according to Samuelson and Coleman:[16] 1) *myositis ossificans progressiva* (usually starts soon after birth, which progressively affects all skeletal muscles, and leads to death), 2) *myositis ossificans traumatic*a (is the more common form of the disease, and occur following, and probably as a result of, local trauma), 3) *myositis ossificans* associated with neuromuscular and chronic diseases (usually occurs in association with neuromuscular disorders, burns, chronic infection, or other systemic diseases), and 4) non traumatic *myositis ossificans* (occurring in those with no definitive causative factor).

Myositis ossificans traumatica is caused by the avulsion of tendons or muscle attachments, generating a hematoma. With time, the hematoma is usually dissolved. Occasionally, however, the muscle tissue will respond to the trauma by producing bone directly in the muscle tissue itself, often in association with the hematoma. The resulting calcified and often ossified mass of woven bone constitutes the lesion known as *myositis ossificans traumatica* (post-traumatic *myositis ossificans* or *myositis ossificans circumscripta*). This excessive formation of bone by muscle can be entirely separated from the bone or it can become part of the existing bone tissue.[17] The most common areas are the extensors and adductors of the thigh and the deltoid and pectoralis muscles and their associated tendons.

These traumatic lesions are most commonly seen in active adolescents and young adults (as in this case, in a juvenile individual), younger than 30 (in their 20s) with a peak occurrence between 11–20 years (it is rare among children under 10 years old), participating in some physical activities (sports, especially among athletes), with a slight male predominance (gender ratio: M/F is 1.2/1 to 2.2/1).[18] Frequency of occurrence: *myositis ossificans* accounts for < 1% of benign, soft tissue tumours.

Myositis ossificans traumatica can be seen relatively often in skeletons, usually manifested by the presence of irregularly shaped pieces of bone attached to long bones. Lesions manifest as painless or painful masses. Ossification may begin in first 7–10 days, bony

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[12] Ortner 2003, 128.

[13] Lungu 2011, 25; Meyers 2008, 618; Parikh *et al*. 2002, 1058.

[14] Lungu 2011, 25; Meyers 2008, 618.

[15] Atanassova-Timeva, Galabova 2015, 63; Aufderheide *et al*. 1998, 27; Bultheel *et al*. 2016, 33; Mann 1993, 224; Ortner 2003, 128.

[16] Samuelson, Coleman 1976, 1132.

[17] Aufderheide *et al*. 1998, 26; Ortner 2003, 133–134.

[18] Carmichael 1981, 184; Howard *et al.* 1998, 80; Meyers 2008, 618; Mogere *et al*. 2014, 61; Nishio *et al*. 2010, 270; Resnick, Niwayama 1995, 4577.

[19] Rodríguez-Martín 2006, 211; Schwarz 2015.

[20] Meyers 2008, 618.

[21] Meyers 2008, 618; Mogere *et al*. 2014, 61; Parikh *et al*. 2002, 1058; Schwarz 2015.

[22] Mogere *et al*. 2014, 61.

[23] Aufderheide *et al*. 1998, 26; Carmichael 1981, 184; Meyers 2008, 618.

[24] Rodríguez-Martín 2006, 211; Carmichael 1981, 185.

[25] Meyers 2008, 618; Ortner 2003, 450, Uehlinger 1936.

[26] Aufderheide *et al*. 1998, 27.

[27] Ortner 2003, 158.

[28] Aufderheide *et al*. 1998, 27.

[29] Miladinović-Radmilović 2011, 178, 179.

mass in the muscle tissue develops within 2–6 weeks after trauma (according to some authors, this period is 3–4 weeks), but needs at least 3–6 months to develop to mature bone.[19] Lesions located within muscle are often well-defined, ovoid or spheroid, and sometimes lacy, ranging in size from 2 to 12 cm.[20]

Any part of the body may be affected, but it tends to develop over the shaft of long bones, areas where muscles are prone to direct trauma. Some 60% to 75% of reported cases of *myositis ossificans* occur as a result of trauma, the rest are due to total hip arthroplasties, paraplegia, chronic inflammation, immobility, polio, coma, tetanus or burns, etc.[21]

The two most commonly affected anatomical areas are the anterior thigh (quadriceps femoris muscle) and the arm (brachialis muscle), with an incidence of 51.9–56% at the femur, and 12–25% at the humerus, but the temporalis and masseter muscles of the jaw can also be affected.[22] Therefore, lesions occur mostly in the upper legs, then in the trunk, proximal limbs, upper extremities, hips/buttocks, hands or wrists and temporalis or pterygoid muscles.[23]

DIFFERENTIAL DIAGNOSIS

It is necessary to differentiate between this condition and paleopathological cases such as *myositis ossificans progressiva*, osteochondroma, osteosarcoma or other malignant primary or secondary bone tumours.[24] The important factor to evaluate in differential diagnosis is the anatomical location of the lesion. *Myositis ossificans progressiva* is a rare hereditary disease which causes symptoms from early infancy and involves several muscles (heterotopic ossification occurs simultaneously at multiple sites and morbidity and early mortality in children is due to respiratory difficulties and improper treatment).[25] *Myositis ossificans traumatica* is rarely encountered in children and does not imply genetic mutations. When attached to bone, lesions of myositis ossificans traumatica usually occur at the origin or insertion of tendons or ligaments. Tumours may arise at these sites as well but they are often irregular and commonly demonstrate an obvious relationship to their origin in the bone.[26] Enthesopathies also occur at sites of tendon and ligament insertion, but the pathogenesis of enthesopathy differs from *myositis ossificans traumatica* in that the bony projections are probably the result of repeated hard use of the muscle over a relatively long duration of time rather than a single traumatic event, as is the case in *myositis ossificans traumatica*.[27] Exostosis in this case are smaller and often related to the epiphyseal line.[28] Enthesopathies tend to be a much less severe manifestation of abnormal mineralising connective tissue than is the case in *myositis ossificans traumatica*.

CONCLUSION

The overall paleopathological findings of this young male comprehend a healed bone fracture of the right femur followed by severe *myositis ossificans traumatica.* The bone fracture caused unevenness in bone length of the femurs, that is to say, difficulties in walking, which also had effects on other bones of the postcranial skeleton, namely, osteoarthritis, deformations of several bones, dislocations of certain joints, etc.

Unfortunately, from the preserved old medical records, we could not see how doctors treated these bony lesions in the Late Roman period. However, what can be seen from these skeletal remains is that, on the basis of very pronounced muscular, ligamentous and tendinous enthesies recorded on the right and left clavicles, on the right and left bladder, on the ribs and bones of the upper extremities, as well as on the dislocation of the shoulders joints and curvature of both ulnae, this person probably relied on medical aid for a long time, that is, on crutches.

In the anthropological literature there are very few published cases of *myositis ossificans traumatica* from the archaeological context. In our country, it was found only in one case in Sirmium (juvenile female (?) individual, 18 years old).[29]

Translated by the authors

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A case of myositis ossificans traumatica on one skeleton from Viminacium (203–214)

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СЛУЧАЈ *MYOSITIS OSSIFICANS TRAUMATICA* НА СКЕЛЕТУ ИЗ ВИМИНАЦИЈУМА

Кључне речи – Viminacium, касна антика, локалитет Пећине, *myositis ossificans traumatica*, прелом кости

Римски град и војни логор Виминацијум налази се између села Стари Костолац и Дрмно, на 12 km североисточно од Пожаревца, у близини ушћа Млаве у Дунав (карта 1). Током своје историје постао је највеће урбано насеље и главни град провинције Горње Мезије (*Moesia Superior*), касније Прве Мезије (*Moesia Prima*). На некрополи Пећине у гробу G-5785, из касноантичког периода, откривени су скелетни остаци јувенилне особе мушког пола, старе 20–25 година (сл. 1; табеле 1–3).

Палеопатолошка анализа је показала присуство сраслог, највероватније спиралног, прелома са антеверзијом (?) у горњој половини тела десног фемура, праћеног *myositis ossificans traumatica*-ом на постериорној страни тела. На *linea aspera*-и егзостоза је извучена ка медијалној страни (табла I/1–4). Осим прелома, константован је и благи остеоартритис на тарзалним костима и *osteochondritis dissecans*, односно посттрауматична субартикуларна некроза (пречника 1,7 cm) на медијалном кондилу левог фемура (табла I/5). На десној скапули видљива је дислокација гленоидалног удубљења, и то испод самог удубљења, изнад *m. triceps brachii – Caput longum* (табла II/4, 5). Постериорно је на сакруму уочена дислокација једног сегмента (табла I/6). На обе илијачне кости, изнад аурикуларне површине, приметни су сулкуси (табла II/6, 7).

Изражене ентезе мишића, лигамената и тетива видљиве су на: оба хумеруса (табла II/3), на обе улне, на оба радијуса, на обе клавикуле, на обе скапуле, на два ребра, на обе карличне кости, на оба фемура (на десном фемуру су припоји израженији). Такође, на улнама су приметна, поготово са постериорне стране у горњој половини тела, и латерална закривнућа тела (табла II/1, 2).

Myositis ossificans (*traumatic myositis ossificans, heterotopic ossification, ectopic ossification, neurogenic ossifying fibromyopathy, reactive Mesenchymal proliferation, ossifying hematoma, pseudomalignant osseous tumour of soft tissues*) представља локализоване не-неопластичне, репаративне коштане лезије, које се састоје од реактивног хиперцелуралног фиброзног ткива, хрскавице и/или кости у мишићу или меком ткиву. Може настати као последица прелома, као што је овде случај, или услед трауме (активне или хроничне) или тупе повреде која доводи до дубоког крварења у ткиву. Понављајуће мање трауме, које се понекад виде на унутрашњој страни бутине код коњаника, такође могу довести до *myositis ossificans*-а. Код савремене популације, *myositis ossificans* се може развити код особа које су имале операције (посебно замену кука), спортске повреде или несреће, као и код особа које имају параплегију.

Myositis ossificans се према Самјуелсону и Колману може класификовати у четири подтипа: 1) *myositis ossificans progressiva*, 2) *myositis ossificans traumatic*а, 3) *myositis ossificans* који је у вези с неуромишићним и хроничним обољењима и 4) не-трауматични *myositis ossificans*. *Myositis ossificans traumatica* настаје авулзијом тетива или мишићних припоја, при чему се ствара хематом, који с временом може нестати, али мишићно ткиво повремено, као одговор на трауму, ствара кост директно у мишићном ткиву, често и у вези с хематомом. Новонастала калцификована и, често, осификована коштана фиброзна маса представља лезију познату као *myositis ossificans traumatica* (*post-traumatic myositis ossificans*, *myositis ossificans circumscripta*). Ова маса може бити у потпуности одвојена од кости или може постати њен део. Најчешће се појављује код физички активних адолесцената (ретко се јавља код деце млађе од 10 година) и одраслих особа млађих од 30 година, код особа које су физички активне, и са већом учесталошћу код мушкараца (однос међу половима: M/F је 1,2/1–2,2/1). На скелетима древних популација често је видљив у виду неправилно обликованих коштаних израслина које су срасле са дугим костима (дужине 2–12 cm). Било који део тела може бити погођен *myositis ossificans traumatica*-ом, али најчешће се јавља на телу дугих костију, деловима где су мишићи склони директној трауми. Око 60–75% забележених случајева *myositis ossificans*-а јесу последица трауме, док су остали случајеви последица операције замене кука, параплегије, хроничних упала, непокретљивости, полиа, коме, тетануса, опекотина итд. Најчешће се појављује на фемуру (*m. quadriceps femoris*), са учесталошћу од 51,9–56%, и на хумерусу (*m. brachialis*), са учесталошћу 12–25%, док је најмања учесталост појављивања на вилици, на *m. temporalis* и *m. masseter*. Приликом дијагностиковања *myositis ossificans traumatica* важно је направити диференцијалне дијагнозе и разликовати то стање од других палеопатолошких промена као што су *myositis ossificans progressiva*, остеохондрома, остеосаркома, или други малигни примарни или секундарни тумори костију, егзостозе, ентезопатије итд.

Палеопатолошки налаз овог младог мушкарца, као што смо већ истакли, показује залечен прелом десног фемура, праћен озбиљним *myositis ossificans traumatica*. Прелом је проузроковао скраћење дужине десног фемура, што је касније изазвало читав низ других проблема: потешкоће у ходању,

појаву остеоартритиса, деформације неколико костију, дислокације одређених зглобова итд. Нажалост, из сачуваних античких медицинских извора нисмо могли да видимо како су лекари у касноримском периоду лечили такве лезије на костима, али оно што се види из остеолошког материјала – засновано на веома израженим ентезама мишића, лигамената и тетива видљивим на обе клавикуле, на обе скапуле, на ребрима и костима горњег екстремитета, као и на дислокацији раменских зглобова и закривљености обе улне – јесте то да се ова особа вероватно дуго ослањала на штаке.

У антрополошкој литератури постоји веома мало публикованих случајева *myositis ossificans traumatica.* Код нас је пронађен још само у Сирмијуму, код јувенилне индивидуе женског (?) пола, старе 18 година.

Plate I – 1–4) healed fracture of the right femur and myositis ossificans traumatica on the posterior side of the body; 5) osteochondritis dissecans on the medial condyle of the left femur; 6) dislocation of one of the segments on the posterior part of the sacrum (photo by N. Miladinović-Radmilović)

Табла I – 1–4) срастао прелом на десном фемуру и myositis ossificans traumatica *на постериорној страни тела фемура; 5)* osteochondritis dissecans *на медијалном кондилу левог фемура; 6) дислокација једног сегмента на постериорној страни сакрума (фотографисала Н. Миладиновић-Радмиловић)*

Plate II – 1–2) lateral curvatures of the body on both ulnae; 3) prominent muscular entheses on both humeri; 4–5) dislocation of the glenoid cavity on the right scapula; 6–7) prominent sulcuses above both the auricular surfaces, on both iliac bones (photo by N. Miladinović-Radmilović)

Табла II – 1–2) латерална закривнућа тела обе улне; 3) изражене мишићне ентезе на оба хумеруса; 4–5) дислокација гленоидалног удубљења на десној скапули; 6–7) изражени сулкуси изнад обе аурикуларне површине, на обе илијачне кости (фотографисала Н. Миладиновић-Радмиловић)

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BURIAL OF A WOMAN WITH AN AMBER DISTAFF AT *VIMINACIUM*

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Abstract – A luxurious set of spinning implements was discovered as part of the furnishings in the grave of a woman, unearthed in the surroundings of ancient *Viminacium*. A unique amber distaff with the upper part modelled in the form of a female bust stands out as the most important part of the grave assemblage. Similar artefacts were often misinterpreted, but this specimen was found together with a spindle, thus confirming that it actually is a distaff. Miniature copies of spinning equipment made out of precious materials are known from sepulchral contexts, and are described as objects expressing feminine virtue. It is considered that they were used in wedding rites, thus indicating the possible age of the deceased. Spinning implements can represent useful tools for studying the life course of Roman women. In this paper, an attempt was made to identify the divinity or person depicted on the distaff from *Viminacium*, considering the symbolic nature of these artefacts.

Key words – *Viminacium*, funerary archaeology, spinning equipment, amber, life course studies

The broader city area to the east and southeast of *Viminacium*'s *castrum* and civil settlement is endangered by the expansion of the local strip coal mine and, for that reason, extensive rescue excavations have been conducted in this area since 2008 (Fig. 1). During several continuous campaigns, numerous archaeological features have been unearthed: remains of a settlement of an economic-industrial character, several cemeteries, three villas, three aqueducts, two water towers (*castellum aquae*), as well as roads that led to the smaller fortifications of *Pincum* and *Lederata.*[1] In one of the trenches, strategically placed in order to locate the route of the latter road, five graves were discovered. They were lined up alongside the northern edge of the section of the road. Three burials contained remains of cremated individuals (two belonging to the type Mala Kopašnica–Sase II and the third to Mala Kopašnica–Sase I)[2], while the remaining two were inhumed deceased.[3]

Furnishings in one of the inhumation graves featured luxurious spinning equipment, on which this paper will be focused. The individual was laid on its back in a plain burial pit, without any evidence of the existence of a wooden coffin. The left arm was placed alongside the body, while the right one was bent at the elbow with the hand placed on the abdomen. The legs were crossed at the ankles (Fig. 2). It was determined by the analysis of the skeletal remains that the deceased person was a female, and that she had died

[1] Jovičić, Redžić 2014, 55; Milovanović et al. 2018, 43.
[2] Јовановић 1984, 100–103.
[3] Redžić et al. 2014, 63–64.

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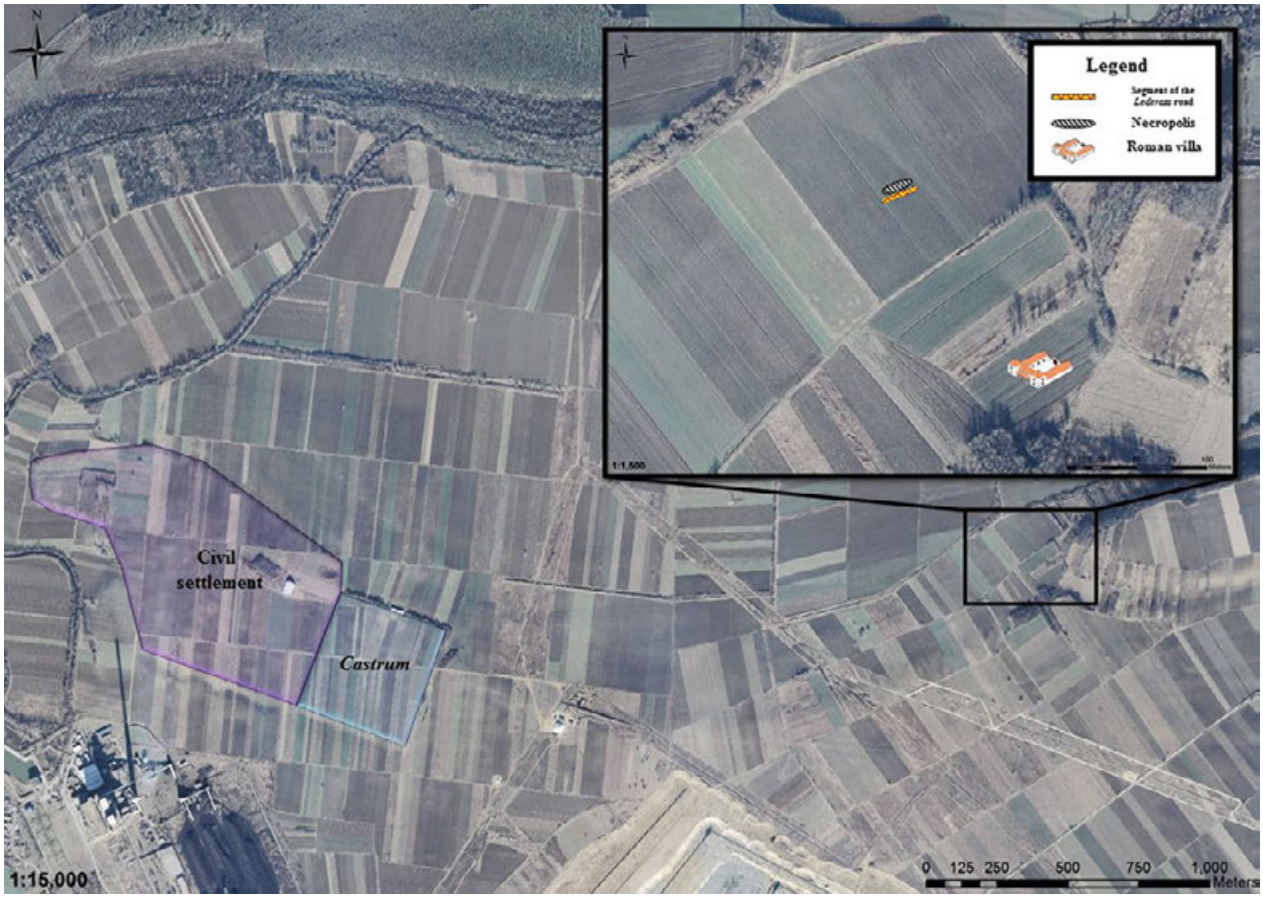


Fig. 1. Aerial photo of Viminacium with the location of the discovered grave (Documentation Centre, Viminacium)

Сл. 1. Аерофотографија Виминацијума са локацијом откривеног гроба (Документациони центар Виминацијум)

during the 4th decade of her life. She was around 145 cm tall, while the heightened abrasion of the incisors pointed to her using her teeth as "a third arm" during day to day activities.

On the right side of the mandible a bone sewing needle was located (Fig. 3). Given the position of the object, one can assume that it was used to pin clothes, as a kind of primitive brooch. It has been attested that needles were used for this purpose.[4] Spinning implements were placed on her chest. An amber distaff was placed on the left side, while fragments of a bone spindle with a glass whorl were found on both sides. The spindle was probably originally placed next to the distaff, but was broken and dislocated due to taphonomic processes (Fig. 4). Next to her feet, the remains of a small casket were discovered. With all perishable materials long gone, only the handle and parts of the lock, both made of bronze, as well as an iron key, were preserved (Fig. 5).

The distaff is certainly the most important part of the inventory of the grave in question (Fig. 6). It consists of the core, which is a rod made out of bronze, measuring 19.35 cm in length, and 27 amber segments, some of which had deteriorated, given their small dimensions. During the conservation/restoration of the artefact it was observed that small sheets of metal[5] were rolled around the core in order to ensure that the amber beads remained in place.[6] All segments are made from reddish-brown amber, and all of them are perforated along the vertical axis. At the lower end, a

[4] MacGregor 1980, 111–112; Petković 1995, 28; 46.

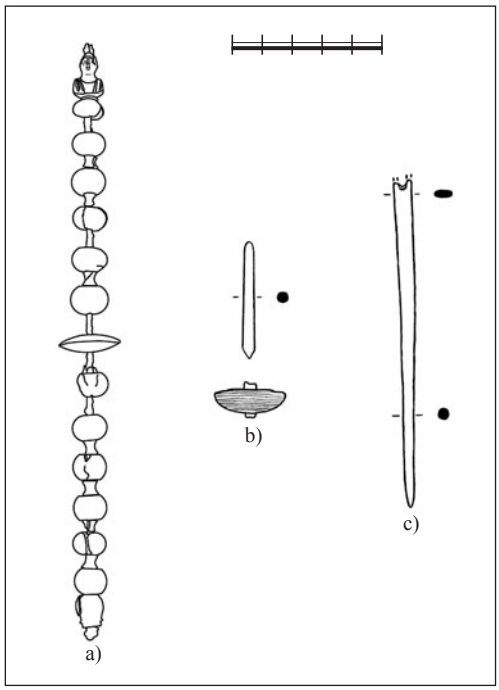
[5] Physico-chemical analysis of these sheets is required in order to determine exactly which metal was used.

[6] Conservation and restoration of the distaff were carried out by Robert Koračin of the Institute for the Protection of the Cultural Heritage of Slovenia, Regional Office, Novo Mesto.

pear shaped segment was placed, and above it 12 spherical and 12 conical beads alternated, divided in the middle by a discoid segment. The uppermost piece of amber is modelled in the form of a female bust (Fig. 11). Taking into consideration the limitations that must have been imposed on the craftsman due to the size of the object, it can be said that the represented person was wearing a *stola* with a *palla* draped over the shoulders, or a short-sleeved tunic. The upper parts of the head are damaged, so information about the coiffure or the headdress is unavailable, although broad horizontal waves can be observed on the side of the head.

Fig. 2. Grave of a woman buried with spinning equipment (Documentation Centre, Viminacium)
Fig. 3. Spinning equipment laid on the chest of the deceased (Documentation Centre, Viminacium)

Сл. 2. Гроб покојнице сахрањене са прибором за предење вуне (Документациони центар Виминацијум)
Сл. 3. Прибор за предење вуне положен на груди покојнице (Документациони центар Виминацијум)



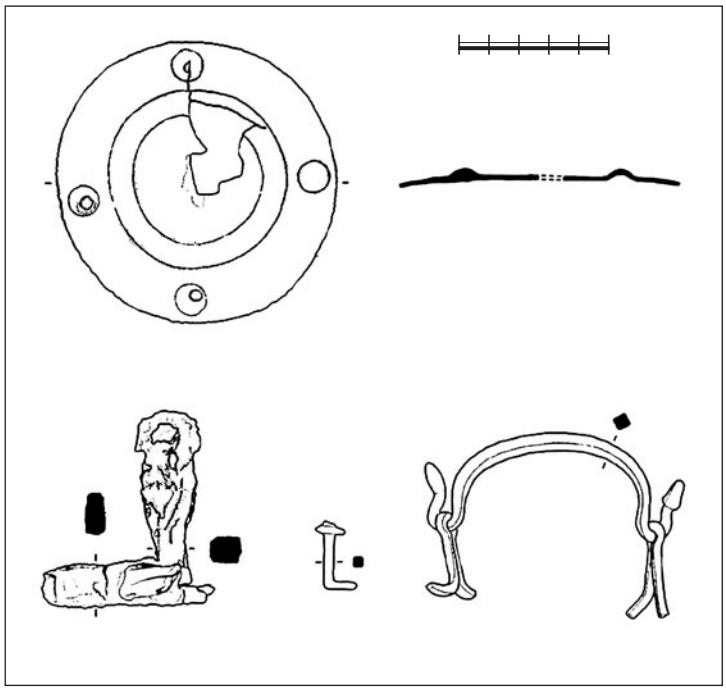


Fig. 4. Grave inventory: a) Amber distaff, b) Bone spindle with glass spindle whorl, c) Needle (Documentation Centre, Viminacium)
Fig. 5. Grave inventory: Parts of a casket (Documentation Centre, Viminacium)

Сл. 4. Инвентар гроба: а) Преслица од ћилибара; b) Вретено од кости са пршљенком од стакла; c) Игла (Документациони центар Виминацијум)
Сл. 5. Инвентар гроба: делови ковчежића (Документациони центар Виминацијум)

Fig. 6. Amber distaff (Photo: Goran Stojić)
Fig. 7. Bust of an unknown woman, early 3rd century, Museo Archeologico Nazionale di Napoli, Italy (After: Croom 2002, 82)

Сл. 6. Преслица од ћилибара (фотографија: Горан Стојић)
Сл. 7. Биста непознате жене, рани III век, Национални археолошки музеј у Напуљу, Италија (према: Croom 2002, 82)

With much caution, this could be associated with hairstyles typical of members of imperial families in the last two decades of the 2nd century.[7] While *stola* and *palla* faded out of fashion somewhere around the end of the 1st century CE, the short-sleeved tunic was actually worn in the same period as the described hairstyle (Fig. 7).[8]

Distaffs in the Roman period

Similar artefacts are known from archaeological sites across Europe, and mainly originate from sepulchral contexts. Their interpretation has long been debated, so they have been seen as scented sticks lit during funeral ceremonies or cosmetic rods for applying perfumes.[9] Other authors have recognised them as sceptres, and believed they represented insignia of power. In several cases they were even interpreted as hand fan handles[10], and in very rare examples they were identified as spindles, which could simply be the consequence of unfamiliarity with the wool spinning process. Today, it is widely accepted that these objects are in fact hand distaffs.[11] The specimen discovered in *Viminacium* reinforces this claim given that it was found together with the spindle, thus completing the equipment needed for spinning.

Distaffs are a diverse category of artefacts. The ones that were used in everyday activities were probably made of wood, and any kind of branch or a stick pronged at the top could be used for this purpose. Due to the perishable nature of timber, not a single such distaff is preserved today, while a fragment of one is on display in the Louvre Museum.[12] This was found in a grave as well, and it is also unique by virtue of the fact that a lump of wool is still preserved attached to the top.[13] Objects that were actually used in the process of wool making had to be significantly longer than those specimens made of expensive materials because of the need to hold the distaff beneath the left armpit, and resting it on the waist to reduce the tiredness of the arm during spinning.[14]

Luxurious specimens manufactured from various materials discovered thus far are almost exclusively distaffs of significantly shorter lengths.[15] Amongst them, a further division can be made, recognising hand distaffs, such as our specimen, and those featuring a ring in the bottom end, which would enable a better grip during work (finger distaffs).[16] These were manufactured from bone, ivory, glass, amber, jet and bronze. Lone examples made out of precious metals and wood with amber and a glass bead on opposite ends are known.[17]

Regardless of the material that was utilised, a broad spectrum of interpretations has been proposed by different researchers, so that in addition to the

[7] Croom 2002, 101.
[8] Croom 2002, 80–83.
[9] Gagetti 2006, 146.
[10] Aurisicchio et al. 2002, 108.
[11] Gottschalk 1996; Aurisicchio et al. 2002; Facchinetti 2005, Палавестра, Крстић 2006, 369. etc.
[12] Facsády 2008, 167.
[13] Gottschalk 1996, 486.
[14] Smith 1859, 565.
[15] With the exception of four arm distaff made out of ivory, two of them unearthed in Cologne, and one in Milano and Selongey, respectively (Facchinetti 2005).
[16] Gottschalk 1996, 483.
[17] Gottschalk 1996, 483

Fig. 8. a) Scene depicted on the sarcophagus from Ephesus, b) Spinning equipment found inside the sarcophagus (After: Trinkl 1994)

Сл. 8. а) Предсшава йокојнице на саркофагу из Ефеса; b) Прибор за йредење ошкривен унушар саркофага (йрема: Trinkl 1994)

already mentioned explanations they have been recognised as pestles for the grinding of cosmetic and pharmaceutical products or pigments used by painters, handles, mirrors, and specimens with figurally modelled tops as hairpins, votive objects, or even as strigils.[18] There are several confirmations that these are in fact parts of the spinning equipment. A distaff is represented on a grave monument located in Izmir, and it features unspun wool as well as the characteristic ring in the bottom end[19]. A similar representation can be seen in a scene depicted on a sarcophagus discovered in Ephesus. Interestingly, amongst other furnishings placed inside this sarcophagus, belonging to a young, pregnant woman and a child, there was a bone distaff, as well as spindle and several whorls (Fig. 8).[20] A glass specimen found in the grave of a cremated woman in *Aquincum*, was discovered alongside a bone spindle and a glass whorl.[21]

Amber hand distaffs comprise one of the most numerous categories within this type of artefact. Naturally, one should not forget that the vast majority of distaffs were most probably made out of wood that could not be preserved to the present day. Also, it is to be expected that large numbers of these objects were destroyed as a result of being placed on funeral pyres. This custom is evidenced by at least five distaffs (three made out of bone, one of amber, and one of glass) originating from the cemeteries of *Viminacium*, which displayed different extents of damage due to exposure to fire.

Several authors have proposed typologies of specimens manufactured from amber, and a brief review of two of them will be presented here. Raymund Gottschalk, in his paper which is one of the most detailed studies of hand distaffs, divided the amber specimens into four types:

I. Type *Aquileia A* is characterised by cylindrical, smooth beads, with a subtype in which they can be spirally twisted or fluted. End segments can be of various shapes. This type is the most numerous.

II. Type *Aquileia B* is characterised by rounded beads.

III. Type *Aquileia C* is comprised of distaffs with conical and cylindrical beads. The specimen from *Viminacium* belongs to this type.

IV. Dorweiler type is characterised by elongated oval beads which are spirally twisted.[22]

The most detailed typology of distaffs in general was presented by Grazia Facchinetti. Based on her division (Fig. 9), the distaff from *Viminacium* can be attributed to type IId5.[23] An ascription of our specimen to this type was made after taking into consideration the way in which the beads of the body of the distaff were made. As there are no analogies for the piece modelled in the form of a female bust, it would only be logical that it represents a separate subtype.

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[18] Fremersdorf, Polonyi-Fremersdorf 1984, 111–112; Јевремовић 1996; Ivčević 2002, 474; Facsády 2008, 165.

[19] Trinkl 2000.

[20] Trinkl 1994.

[21] Facsády 2008, 165.

[22] Gottschalk 1996, 484–486.

[23] Facchinetti 2005, 205–208.

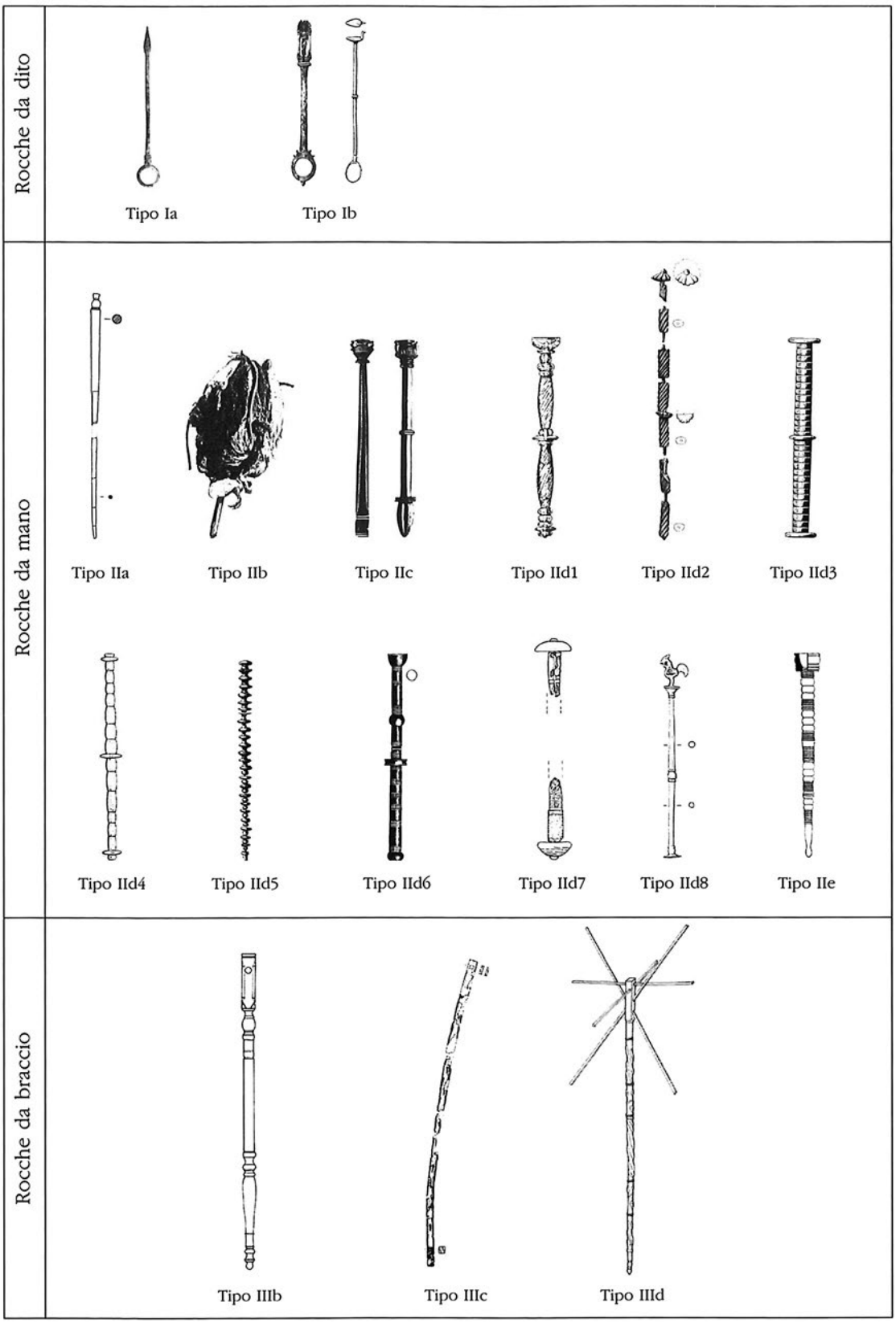

Fig. 9. Typology of Roman distaffs (After: Facchinetti 2005, 221)

Сл. 9. Типолоīија римских īреслица (īрема: Facchinetti 2005, 221)

The accepted dating for amber distaffs places them in a time span ranging from the reign of Augustus until the first half of the 3rd century.[24] Gottschalk moves the upper date to the second half of the 3rd century, while he dates the *Dorweiler* type to the 3rd and the beginning of the 4th century.

When the geographical distribution of amber distaffs is taken into consideration, one may notice three areas with a higher occurrence of these artefacts. First is the city of *Aquileia* and neighbouring territories with which it had an intensive trading relationship (*Histria, Emona, Poetovio…*). Three specimens originate from the cemeteries of *Emona,*[25] and three more from the necropolis in Ribnica na Dolenjskem (Slovenia).[26] In *Poetovio*, an amber distaff with an unclear context was discovered.[27] This should not come as a surprise, given that the city of *Aquileia* was situated at the southern end of the European amber road, which led from the Baltic, and because of this fact workshops specialised in manufacturing objects from amber were established right here. There are indications that workshops also existed in the area of *Pompeii* and *Herculaneum*[28]*,* although they maybe should be ruled out as a place of provenance of amber distaffs because of their absence from archaeological records south of the vicinity of the city of Rome. The second territory with a higher concentration of distaffs is noted along the *Limes Germanicus*, while the third region is the province of *Pannonia Superior*.

In the neighbouring province of *Dalmatia*, the city of *Salona* stands out with several distaffs made out of amber that have been unearthed there.[29] Also, one specimen was discovered in the grave of inhumed female individual in *Doclea*.[30]

Three partially preserved specimens are known from the territory of the province of *Moesia Superior,* not including the distaffs from *Viminacium*. Unfortunately, they all originate from unknown contexts, given that two of them are parts of the Dunjić private collection, while the third was bought in the territory of Guberevac.[31]

Besides the artefact discussed in this paper, two more amber distaffs have been found in *Viminacium*. The first of them was placed inside a Mala Kopašnica–Sase II grave with cremated remains, which was discovered in the southern city necropolis. The object is fragmented, possibly because it was placed on a bonfire alongside the deceased person, after which the remains were gathered and laid in the grave. It can be attributed to the type IId3. The grave inventory also included a glass *balsamarium* and a clay oil lamp, which had a stamp reading NERI. Lamps of this particular type are dated to the 2nd and the beginning of the 3rd century.[32]

The second distaff originates from the eastern city necropolis. It was discovered inside a vaulted tomb containing the remains of a wooden coffin. It belongs to the type IId3. The tomb was dated by mints of *Antoninus Pius, Faustina Maior* and *Septimius Severus*.

The fact that all three distaffs from *Viminacium* were discovered in a funerary context precisely reflects the situation recorded in the territory of the whole Empire, not only where amber distaffs are concerned. Specimens found outside sepulchral features are extremely rare, and a group of eight such objects discovered in a residential area of Ephesus is a unique example.[33] In order to explain these circumstances, one needs to reflect on wool spinning and the place it had in the tradition and ideology of the inhabitants of the Roman state.

Wool working as a metaphor in antiquity

In order to start spinning wool, several actions need to have been completed beforehand. The first step was the shearing of the sheep, after which the wool was washed and beaten with a specially designed tool in order to remove any impurities. Next, the raw material was combed and in some cases dyed, and only then was the wool prepared for spinning. Spinning equipment consisted of three elements: a distaff (*colus*), a spindle (*fusus*)[34] and a basket in which the first two, as well as rovings of unspun wool and balls of yarn, were kept (*calathus*).[35] Further along the process of spinning,

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[24] Facchinetti 2005, 201–202.

[25] Petru 1972, 74, 122–123; T.XXVII, T.LV.

[26] Križ 2017, 132–133.

[27] Jevremov 1985, 423, T.5.

[28] Girardi Jurkić 2010, 164.

[29] Gagetti 2006, 144.

[30] Цермановић-Кузмановић et al. 1975, 114–115.

[31] Палавестра, Крстић 2006, 301.

[32] Korać 2018, 493–494.

[33] Trinkl 2005, 301.

[34] When compared to distaffs, spindles were a rather less diverse group of objects. Mostly they were comprised of a shaft made of wood or bone, which was weighted by a spindle whorl at one end in order to stabilise rotation. The whorl was most commonly made of baked clay, but specimens manufactured from bone, metal, glass etc. are also known.

[35] Facsády 2008, 166.

a lump of wool would be attached to the top of the distaff which was held in the left hand, and threads would be extracted from the lump with two fingers. The right hand held the spindle on which there was a little bit of already spun yarn, which would be connected with the threads. At that moment the spindle would be spun, and its rotation would catch the unspun threads, thus making yarn. When the spindle reached the ground, spun thread would be coiled around it, and the process would be repeated.[36]

Wool was of special significance to the Romans. The fact that the Latin term for this material – *lana*, was also simultaneously used for clothes, speaks for itself.[37] It also had a certain religious importance. Robes of priests had to be made exclusively of wool; it was used for the weaving of the bands that were tied around the heads of animals prepared for sacrifice, sacred trees, altars, temple columns etc. Wool symbolises a good relationship with nature because, unlike leather, it comes from an animal that continues to live.[38]

Wool spinning, as well as weaving, was considered a woman's job, and it was expected of them to provide clothes for the family.[39] At the same time, it was an activity that was conducted in the household, so it implied that the woman was taking care of it. Weaving was probably handed down to younger girls or slaves, given it required a greater physical investment. Actually, it was the only labour intensive task expected of women, according to the treaty agreed after the Rape of the Sabine Women.[40] Besides, weaving required that the person doing it was bound to one place in the home, the place where the loom was stationed, most commonly in the *atrium*. On the other hand, spinning allowed mobility, so a matron could oversee all the other activities in the household, or easily put away the equipment if her assistance was needed elsewhere.

Over time, spinning became a symbol of femininity and an expression of female virtue. This was why a number of epitaphs from the time of the Republic incorporated the words *lanam fecit*. A good example is a funerary monument dated to the 2nd century BCE, which informs us that *Claudia* was married, gave birth to two sons, was pleasant to talk to, took care of the household, and that she spun wool.[41] So, these were the qualities that a Roman woman was expected to have possessed. The truth is that developed industrial production most likely would have existed by then, making domestic manufacture completely obsolete. Even if this was not true, it seems that ladies gave this job over to servant girls, which was the "problem" accounted by *Columella* in the 1st century BCE. He says that women gave themselves to luxury and pastimes, that they even refused to oversee spinning of the wool, and that their only interest was to buy clothes for large sums of money.[42]

By that time, a woman spinning wool had gained a metaphorical meaning in literary works. The most famous instance is Livy's story of *Lucretia*, whose husband was absent due to war. During the siege of a city, he met with other commanders, Etruscan royals, and the discussion of their wives' virtues ensued. The decision was made to pay them an unexpected visit. They found them engaged in dancing and leisure, while *Lucretia* was at home, spinning wool, though it was late in the evening.[43] After a few days, an Etruscan prince raped *Lucretia*. She made her father and brother take an oath to avenge her, then she committed suicide. This led to an uprising against the Etruscan rule and the founding of the Republic.[44] Female virtue, highlighted by the spinning metaphor, thus lies in the core of the story of the birth of the Roman state.

Although men employed in wool production had to exist, literary sources bring us descriptions which hold that the involvement in these activities reflected moral weakness. One samian ware cup depicts *Marcus Antonius* in a chariot procession, followed by women carrying his fan, parasol, basket and distaff. In such a manner his incompetence to rule over Romans was highlighted. Another example is brought to us by *Dio Cassius*, who mockingly says that *Elagabalus* likes to spin wool.[45]

As part of extensive reforms that had the goal of reviving Roman virtue, *Octavianus* ordered female members of the Imperial family to take part in spinning and weaving. *Suetonius* informs us that he, except on rare occasions, wore the clothes made by them. Mastery of these skills became part of an aristocratic upbringing, and every woman was expected to aspire to them.[46]

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36 Facchinetti 2005, 203–204.
37 Larsson Lovén 1998, 85.
38 Sebesta 2001, 47.
39 Allason-Jones 2005, 104.
40 Larsson Lovén 1998, 87.
41 Larsson Lovén 1998, 88.
42 Croom 2000, 19.
43 Thurston Peck 1898, 1526.
44 D'Ambra 2007, 58.
45 Pasztókai-Szeöke 2011, 128.
46 Larsson Lovén 1998, 89.

Spinning was accepted as the symbol of female virtue across the Empire. Instead of the *lanam fecit* formula, depictions of distaffs and spindles appear on funerary *stellae*. The actual process of spinning the wool is never shown, only the equipment.[47] On the aforementioned sarcophagus from Ephesus, a distaff, spindle, and basket are shown beneath the bed on which the matron is reclining. Other way in which these object can be shown is passively, in the hands of the portrait of the deceased. Lumps of unspun wool can regularly be seen on distaffs, and coils of yarn on the spindles. Such representations are typical for the western parts of the Empire. For example, in *Pannonia*, spinning equipment is represented exclusively in this manner,[48] but is also very common in the Eastern Aegean, Syria, Germany, and occasionally in Britain.[49]

The last method of the symbolic expression of feminine virtue and care of the household is the custom of placing luxurious hand distaffs in graves of deceased women.[50] It is important to underline that, judging by their miniature dimensions, and fragile and/or expensive materials, several authors proposed that these objects did not serve the purpose of actual spinning.[51] This is particularly true for those specimens made from amber and jet. They are, rather, artefacts of symbolic and ritual character. The corpus of distaffs from *Viminacium* confirms that they were, above all, used in funerary rites. Of 39 bone distaffs from this site, as many as 26 were found in graves and a further 9 within the area of the cemetery. It can be assumed that the latter were dislocated from their original context during the cleaning of the necropolis and the devastation of the older strata of the graves by the new ones. *Viminacium* has yielded six bone spindles, all from a sepulchral context. Every single one of the seven glass distaffs come from graves or cemeteries.[52] As has already been mentioned, three specimens made from amber were parts of grave furnishings.

The question that needs to be addressed is whether the luxurious spinning equipment was crafted solely for the needs of funeral rituals or it was amongst the belongings of a woman during her lifetime. Mentions of spinning equipment in literary sources might be scarce, but they can lead to the sought after answer. During the wedding ceremony, more precisely in the procession from her maiden home to that of the groom (*deductio in domum mariti*) the bride would carry a distaff and spindle in her hands.[53] Accounts of this custom can be found in works of Pliny the Elder[54] and Plutarch.[55] It can be assumed that costly spinning equipment was acquired exactly with the purpose of being used in such an important life event.[56] Its lavishness would highlight the status and wealth of the family.[57]

Later in life, a luxurious distaff was presumably amongst the most prized possessions of the matron and it could be used during public appearances to emphasise status or in front of guests and clients in the *domus,* and to symbolise the care she took of the household. The group of distaffs unearthed in a residential area of Ephesus is particularly informative regarding this matter, given that all of them were found in premises that had public character.[58] Lavish spinning equipment, being objects of a specifically personal nature, were laid with a woman in her grave after she passed away. As these artefacts were probably obtained during wedding preparations, they can be very informative from the perspective of life course studies. Specifically, they could point to the particular age group in which women were married. In the province of Asia Minor, it is attested that representations of distaffs and spindles in the hands of women mean that they have entered into matrimony.[59]

Finds of spinning equipment in graves of ten-year-old girls in *Pannonia* might be something to consider further. However, it should be noted that although the legal age for marriage was 12 years, there are known cases of girls getting married before fulfilling this requirement.[60] The discovery of spinning implements in

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47 Facsády 2008, 169.

48 Pasztókai-Szeöke 2011, 129.

49 Carroll 2013, 301.

50 This tradition probably has it roots in mythical times when Kings ruled the city of Rome. Namely, a number of 7th century graves in Latium have yielded spinning equipment (Le Glay et al. 2005, 19)

51 Bíró et al. 2012, 22; Trinkl 2005, 290–291; The functional aspects of bone spinning equipment from *Vimiancium* will be part of a separate study.

52 Попкић 2006.

53 D'Ambra 2007, 75

54 Plin. *Nat.* VIII.74.

55 Plut. *Quaes. Rom.* 31.

56 Facsàdy 2009, 690.

57 Roman poet *Ovidius*, telling the myth of the origins of amber, informs us that Roman brides used it to make necklases worn during the wedding (Палавестра, Крстић 2006, 22). Girls whose families could aford to buy distaffs made out of this precious material would have indirectly been following this ancient custom.

58 Trinkl 2005, 300–302.

59 Facsàdy 2009, 690.

60 Pasztókai-Szeöke 2011, 126–127

Fig. 10. Bone distaff from unknown site in Pannonia (After: Pasztókai-Szeöke 2011, 133)
Fig. 11. Top of an amber distaff from Viminacium modelled in the form of a female bust (Photo: Goran Stojić)

Сл. 10. Кошшана йреслица са нейознайоī налазишша у Панонији (йрема: Pasztókai-Szeöke 2011, 133)
Сл. 11. Врх йреслице од ћилибара из Виминацијума, моделован у виду женскоī йойрсја (фошоīрафија: Горан Сшојић)

the grave of a six-year-old girl in France has been referred to as a way of compensation for an unattained wedding.[61] It is important to stress that not a single item of spinning tools from the cemeteries of *Viminacium* comes from a grave of a subadult individual.

Judit Pasztókai-Szeöke[62] proposes an alternative explanation for the nature of the tradition in question, based on certain observations regarding finger distaffs with the depiction of a female figure nursing an infant at the top (Fig. 10). She paid attention to vertical lines rising from the navel in some of the specimens. After explaining that until the 19th century Caesarean section was actually performed in this manner, she suggests that an unknown deity, the protector of childbirth, or a woman who survived this extremely complicated procedure, was represented. Accordingly, she interprets distaffs as symbols of maternity and fertility, as well as guidelines for the bride who carries the distaff during the wedding procession, instructing her to continue the thread of the family and society itself.

Conclusion

The amber distaff from *Viminacium* is the single chronologically sensitive artefact from the inventory of the grave in question. As was already mentioned, such objects are dated from the reign of *Augustus* until the beginning of the 3rd century CE. Early dates should be ruled out because there is no archaeological confirmation of residential activities in this area from the 1st and the beginning of the 2nd century. Also, it is not likely that the distaff was in prolonged usage given the personal character of the artefact, which would not be expected to have been passed down to the next generation. An important thing to notice is that the production of amber objects in *Aquileia*, the reasonable place of provenance of the distaff, began to decline towards the end of the 2nd century.[63]

Two graves, located to the west of the burial containing the distaff, were dated by the mints of *Hadrianus* and *Antoninus Pius*. Based on all the factors, the narrowest timeframe that can be proposed is the second half of the 2nd century to the beginning of the 3rd century, which would correspond with the dating of the remaining two amber distaffs from *Viminacium*. Additional confirmation for this claim, although one that should be taken with caution, is the already mentioned possibility that the figural depiction at the top of the distaff has coiffure that resembles that of the women of imperial families in the last two decades of the 2nd century.

The miniature dimensions of the segment depicting the bust of a female (Fig. 11), as well as the damaged parts of the hair and headdress (?), do not allow us to make a definitive conclusion about the deity or the person the craftsman wanted to represent. The first

[61] Carroll 2013, 301.
[62] Pasztókai-Szeöke 2009; 2011
[63] Палавестра, Крстић 2006, 77

step would be to take into consideration the mythical characters that are known for their ties to wool spinning, *Ananke* and *Clotho*. *Ananke* was the personification of natural necessity. In her lap she keeps a diamond spindle around which the whole universe revolves.[64] Her daughter, *Chloto*, one of three *Parcae*, spins the destiny of every human being.[65] The custom of depositing distaffs inside graves was explained as part of the *Parcae* cult,[66] but this interpretation is very unlikely, given the aforementioned evidence.

A certain number of distaffs depict *Venus Pudica*, a symbol of modest femininity, but always the whole body, in a standing posture.[67] Analogies for the representation of the unidentified female bust can be found in bone specimens from *Sirmium*[68], as well as in three distaffs from Asia Minor, two of which are on display in the Afyonkarahisar Archaeological Museum[69], and the third one originating from Ephesus.[70] Elisabeth Trinkl proposed that the last mentioned specimen might represent the goddess Minerva, based on similarities with a spatula with a female bust from Gaul. In that way, two important qualities of a Roman matron would have been combined: care of the household, metaphorically illustrated by wool spinning, which was only made possible by a proper education and upbringing, which are symbolised by this particular divinity.[71]

The last explanation, and probably the most plausible is that the represented female is, in fact, an idealised representation of a Roman matron, which the owner of the distaff wanted herself to be, and which society expected of her. This interpretation makes even more sense if the coiffure of the bust really imitates that worn by women of the royal families at the turn of the 3rd century. The Empress was mother of all the citizens of the Empire, a literal embodiment of female virtue and, as such, the best role model for every woman who wanted to run a successful household.

Our lady with an amber distaff was buried less than 100 m from a villa discovered in this area, and it is safe to assume that this was the household she took care of. She had to be a member of the family of the estate owner, because there were not many people who could afford an object that precious. Even if slightly exaggerated, a passage from the work of Pliny the Elder, telling us that one small effigy made out of amber was worth more than an actual human, even one that was healthy and strong[72], is very informative when it comes to the price of this material. This is why, at first glance, the type of her grave, a plain burial, is a bit puzzling, especially when you bear in mind that most of the distaffs made out of bone, jet and amber come from sarcophagi or cists.[73] On the other hand, maybe it should not come as a surprise, and can be viewed as a continued display of feminine virtue: she was humble during her life, and remained humble, even in the afterlife.

Translated by the author

[64] Срејовић, Цермановић-Кузмановић 2004, 30

[65] Срејовић, Цермановић-Кузмановић 2004, 272

[66] Martin-Kilcher 2000, 65.

[67] Ivčević 2000; Trinkl 2005, 282-283; Kat. Nr. 1; Eckardt 2014, 142.

[68] Шарановић-Светек 1981, 156; T II, 11,12; T IV, 7

[69] Encyclopédie des petits objets archéologiques; QNL-4012; http://artefacts.mom.fr (Retrieved: 22.01.2019)

[70] Trinkl 2005, 284; Kat. Nr. 2

[71] Trinkl 2005, 302.

[72] Plin. *Nat.* XXVII.12.

[73] Gottschalk 1996, 493.r

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Plut. *Quaes. Rom.* . . . . . Lucius Mestrius Plutarchus, *Quaestiones Romanae* (Plutarch, *The Roman Questionse,* Frank Kole Babbit, Ed. – Perseus Digital Library – http://www.perseus.tufts.edu/hopper/text?doc=urn:cts:greekLit:tlg0007.tlg084a.perseus-eng1 – retrieved 30.01.2019).

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Burial of a woman with an amber distaff at *Viminacium* (215–229)

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САХРАНА ЖЕНЕ СА ПРЕСЛИЦОМ ОД ЋИЛИБАРА ИЗ ВИМИНАЦИЈУМА

Кључне речи – Виминацијум, фунерарна археологија, прибор за предење, ћилибар, студије животног тока

Приликом заштитних ископавања шире градске територије античког Виминацијума откривен је гроб жене преминуле у тридесетим годинама живота, а сахрањене са луксузним прибором за предење. Посебно се издваја преслица, начињена од ћилибарских перли нанизаних на језгро од бронзе, коју јединственом чини врх који је фигурално моделован у виду женског попрсја. Минијатурне копије алата за упредање вуне, начињене од различитих материјала, познате су са територије целог Римског царства, и махом потичу из фунерарног контекста. Вуна је за Римљане имала посебан значај, о чему говори податак да је латински назив за овај материјал – *lana* – уједно био и назив за одећу. Одора свештеника израђивана је искључиво од вуне, као и тканине употребљаване у религијским ритуалима. Предење је сматрано женским послом и од жена се очекивало да опскрбе породицу одећом. У исто време то је била активност која је обављана у оквиру домаћинства, те је у пренесеном смислу и то значило да се о њему стара жена. С временом је предење постало симбол женског рода и израз женске врлине, а особа која преде добила је метафорично значење у литератури. Материјална манифестација симболике предења јесте луксузни прибор што је полаган у гробове покојница.

Антички писани извори нас обавештавају да су невесте носиле преслицу и вретено током свадбене процесије која се кретала од њиховог девојачког дома ка кући будућег мужа. Може се претпоставити да је управо за тако битан животни догађај набављан скупоцени, ритуални прибор за предење, који би током церемоније наглашавао висок статус и богатство. Луксузне преслице, као изражено лични предмети које су жене поседовале у току живота, постајале су део гробног инвентара, што их чини веома корисним алатом са становишта студија животног тока, будући да упућују на припаднице конкретне старосне групе – удате индивидуе.

Примерак откривен у Виминацијуму може се на основу расположивих показатеља определити у период краја II и почетка III века, што одговара датовању римске виле у чијој је близини гроб откривен, тако да се покојница може довести у везу с породицом у чијем се власништву налазило то газдинство. Минијатурне димензије фигуралне представе не допуштају прецизно утврђивање божанства или особе која је приказана. У раду је изнета претпоставка да се ради о генерализованој представи римске матроне, што је био идеал коме је власница предмета тежила.

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Original research article

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SYRIAN PRIESTHOOD IN THE TERRITORY OF DANUBE LIMES OF MOESIA SUPERIOR: FUNERARY MONUMENT DEDICATED TO JUPITER DOLICHENUS AND DEA SYRIA FROM GLAMIJA

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Abstract – In 1982, during archaeological excavations in the Danube Limes, a funerary stela was found in the locality of Glamija I (in the village of Rtkovo), inside the Roman fortress, dedicated to Jupiter Dolichenus and Dea Syria. The dedicant is the priest of the divine couple. The monument from Glamija I represents one of only a few monuments dedicated to Jupiter Dolichenus and Dea Syria, particularly since the dedication is made by the priest of the gods. This paper discusses the question and role of Syrian priesthood in the territory of the Danube Limes and the Central Balkan Roman provinces, in the context of the cults of Jupiter Dolichenus and Dea Syria, along with the hypotheses regarding the possible sanctuaries of the deities, their worshippers and the period when their cults existed in the aforementioned territories.

Key words – Danube Limes, Dea Syria, Jupiter Dolichenus, priesthood, sanctuaries

During archaeological excavations in the Danube Limes locality of Glamija I (in the village of Rtkovo), in 1982, inside the late antique smaller Roman fortification (*burgum*), a limestone monument was found (Fig. 1).[1] The only preserved part of the *stela* is its middle part with an intact inscription, while the upper and the lower parts of the monument are, unfortunately, missing. Therefore, it is unknown whether the stele contained some iconographical motifs/scenes, which could additionally contribute to a better analysis and interpretation of the monument in question. The saved part of the stele is 57 cm high and 71 cm wide, the inscription field is 49 cm wide and the letters are 4.5–5.5 cm high (Fig. 2). The text of the inscription reads:

D(is) M(anibus)| in memoria(m) Iul(ii) Apollina | ris sacerdo| tis I(ovis) Dol(icheni) et | deae Syriae | - - - XXI |[2]

The monument is dedicated to the Manes (the spirit-gods, the spirits of the dead) in memory of Julius Apollinaris, the priest of the gods Jupiter Dolichenus and Dea Syria.

Unfortunately, from the text of the inscription nothing more can be said about the reason for its dedication or about the dedicant himself (his origin, profession, social status etc.). From his name *Julius Apollinaris* we can only presume his origin from the Hellenised East, which is suggested by his name Apollinaris.[3] The name

[1] The stele was used as *spolia,* in the south-western corner of the late-antique fortress' wall, Gabričević 1987, 143.

[2] At the end of the inscription, M. Gabričević reads "XXI", while M. Mirković reads the inscription without the recognition of the number XXI on the monument, Gabričević 1987, 143; Mirković 2015, 100.

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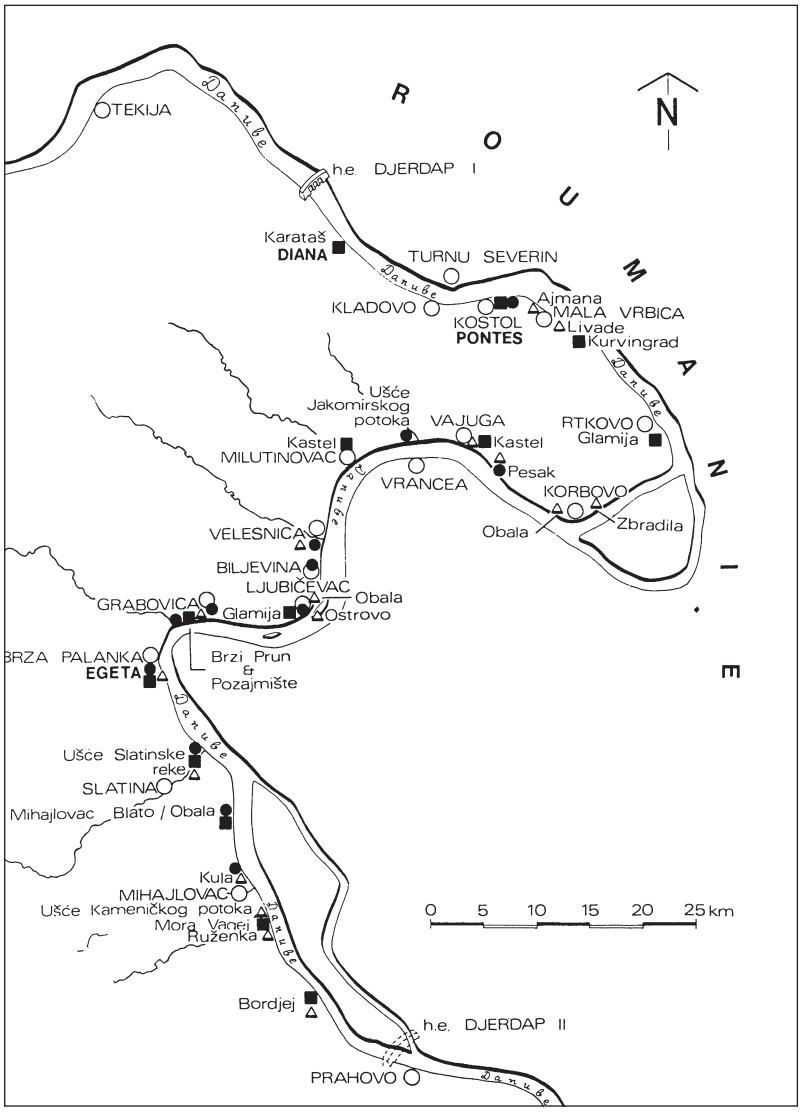

Fig. 1. Map of the localities in the Danube Limes province of Moesia Superior (Cahiers des Portes de Fer IV)

Сл. 1. Карта локалитета на дунавском лимесу провинције Горње Мезије (Ђердапске свеске IV)

Apollinaris has been confirmed on several Danube Limes localities, such as Taliata, Viminacium, Aquincum, Burgenae, Sirmium and Ritium, which is not unusual since many individuals employed in military service stationed on the Danube Limes or persons who were in civilian service, were of Greek or Eastern origin.[4] P. Merlat considered that the name *Apol(l)inaris*, known from a few monuments dedicated to Jupiter Dolichenus, was a name of Graeco–Oriental origin, while M. Speidel referred to the name *Apollinaris* as a name that worshippers of Jupiter Dolichenus "often bore in honour of Apollo".[5] The name *Apollinaris* does not appear only among the names of Dolichenus' worshippers, like is the case, for example, with two votive monuments from Rittium dedicated to the god by Marcus Aurelius Apollinaris, municipal decurion of Mursa.[6] It is often the name of the priests of the god as well. Elaborating on the important role of the priesthood in the cult of Jupiter Dollichenus, M. Speidel writes that priests were usually of oriental origin, with names like

[3] The nomen *Julius* is very common in the imperial period, while the cognomen *Appolinaris* is probably Greek by origin (there are opinions in the literature of its Latin origin as well), Tuck 2005, 46.

[4] Taliata, *IlJug* 2, 477; Viminacium, *IMS* 2, 138; Aquincum, *CIL* 3, 10498, *CIL* 16, 136; Burgenae, *CIL* 3, 10243; Sirmium, *AE* 1994, 1403; Ritium, *CIL* 3, 10243a, 10243b.

[5] P. Merlat names several forms of names derived from the name Apollo, among which is the name *Apollinaris*, Merlat 1951, 397. M. Speidel writes about the "Dolichenian Pantheon", that is of the gods who were included to the Dolichenian circle of gods. In his opinion, one of these deities was the god Apollo, who appears with Jupiter Dolichenus on the altar from the Aventine *Dolichenum* and in the relief from the temple at Corbridge, Speidel 1978, 23–24.

[6] Merlat 1951, n. 63, n. 64; Hörig, Schwertheim 1987, n. 208.

Fig. 2. Monument from Glamija I, 3rd century (Gabričević 1987, 145)

Сл. 2. Надгробни споменик са локалитета Гламија I (3. век) (Gabričević 1987, 145)

Marinus, Aquila, Barhadados and Apollinaris.[7] Besides the Glamija monument, the name *Apollinaris* as the name of Dolichenus' priest, is known from a votive monument from Narona (dedicated by two priests, Flavius Faladus and Domitius Apollinaris),[8] a bas-relief from Dolichenum in Aventine hill[9] and from a monument found in Corbridge, where the dedicant Apollinaris was a centurion of the legion VI Victrix and possibly a priest of the god's cult as well.[10]

An interesting detail, however, about the funerary stele from locality Glamija is that the dedicant, Julius Apollinaris, is not only the priest of the god Jupiter Dolichenus, but the priest of the divine couple – the god Jupiter Dolichenus and his paredra Dea Syria. The pairing of Jupiter Dolichenus with the goddess Juno Dolichena is not infrequent and is known from epigraphic dedications, as well as from statuary finds.[11] However, the pairing of Jupiter Dolichenus with Dea Syria is very rare and obviously based on a much older model of partnership, made between the Syrian god Hadad and the Syrian goddess Atargatis (Fig. 3). As it is well known, the supreme god of Doliche was, upon the Roman conquest, identified with the Roman god Jupiter, as the main Syrian goddess Atargatis was, in the period of Roman reign, known by the name of Dea Syria.[12] A local god of storms, Hadad (Zeus Hadados), is known from the Bronze Age period, through the

[7] Speidel 1978, 46.

[8] Merlat 1951, n. 55; Hörig, Schwertheim 1987, n. 124.

[9] Ibid, n. 190; Ibid, n. 371.

[10] Ibid, n. 271; Ibid, n. 565; Jolliffe 1941, 36–61; M. A. Marwood thinks that the name *Apollinaris* of the dedicant of the Corbridge monument could imply his service as a priest of Dolichenus' cult, because of the fact that serving soldiers could be at the same time in active military service and priests of the Syrian god (successfully argued previously by M. Seidel, Speidel 1978, 46 etc.), Marwood 1984, 322.

[11] *CIL* 3, 1128; *CIL* 13 7411; *CIL* 13, 11779a, b; *AE* 1956, 210; *AE* 1920, 60; *CIL* 6, 465; *CIL* 6, 367; *AE* 1940, 73; *AE* 1940, 79; *AE* 1940, *AE* 1998, 1430; Hörig, Schwertheim 1987, n. 75, n. 332, n. 337, n. 364, n. 405, n. 415, n. 416, n. 509.

[12] The name of Syrian goddess, Dea Syria is in Greek and Latin sources known in different forms – as *Συρια θεά*, *Συρια θεά, ή θεος ή Συρια, Δειασυρία, Dea Syria, Syria Dea, Dea Suria, Suria dea, Diasuria, Diasura, Dasyra*, *Iasura*, which are actually Latin forms of the name of the Syrian goddess Atargatis (*Αταργατῖς, Ατάργάθη, Αταργάτη*), Drijvers 1986, 355. The name *Συρια θεά* or Dea Syria, first appeared in the period of Hellenism, Van Berg 1972, 13. J. L. Lightfoot mentions the possibility that the name of the goddess *Atargatis* contains the notion of *Gad* (atar-gade), that it is the notion of personified Good Fortune who was (among other functions) a city goddess Tyche and as such, crowned with a *corona muralis,* which is sometimes the attribute of Dea Syria, Lightfoot 2003, 23–24. In that context, it is well known that the goddess Atargatis in Syria assumed the role of Tyche and that, for example, the Tyche of Palmyra was presented with lions, Atargatis' animals par excellence, Cumont 1926, 111. Detailed theology and ritual practices or Atargatis' cult are not well known, but according to Lucian's work from the 2nd century "De Dea Syria", the goddess had a famous

Fig. 3. Relief of Hadad and Atargatis, 2nd or 3rd century, Temple in Dura-Europos (https://artgallery.yale.edu/collections/objects/4217)

Сл. 3. Рељефна представа бога Хадада и богиње Атаргатис (2–3. век), храм Дура-Европос (https://artgallery.yale.edu/collections/objects/4217)

Iron Age up to the Roman period (early 2nd century), when his cult was syncretised with the cult of the supreme Roman deity and became the cult of the god Jupiter Dolichenus, which spread from Doliche, Hierapolis (Membij), Damascus and other near eastern localities, and through the western empire, particularly along the Rhine and Danube Limes.[13] Regarding the Syrian goddess Atargatis who was a local fertility goddess with her main sanctuary in Hieropolis,[14] during Hellenism she became identified with the Greek goddess Tyche as a tutelary deity and a protectress of urban centres. Her iconography and cultic characteristics often blended with the iconography and cult dimensions of various local Syrian goddesses, the Asia Minor goddess Kubaba, the Arab goddess Allath, the goddesses Astarte and Artemis Azzanathkona and with the Greek female deities Cybele, Hera and Aphrodite.[15] It is probable that the influence of the previously mentioned goddesses' cults and iconographic traits reflected in the image of Dea Syria as a universal goddess who was *omipotens* and *omniparens* and whose main sanctuary was in Hierapolis, where she was venerated together with the god Hadad, from where her cult was

temple in Hierapolis where she was worshipped as a fertility goddess (confirmed by fertility symbols in shape of *phalli* found near her temple). The cult of Dea Syria was associated through myth and her identification with other goddesses, with animals that are considered to be her sacred animals: fish (which was considered the goddess' sacred food, rarely eaten by her worshippers, but consumed during the ritual banquets of the goddess by her priests and initiates), doves, pigeons, lions etc., Krill 1978, 34–35.

[13] Thanks to the archaeological research conducted on Duluk Baba Tepesi, the hill in the locality of Doliche where the oldest sanctuary dedicated to the god Jupiter Dolichenus was discovered, the continuity between the cult and iconography of the ancient local god of Doliche from the early Iron Age and the god worshipped in the Roman period has been confirmed. As M. Blomer concludes, the sanctuary of the ancient local supreme god of Doliche became more popular in the Persian era and by the Roman period it was a well known cultic place in Doliche of the local Syrian storm god. With the Roman domination, iconography of the local god from Doliche was slightly adapted to the conquerer's taste and the god was identified with the supreme Roman deity Jupiter, Blömer 2015, 129–143.

[14] Although in his work "De Dea Syria", the Greek writer Lucian in describing the cult and the temple of the supreme Syrian goddess calls her "Hera", he adds that the goddess and her consort Hadad had other names given by the Syrians. The goddess he describes is actually the Semitic goddess Atargatis, who belonged to the type of Mother goddesses associated with fertility, nature, animals (*potnia theron*), rivers and life in general. She was *Κυρία*, the mistress of the people's fate and lives, but also *επήκος,* the one who carefully listens to the prayers of her devotees. Her iconography, even in the earliest phase (images from coins found in Hierapolis, dated to the late 4th and early 3rd century B. C.) was linked to the image of the Anatolian Mother of gods, Cybele, as Atargatis was also represented seating in the throne flanked by two lions (rarely sphinxes), riding on a lion or accompanied by a lion, Drijvers 1986, 355–357. Atargatis' iconography represents her dressed in a long chiton, with a veil and *modius, corona muralis* or crescent moon on her head and attributes like a tympanum, ears of corn, leaf, mirror, spindle, a scepter, a plate, a cup or a staff. Her main temple was in Hierapolis, where she was worshipped with her paredros Hadad, which is confirmed by the relief from the temple of Atargatis, Hadad and Adonis, where the divine couple is presented seated on their thrones, flanked by their cult animals – two bulls (Hadad) and two lions (Atargatis/Dea Syria). The iconography of the goddess is described in Lucian's "De Dea Syria" chapters 15 and 32, Strong 1913. Depending on a local goddess with whom Atargatis was identified, she was represented differently – with a *corona muralis* and flanked by doves, as in the relief from the temple at Dura Europos, Bilde 1990, 175, fig. 7 or as the "fish-goddess" (with two fishes above her head) as on a relief from the temple at Khirbet et-Tannur, Glueck 1937, 368–372.

[15] Hörig 1983, 1541–1546; Drijvers 1986, 355; As J. L. Lightfoot argues, comparing the iconographies and attributes of the goddess Atargatis and goddesses Tyche, Allath, Astarte and Cybele, Lightfoot 2003, 24–35.

Fig. 4. Basalt stele from Dolichenum, 1–2nd century, Duluk Baba Tepesi (Blömer 2011, T. 19, 1)

Сл. 4. Базалтна стела из долихенума (1–2. век), локалитет Дулук Баба Тепеси, Долиха (Blömer 2011, T. 19, 1)

spread through Syria, Asia Minor, Greece and finally reached Rome.[16]

As M. Blömer points out, the cult continuity between the ancient storm god Hadad from the Iron Age and Jupiter Dolichenus can be presumed an unbroken ritual practice which implies religious continuity,[17] but can the same be assumed for Juno Dolichena regarding the connection between her and the goddess Atargatis / Dea Syria (with a probable degree of influence of other local goddesses, like Kubaba)? P. Merlat and R. Turcan thought that similar to Jupiter Dolichenus, his paredra Juno Dolichena was of Syrian or Syrio-Hittite heritage – as the goddess Hebat (Hepet) associated to Teshub, Juno Dolichena was presented standing on the back of a hind, a goat, a deer, and sometimes a lioness, wearing a *calathus* or a diadem on her head, veiled, holding a sceptre, a *patera* or a mirror. A basalt stele dated to the 1st–2nd century A. D. was discovered in 2007 on the sacred area at the locality of Duluk Baba Tepesi, representing the divine couple of Doliche, analogous to the deities' representations from the Iron Age, which could imply the previously considered question (Fig. 4). Both deities are represented standing on the backs of their cult animals – the male deity stands on a bull's back, while the female deity stands on the back of a stag.[18] E. Winter concludes that the analysis of the divine couple's iconography from Doliche's stele, particularly the image of the goddess, implies that traits of the goddesses Kubaba and Atargatis / Dea Syria are incorporated in the iconography of the supreme female deity of Doliche. Additional finds from the cult space of Duluk Baba Tepesi dated to the period from 1st to the 2nd century, such as the representation from a votive altar of a goddess similar to Dea Syria or the representation of a doe on another votive altar found in the locality, also contribute to the

[16] Beside Hieropolis, other important cult centres of Dea Syria were Dura-Europos, Palmyra, Edessa, Khirbat et-Tannur, Ashkalon, Hatra, Damascus, Delos etc. The cult of Dea Syria is confirmed in Italy, Dacia, Pannonia Superior, Pannonia Inferior, Dalmatia, Moesia Superior, Moesia Inferior, Thracia and Britannia. For the cult of Dea Syria see Drijvers 1980, 76–121; Hörig 1983, 1536–1581; Morin 1960; van Berg 1972; Drijvers 1986, 355–358; Bilde 1990; Lightfoot 2003.

[17] Blömer 2015, 136.

[18] Ibid, 135–137. The damaged basalt stele was found in the sanctuary of Jupiter Dolichenus in the locality of Duluk Baba Tepesi in 2007 which was, as the found material implies, occupied in continuity from the early Iron Age to Late Antiquity. The stele dates from the Roman period and it is divided in two parts – a longer, upper part and a smaller lower part. In the upper part, a divine couple of Doliche is represented, while in the lower part a sacrificial scene is shown. In it, two priests are sacrificing around the altar, with a branch or bundle of branches in their right hands. As for the main upper scene, both the male and female deity are shown in a way as they were presented in the Iron Age period – the god has a horned cap on his head, a long pigtail and a belted kilt, holding a lightning bolt in one hand and a double axe in other hand. As M. Blömer emphasises, a particularly ancient iconographic element is represented by the horn crown of the god. The goddess is dressed in an ankle-length belted robe, with a cloak and raised hands, in which she holds a mirror and an unknown round object, perhaps a pomegranate, Blömer 2011, 69–104.

hypothesis regarding a local version of Atargatis in Doliche, who was worshipped alongside Hadad of Doliche in the Roman period and was known as Jupiter Dolichenus.[19] As M. Blömer emphasises, with the Roman domination over Doliche and the spread of the cult of Jupiter Dolichenus, over time, the iconography of the god changed and adapted to Roman taste. However, in his hometown of Doliche, the indigenous population continued to worship the god in a traditional way, keeping intact some of the local beliefs and some older iconographical traits from the Iron Age tradition.[20] A similar situation is presumed for the goddess Juno Dolichena, who was presented wearing a diadem and holding a sceptre like the goddess Juno, but sometimes holding a mirror as well, which made her more akin to the Dea Syria in the eyes of her oriental worshippers.[21] Nobody could know more about or was more attached to the ancestral religion and traditional iconography of the homeland deities, ritual practices and beliefs, than the priests of the Syrian deities, who were mostly of oriental origin and who spread the religion of their gods and goddesses all over the Roman Empire, devoted to their traditional ways.[22] After this brief but, in our opinion, important digression for the understanding of the role of Syrian priests in the Danube Limes area and the Central Balkan provinces in the Roman period, we return to the priestly dedication from the locality of Glamija.

In the territory of the Danube Limes and, more generally, the Central Balkan Roman provinces, priests of the god Jupiter Dolichenus are known from several inscriptions discovered in the localities of Karataš (*Diana*), Arčar (*Ratiaria*), Vidin and the village of Kličevac near Viminacium.[23] At all these localities, the existence of Dolichenus' sanctuaries, *dolichena,* can be presumed as well, not only by the epigraphic testimonies, but also by archaeological finds, which is not surprising since the migration of the Orientals in the Danube Limes' areas of Pannonia Inferior and Moesia Superior happened in several waves.[24] The presence of Syrian migrants, however, is attested primarily in bigger centres like Sirmium,[25] Singidunum, Viminacium (where closed communities of Syrian immigrants could have existed, *IMS* II, 213), Scupi or in the localities along the Danube Limes border. In the locality of Karataš (Diana), a votive altar dedicated to Juppiter Dolichenus was discovered in a niche, *extra muros* of a military fort (below a bridge on the Danube). The monument was erected in honour of the emperor Caracalla and his mother Julia Domna, by a certain Restutum and priests of the god, on the orders of the provincial governor L. Marius Perpetuus.[26] In the area of Arčar (Ratiaria), four votive monuments dedicated to Jupiter Dolichenus have been found, of which one monument is dedicated by two priests. The votive monument from Kličevac (Viminacium) is quite interesting, because the dedicant, the priest Aurelius Iulianus, names as his homeland *Syria Coele*, the region of *Cyrrhestica*, the village of *Capersin(?)*.[27] A votive monument dedicated by two priests of Jupiter Dolichenus was also discovered in the interior of the Central Balkan Roman provinces, in the locality of Ulpiana.[28]

The votive monument from the locality of Karataš (Diana) is particularly interesting, since it was, as was already mentioned, dedicated to Juptter Dolichenus and erected upon the orders of the provincial governor L. Marius Perpetuus, by a certain Restuum and priests of the god, *pro salute* of the emperor Caracalla and his mother Julia Domna. The monument was probably erected between 211–214. and was found in the presumed sanctuary of the god.[29]

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[19] Winter 2011, 8. However, unlike in the Atargatis–Hadad partnership in the temple of Hierapolis, where the goddess was dominant and the god was subordinated, in the partnership of Jupiter Dolichenus and Juno Dolichena, the god is the central figure, while the goddess is merely occasionally his companion.

[20] Blömer 2015, 139.

[21] Turcan 1996, 161.

[22] As was already mentioned, votive inscriptions confirm that priests of Jupiter Dolichenus could have been at the same time in active military service or veterans or in some other profession, like for example, a civilian priest who was a wine-merchant, Speidel 1978, 47–50.

[23] Mirković 1977, 443–448; Hörig, Schwertheim 1987, 71, n. 87, 82, n. 104, 85, n. 112; Gavrilović 2010, n. 86, n. 89, n. 97, n. 100; Mirković 2011, 129–130.

[24] As I. Popović elaborates, the migration of the Orientals happened: after Trajan's Dacian wars, then during the 2nd century (particularly during the period of the Severan dynasty) and finally at the end of the 3rd century and the beginning of the 4th century, Popović 1993, 75–76;

[25] A certain Stygius named on the stone slab from the bank of the River Sava in Sremska Mitrovica is mentioned on it as the one who was born in Syria, while the monument of a certain Aurelius names him as *civis Syrus,* Popović 2005, 102.

[26] Mirković 1977, 443–448; Mirković 2011, 126.

[27] Gavrilović 2010, 156–157, 164.

[28] Вулић 1931, n. 510; Gavrilović 2010, 300, n. 97.

[29] The votive monument was found in the area of the presumed sanctuary of Jupiter Dolichenus, in the locality of Karataš (Diana). M. Mirković suggests that since the name of Geta is not mentioned beside the names of his mother and brother, Julia Domna and Caracalla on the monument from Karataš (Diana), the votive monument could have been erected in 214, on the occasion of Caracalla's visit to the Roman fortress in Diana, Mirković 1977, 443–448.

In the case of the goddess Dea Syria, however, there are no epigraphic monuments dedicated to the deity found in the Danube Limes area of the former Roman province of Moesia Superior – the closest geographical analogy are two votive monuments from the locality of Dolno Nerezi (*Scupi*), dedicated to the main goddess of Syria.[30] The first monument is interesting, because its dedicant, who was the city decurion, honoured the goddess by building her a temple. Unfortunately, the remains of the Dea Syria's sanctuary haven't been yet archaeologically confirmed in the area of Scupi. However, priests of the goddess are known also from the neighbouring province of Dacia, from the locality of Porolissum, where the *sacerdos* Aurelius Gaianus (also a city decurion) dedicated a votive altar to the goddess in the first decades of the 3rd century.[31] On a votive plaque discovered in the locality of Napoca and dated to 214, we again encounter the name of the provincial governor L. Marius Perpetuus, known by his dedication to Jupiter Dolichenus found in the Danube Limes locality of Karataš (Diana), as the dedicant of a Dea Syria's monument, where it is implied that the temple of the goddess was erected by two brothers.[32] With this dedication, it is clear that the provincial governor L. Marius Perpetuus paid considerable attention to the supreme deities of the Syrian pantheon, which is not surprising bearing in mind the fact that he governed in the period of the reign of the Severan emperors, Septimius Severus and Caracalla.[33]

As was already mentioned, what makes the monument from Glamija rare is the fact that it is dedicated by a priest of the Syrian deities – Jupiter Dolichenus and Dea Syria. As far as we know there are only two more votive inscriptions dedicated to the divine couple Jupiter Dolichenus and Dea Syria – one from the locality of Apulum (Alba Iulia) and one from Rome.[34] Therefore, the inscription from the locality of Glamija would be the third known priestly dedication to the supreme Syrian god and goddess in the whole territory of the Roman Empire. However, the two inscriptions discovered in Apulum and Rome present analogies only in the context of the dedications that are made to the deities, because the inscription from Apulum is dedicated to Dea Syria, identified with the goddess Caelestis, while the monument from Rome is dedicated to *Juno Asyria*. The identification of Dea Syria with the goddess Caelestis on the votive monument from Apulum is not surprising, since the two goddesses shared the same position as supreme deities (one of Syria and the other of Carthage), iconography and the same paredros – Baal.[35] In the context of the iconography, as with Dea Syria and Magna Mater, the goddess Caelestis was presented with lions, frequently riding side-saddle on a lion's back and, like the Syrian goddess and Anatolian Mother, she also had similar clergy, a ceremony similar in nature to the Magna Mater's spring celebrations and

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[30] *IMS* VI 1982, n. 15, 16 and 17, but n. 17 is disputable, because the inscription is in too fragmentary a state and B. Dragojević-Josifovska presumed that the monument is dedicated to the goddess Dea Syria with the epithet *Sanctissima,* which would make the dedication from Scupi a unique one, since it would be the only monument in the whole territory of the Roman empire where a goddess is referred to by the epithet *Sanctissima*. The first monument (n. 15) found in the locality of Dolno Nerezi is actually a marble plate in the form of a *tabula ansata* and it is dedicated by a decurion and a duovir of the *colonia Scupi*, who built a temple to the goddess Dea Syria. The second monument (n.16) was found near the place where the first monument dedicated to the goddess was discovered and it is dedicated to Dea Syria by a certain Aurelius. Unfortunately, both monuments have disappeared.

[31] *AE* 1977, 662.

[32] *AE* 1960, 226. The votive monument from Napoca was probably dedicated in 214, by L. Marius Perpetuus who was at the time the governor of the province *tres Daciae,* where he went immediately after his governorship in Moesia Superior, Mirković 1977, 443–448.

[33] During the reign of the African born emperor Septimius Severus and his sons, Oriental cults came more into the focus, but not at the expense of the traditional Roman gods. However, being of Syrian origin,from Emessa and as a daughter of the priest of Elagabal, Septimius Severus' wife Julia Domna was inclined towards the traditional gods of her homeland, which can be confirmed by her affinity towards Dea Syria and the goddess of Carthage, Dea Caelestis. A visible orientalisation can be seen in some of the presentations of Julia Domna, like in the Arch of the Argentarii in the Forum Boarium, where she is presented sacrificing in a similar way to that shown in a monument from Dura Europus, and her right hand is raised palm forwards, like in the statue of a young woman of the royal dynasty of Hatra, Levick 2007, 22, 134–136; Birley 2002, 72–73. Prior to the Severan dynasty, as Suetonius confirms, emperor Nero was inclined towards the cult of Dea Syria, but soon developed contempt towards her as he despised other deities as well, Suetonius VI.56.

[34] The votive inscription found in the locality of Apulum reads thus: *I(ovi) O(ptimo) M(axiom) D(olicheno) et deae |S< y =U> riae Magnae | Caelesti pro salu|te perpetui imperi(i) | Romani et leg(ionis) XIII | Gem(inae) Flavius Bar|hadadi s(acerdos) I(ovis) D(olicheni) ad | leg(ionem) S(upra) s(criptam) v(oto) l(ibens) m(erito), AE* 1965, 30a; The votive inscription from Rome read thus: *Iovi Opt <i =U> mo Max(imo | Dolicheno | sacrum | L(ucius) Fabirius L(uci) (ibertus) Philoti|mus v(otum) s(olvit) l(ibens) m(erito)|| Iunoni Assy|riae Reg(inae) Dolichenae, CIL* 6, 465.

[35] The goddess Caelestis or, in the Roman period *Dea Caelestis*, is the supreme female deity of the city of Carthage, known as Tanit (Tinnit). Greeks assimilated her with the goddess Aphrodite and she was known as Aphrodite Ourania, during the Roman reign of Venus Caelestis or Virgo Caelestis, Halsberghe 1984, 2203–2208.

ritus of *taurobolium*.[36] The cult of Dea Caelestis is confirmed in Rome at the end of the 1st century and like Dea Syria, the goddess was identified with the Roman goddess Juno, becoming more popular during the reign of Septimius Severus, due to the already mentioned affinity of the empress Julia Domna towards the goddess' cult.[37] As for the votive inscription from Apulum, it is dedicated by the priest Flavius Barhadadi,[38] who was of Syrian origin and paid respect to the deities of his homeland, probably at the end of the 2nd or the beginning of the 3rd century, maybe even in the period of Caracalla's visit to Dacia.[39] The second analogy to our monument, the bronze tablet from Rome, is somewhat disputable by certain authors, but nevertheless it represents a very interesting cult monument, because next to the dedication of the *libertus* Lucius Fabirius to Jupiter Dolichenus and Juno Assyria Regina, there is a scene of the divine couple standing on their cult animals and holding in their hands different attributes.[40] What makes this monument unique among Dolichenus' epigraphic monuments so far, are the epithets of the goddess "*Assyria*" and "*Dolichena*" used together,[41] but, as M. Hörig and E. Schwertheim rightly point out, referring to the goddess as "Assyria" and not "Syria" should not be surprising, since the terms "Assyria" and "Assyrians" were used by the ancient writers Lucian (who calls Dea Syria "Hera Assyria") and Herodotus (who uses the term "Assyrians", a barbaric name for Greek Syrians).[42] Although the bronze tablet from Rome, if its authenticity is accepted, is not dedicated by a priest of the divine couple but by a *libertus*, his most probable Semitic origin (judging by his name *Philotimus*) and conservative way of addressing his *dii patria,* are clear. The same can be assumed for other known dedications to Jupiter Dolichenus or to the divine couple of Syrian deities, where the name of the dedicant and the way that he addresses Jupiter Dolichenus or him and his paredra, implies the conservative attitude of the dedicant, in the context of his loyalty to the gods of his homeland, his respect to the tradition and his keeping the memory of *dii patrii*, intact.

Returning to the monument from Glamija and the question of the presence and role of the Syrian priesthood in the area of the Danube Limes and the Central Balkan Roman provinces, it is necessary to discuss all known priests of Jupiter Dolichenus' or Dea Syria's cult, in the aforementioned territory. On four monuments dedicated to the god Jupiter Dolichenus, the dedicants are his priests[43] and three of the localities where those monuments were found, represented the areas of Roman

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[36] Lightfoot 2003, 21; Halsberghe 1972, 91–94;

[37] The goddess Caelestis, worshipped in Carthage beside the god Baal-Hammon, later Saturn, was venerated as the celestial deity, goddess of fertility and animals, and as the personification and deification of the natural forces and mother of all things on earth and in the heavens. Besides the goddesses Iuno and Venus, she was identified with the goddesses Ceres, Luna, Urania, Fortuna and Magna Mater, Halsberghe 1984, 2203–2209; Halsberghe 1972, 94. Dea Caelestis was worshipped under the epithets sancta, sanctissima, aeterna, domina etc. As for the connection between the empress Julia Domna and Dea Caelestis see Levick 2007, 133–136.

[38] The name Barhadadi is of Semitic origin and means "the son of Hadad" (from other inscriptions dedicated to Jupiter Dolichenus, similar names such as Barsemon, Barsemes, Barlaha, Barsemias, Barhadados etc., are known), Merlat 1960, 15; Berciu, Popa 1978, 4–7, n. 3.

[39] Berciu, Popa 1978, 6. As A Collar suggests, Apulum was one of the earliest centres of Dolichenus' cult in the Danubian provinces, Collar 2013, 101–102, 111, 125. C. Szabo writes that during the period of Septimius Severus' reign, several groups from Asia Minor and Syria came to Apulum and, at the end of the 2nd century, formed a new layer of settlers in the centre of the gold-mining district. Many Syrians are attested in votive and funerary monuments of Apulum, among them adepts of Dolichenus' cult, who were soldiers from the legio XIII Gemina and who were probably connected to the *Dolichenum* (one of two existing in Apulum) built near the *castrum* of the legio XIII Geminaand *mithraeum* in the southern part of the city with other sanctuaries of oriental deities. The text of Dolichenus' monument from Apulum implies that the group of Dolichenus worshippers, in which Flavius Barhadadi was a priest, consisted of Syrian soldiers and veterans of the Legion XIII Gemina, Szabo 2018, 66–67, 162–163.

[40] Authors like A. H. Kan disputed the authenticity of the bronze tablet because of the attributes in the deities' hands and the way they are presented with them: Juno Dolichena is holding a scepter and a discoid object (maybe a mirror) in her hands, while Jupiter Dolichenus is holding a double axe in his left hand and a sceptre in his right hand, which is not the usual way of presenting the deities. However, P. Merlat does not exclude the monument from his corpus of Dolichenus monuments, nor do M. Hörig and E. Schwertheim, Merlat 1951, 244–245, n. 244; Hörig, Schwertheim 1987, n. 430.

[41] As N. Belayche points out, there was a need by freedman Philotimus to emphasise his devotion and loyalty to the goddess Dea Syria with two epicleses by origin ("Assyria", "Dolichena") and one theological epiclesis "Regina" which is mutual to both goddesses, Belayche 2006, 247. Unlike the epithets "Assyria" and "Dolichena" in the bronze tablet from Rome, the epithet "Regina" is frequently used as the epithet of the goddess Juno in the monuments of Jupiter Dolichenus, as is also the case with the epithet "Sancta", *AE* 1920, 60; *AE* 1939, 274; *AE* 1998, 1430; *CIL* 6, 365; *CIL* 13, 7411; *CIL* 13, 11779; Merlat 1951, 328, n. 338; Hörig, Schwertheim 1987, n. 65.

[42] Ibid; Lightfoot 2003, 287–288.

[43] The first monument was found at the Roman *castellum* of the locality of Ratiaria and the dedicants are two priests by the names of Pecta and Flavius Guga who are, perhaps, indigenous inhabitants. The second monument in the form of a *tabula ansata*, was found in the Roman *castellum* near Vidin and was dedicated by Aurelius Bassus (possibly of Thracian or Semitic origin), who declares his loyalty to Juppiter Dolichenus, by declaring that he is

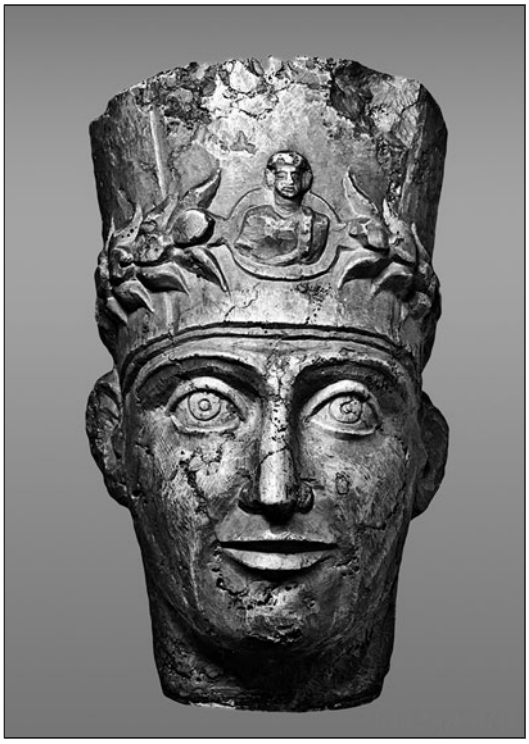

Fig. 5. Bust of priest from Palmyra, 2nd century, Singidunum (https://www.pinterest.com/pin/557742735082112294/?lp=true)
Fig. 6. Relief of Jupiter Dolichenus (a priest is presented under the divine couple), Dolichenum*, Aventine, Rome (Blömer 2011, T. 23, 3)*

Сл. 5. Биста свештеника из Палмире (2. век), Синīидунум (Фоīо-докумениација Народноī музеја Беоīрад)
Сл. 6. Рељефна иредсīава Јуīиīера Долихена (свешīеник је ириказан исīод божанскоī иара), долихенум, Авенīин, Рим (Blömer 2011, T. 23, 3)

castra, that is *castella*. This fact raises a question – were the priests of Jupiter Dolichenus maybe at the same time in military service? The priests of Jupiter Dolichenus who were in active or passive military service are already confirmed elsewhere, like in the case of Marcus Ulpius Chresimus who was a cavalry man and whose name is known from the marble relief dedication discovered in Rome, or Ulpius Amandianus, a soldier from the votive monument found in Carnuntum.[44] Also, since the remains of two (possibly three) *Dolichena* in the Danube Limes area of Moesia Superior[45] were discovered in close connection with the Roman *castra*, the presence of Dolichenus' priests there, would be expected.

However, no claim about their certain Syrian origin can be made, as nothing more can be presumed about their appearance, which could easily differ from other Dolichenus worshippers by the headdress and clothes priests wore (like in the example of two sculptures of Palmyrian priests from Singidunum, Fig. 5),[46]

"servius eius". The third monument is from the locality of Karataš Diana (already mentioned in the paper) and it is dedicated by Dolichenus' priests and a certain Restuum on the orders of the provincial governor L. Marius Perpetuus. The fourth monument was found in the Kličevac area (near Viminacium), where remains of the road which led from Viminacium to Lederata and further on to the Iron Gate limes were found, with different archaeological material (architectural plastics, coinage, fragmented sculptures etc., Gavrilović 2010, 157–164; Mirković 1986, 22, 49, 56.

[44] Merlat 1951, n. 239, n. 108; Hörig, Schwertheim 1987, n. 419, n. 232; Speidel 1978, n. 25, n. 26, 47–48.

[45] The localities Karataš (Diana), Brza Palanka (Egeta) and possibly Čezava.

[46] Popović 1993, 71–76; Gavrilović Vitas in press 2019.

or it could not differ at all (like with the priest Themes who is presented as a soldier on the fresco in the temple of the Palmyrian gods in Dura-Europos, Fig. 7).[47] There are no written or archaeological testimonies regarding the ritual practices of Syrian priests in the localities along the Danube Limes of Moesia Superior or the territory of the Central Balkan Roman provinces, so it can only be presumed that they were similar to the rituals held in honour of both deities, in other parts of the Roman Empire.[48]

In that context, but regarding the fact that the monument from Glamija was found in the area of a Roman fortification, we would presume that Julius Apollinaris paid his respect to Jupiter Dolichenus and Dea Syria in their *omnipotens* capacity, as to the gods who protect and shield their worshippers from all harm and ensure their victory on the battlefield.[49] In the fortification on the Danube border, where the majority of worshippers of the Syrian divine couple were soldiers whose lives were constantly in danger, it is probable that Jupiter Dolichenus and Dea Syria were venerated in the mentioned way. Another argument for the proposed hypothesis would be that, in the case of Dea Syria, unlike other Syrian goddesses whose cults are also known in the area of the Danubian limes (for example, the goddess Balti(s) whose cult is confirmed in several localities in Pannonia Inferior),[50] she represented a homeland deity to Syrian' worshippers and, as an *omnipotens* goddess, she was regarded as a protectress in the most general sense of the word.

Finishing our discussion, we are, however, left with one dilemma regarding the context of the place where the monument was found, the locality of Glamija.[51] The locality, the full name of which is Rtkovo–Glamija I, is situated near the village of Rtkovo, on a natural hill, which made an excellent location for the building of the oldest fortification, which was primarily a watchtower.[52] The antique remains of the Glamija fortifications were first mentioned by Marsigli and later by F. Kanitz and other researchers. The first archaeological excavations in the locality were carried out from 1980 to 1982 and confirmed the older, smaller fortification of a square foundation (burgum), surrounded by a later, larger, outer fortification (castellum), built for stationing auxiliary troops in the 6th century. The analysis of the archaeological material (fibulae, lamps, glass ware, etc.) and coinage from the older fortification confirmed two building phases – the first building phase was determined by the coins of Valentinian I, Theodosius I, Honorius and Arcadius and belongs to the 4th century, while the second, later building phase was determined

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47 T. Kaizer assumes that the priest *Themis*, who was presented on the fresco of the sacrifice by Julius Terentius from the north wall of the *pronaos* of the temple of the Palmyrene gods in Dura-Europos, was at the same time a *sacerdos* and a member of the imperial army, Kaizer 2006, 151–159; About the appearance of Syrian priests see Stuckey 1976, 127–140; Drijvers 1980, 49.

48 Similarities in ritual practices in the cults of Jupiter Dolichenus and Dea Syria allow us to presume that the priest who led ritual processions was also at the top of the hierarchy of the religious community of the *cultores* of the gods (the so-called brothers, *fraters*), who were joined together in ritual practices and liturgical banquets, celebrated in honour of the gods. Besides the main sacrifice, which constituted a sacral animal offered to the deity /deities, the ritual of sacrifice included fire sacrifices (pouring incense and wine on a fire lit on the altar). After the animal sacrifice, a liturgical banquet took place, in which the right shank of the animal (in the case of Dea Syria fish, dove and pork were forbidden for consuming, but meat of bull, goat and lamb was acceptable, as in the cult of Jupiter Dolichenus) was set aside for the god, some part of the carcass was reserved for the priest, while the *extra* (the best parts of the animal, like the liver, heart etc.) was boiled or grilled and eaten by the god's worshippers, thus symbolising their absorption of the divine essence, Pöllath, Peters 2011, 50–57; Ekroth 2016, 329. As for the atmosphere in which ritual practices were conducted, we cannot lean on Lucian's description of the quite barbaric and luxurious rituals of Dea Syria's cult in Hierapolis. Rituals held in the goddess' honour in other parts of the Roman empire were probably without much pomp and noise and consisted of the purification ritual and the mentioned sacrifices by the priests, perhaps (as in the cult of Jupiter Dolichenus) the idol of the goddess was carried in a litter around her sanctuary, Morin 1960, 118–121; Turcan 1996, 164. The previously written is, of course, only a hypothetical reconstruction of the rituals that were held in honour of the Syrian deities in the Danube Limes area of Moesia Superior, because we agree with P. Merlat's observations that the cult practice depended on the particular local characteristics in certain Roman provinces and that the rites and cult practices differed from province to province. Also, differences possibly existed between cult rituals conducted in sanctuaries in military centres and those held in sanctuaries in civil centres, Merlat 1960, 205.

49 The attribution of responsibility for "heaven and earth" to Hadad and Atargatis by Macrobius is well known, Macrobius I, XXIII, 20. However, here we are referring to Dea Syria's dimension of the protectress of the soldiers' lives, not only during their service and on the battlefield, but also in their journey to the death. As I. Skupinska-Lovset argues, it is very possible that the believers of the goddess would turn "to her for protection while passing the barrier of death", Skupinska-Lovset 2005, 382.

50 The goddess Balti(s), whose name is translated as "my lady", is mentioned on several dedications from Danubian Limes' localities, on monuments from Aquincum, even together with the goddess Dea Syria, *AE* 1982, 803; *CIL* 3, 10393. On the monument from Alba Julia, the goddess Balti(s) is mentioned together with Caelestis which, bearing in mind the close connection between Dea Syria and Dea Caelestis, again confirms a link between not only those two deities but a certain closeness between all three goddesses. Balti(s) was the goddess who was worshipped as the goddess of love and fertility in North Mesopotamia, under different names such as al-Uzza, Aphrodite, the Star etc., Drijvers 1980, 184–185.

51 I would like to express my deep gratitude to Dr Miloje Vasić for the fruitful conversation and discussion with him, reagarding

Fig. 7. Priest Themes (behind Julius Terentius who is sacrificing), fresco of Julius Terentius sacrificing, 239 A.D., Temple in Dura-Europos (https://artgallery.yale.edu/collections/objects/4961)

Сл. 7. Свештеник Темес (иза Јулија Теренција који жртвује), представа жртвовања Јулија Теренција (фреско-сликарство, 239. година), храм Дура-Европос (https://artgallery.yale.edu/collections/objects/4961)

by the coins of Anastasius I and Justin I and dates at the beginning of the 6th century. The first phase of the older fortification ended with its destruction, which happened at the beginning of the 5th century and the fortification was then partly restored during the reign of Anastasius I. As for the later, larger fortification, it represented a characteristically early Byzantine fortification dated to the 6th century. It was partly excavated (north-western, south-western and north-eastern towers, as parts of the walls on the northern, western and southern side of the fortification) and it was probably never finished (this assumption is made because of the absence of building rubble and archaeological material).[53]

Archaeological material has confirmed, besides a military presence, the presence of civilians and women in the smaller fortress of the first phase to which the funerary monument would chronologically belong.[54]

the possibility of Glamija's monument being brought from some other Danube Limes locality and for his kind remarks about the possible locations.

[52] Gabričević 1986, 71–74; Špehar 2010, 22–23.

[53] Ibid.

[54] Besides lamps, *fibulae*, different kinds of weapons and military equipment, archaeological material from the older phase of Glamija's fortification included: fragmented earrings, bracelets, pins and whorls, which confirm the presence of women inside the fortification in the late antique period, Gabričević 1986, 72. The involvement of women in the cult of Jupiter Dolichenus is usually connected to their position in the family, they appear within the family structure, as A. Collar remarks, and are rarely dedicants to the god, judging by the thus far known dedications from Mauer-an-der-Url, Trieste, Belgia and Britannia, Collar 2011, 242. As for the cult of the goddess Atargatis / Dea Syria, women were active participants in the rituals and banquets honouring the goddess, but again within their communities and families, never leading the cult processions or sacrificing to the goddess, Finlayson 2013, 61–86.

It is well known from other Roman provinces that women, were also among the worshippers of both Syrian cults. However, what puzzles us, beside the fact that traces of no sanctuary have been detected by the archaeological excavations in Glamija, is that the monument dedicated to Jupiter Dolichenus and Dea Syria was used as *spolia* in the wall of the older fortification at the site and that the locality itself is not such a prominent Limes locality where a larger group of worshippers or some closed group of devotees of Syrian gods would be expected.[55] There is also the question of the dating of the monument from Glamija: the older phase of the fortification which was primarily used as a watchtower is dated to the 4th century, which is, in our opinion, a late period for the date of erecting a monument to Jupiter Dolichenus and Dea Syria in the Danube Limes part of Moesia Superior, bearing in mind the fact that the latest Dolichenus monument from this area, a *tabula ansata* dedicated to the god from the locality of Brza Palanka (Egeta), is dated to the middle of the 3rd century.[56] In that context, our opinion tends towards the possibility that the monument was actually erected in some other locality where Syrians were present, where cult of Iuppiter Dolichenus or cult of Dea Syria or both cults were confirmed and from where in some moment, the monument was transferred and used as building material for the fortification at Glamija.[57] Further developing such a hypothesis, the locality which could be the primary place of the erection of the monument of Julius Apollinaris, would be the locality of Drobeta, the site where the cult of Jupiter Dolichenus is well confirmed epigraphically and archaeologically and from where transportation by river would be easy.[58] The possibility of Drobeta being the original site from where the monument dedicated to Jupiter Dolichenus and Dea Syria was transferred to Glamija could be strengthened by the fact that a similar dedication to Jupiter Dolichenus, erected by three *sacerdotes militares* probably during the reign of Septimius Severus and / or Caracalla, was found in Drobeta.[59] Also, the period of the reign of the Severan dynasty seems more fitting for the dedication of the Glamija monument by a priest of the Jupiter Dolichenus and Dea Syria cults, to whom the emperor Septimius and his spouse Julia Domna were inclined to, than the period of the 4th century, when the older fortification in Glamija is dated.

The second locality which could also be a place from where the monument might have been transported is the locality of Karataš (Diana), which is already mentioned as a cult site of Jupiter Dolichenus, where a sanctuary with *sacerdotes eiusdem loci* existed.[60] However, with the current level of research, the previously mentioned opinion remains in the domain of a hypothesis.

Conclusion

The funerary monument from Glamija, dedicated by the priest of two supreme deities of Syrian provenience in the Roman period, Jupiter Dolichenus and Dea Syria, is of great importance since it represents only the third thus far known dedication made to the divine couple by the mentioned names in the whole Roman Empire. Although the cult of Dea Syria in the Danubian provinces has been differently interpreted in the literature in the context that some authors thought that the goddess' worshippers simply reproduced the cult as it was in their homeland without any alterations[61] and some authors thought that the followers of Dea Syria's cult adapted to a foreign environment so that her cult became more universal and therefore more accepted by Orientals and non-Orientals alike,[62] we are of the opinion that in the particular case of the monument from Glamija, neither attitude can be applied.

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[55] Gavrilović 2010, 298–299.

[56] Ibid. We should also emphasise the importance of the formula *DM* on the funerary stela from Glamija, as a possible chronology marker, because it is the abbreviation of the formula *Dis Manibus*, which began to regularly appear in Roman epitaphs from the 2nd century, Noy 2009, 423.

[57] In this context, we will mention an interesting analogy in the funerary monument from Salona of Aurelius Germanus Barlaha, who was sacerdos of Jupiter Dolichenus and who erected the monument for himself and his Syrian wife, *CIL* 3, 8785. It confirms not only the existence of Syrian migrants in Salona and the worship of Syrian deities in the city, but also perhaps a religious mission of Dolichenus priests in Salona with the goal of spreading the cult of the god and thus gaining more and more worshipers of his cult.

[58] A votive monument dedicated to Jupiter Dolichenus by three sacerdotes of the cohors I Sagittariorum, was found in the area of the Roman *castrum* in Drobeta and may be connected to the existence of a god's sanctuary. All three priests belonged to the cohors I Sagittaria, which was stationed at Drobeta in the first part of the 3rd century, *AE* 2006, 1125; C. Petolescu discusses the possibility of the existence of a *dolichenum* at Drobeta, Petolescu 2004, 44; Ţentea 2012, 62.

[59] Besides the votive monument dedicated by three priests to Jupiter Dolichenus, a marble head (30 cm) of Jupiter Dolichenus was found inside the Roman *castrum* at Drobeta, belonging to a full size sculpture of the deity and representing a rare find in Dacia in connection with the god's cult, for more details see Popa, Berciu 1978, 22–23, n. 20.

[60] Mirković 2015, 92–93, n. 39.

[61] Drijvers 1980, 186.

[62] Lightfoot 2003, 81.

The monument of Julius Apollinaris represents an important testimony by the priest, therefore a person who is or should be very well acquainted with the theology and rituals of the cults of both deities – Jupiter Dolichenus and Dea Syria. The priest would not casually use the name "Dea Syria" for the goddess in the context of thinking of her as just the consort of the god Jupiter Dolichenus – in that case he would, of course, name her Juno Dolichena. Therefore, we think that Julius Apollinaris, who was most probably of Syrian origin, possessed enough education and knowledge to be aware of the religious continuity between the ancestral deities of Doliche, Hadad and Atargatis, who, in the period of Roman domination, become syncretised with the supreme Roman god and goddess Jupiter and Juno and whose iconographies were adapted, to a degree, to Roman taste, but still held the same values and meaning (along with particular iconographical oriental details) that they had in their homeland for their Syrian worshippers.

When analysing the possibility of the existence of a religious community of Syrian deities in a small locality such as Glamija, where the monument dedicated to Jupiter Dolichenus and Dea Syria was found used as *spolia* and where no other oriental cult was confirmed, and the possibility of the monument being transported at some time from some other locality where a religious community of Syrian deities existed in continuity, such as, for example, Drobeta, we are ,at this moment, more inclined to the latter suggestion.

As a priest, Julius Apollinaris was certainly religiously motivated and eager to spread the cults of the deities of his homeland in a foreign environment. By partnering Jupiter Dolichenus, a very popular military deity, with the Syrian supreme goddess Dea Syria who was Romanised enough to be acceptable to non-Orientals as well, he left undoubted testimony to the existence and cult practice of the two main Syrian deities in the area of the Danube Limes' Roman province of Moesia Superior.

Tranlated by the author

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Резиме: НАДЕЖДА ГАВРИЛОВИЋ ВИТАС, Археолошки институт, Београд

СИРИЈСКО СВЕШТЕНСТВО НА ТЕРИТОРИЈИ ДУНАВСКОГ ЛИМЕСА МЕЗИЈЕ СУПЕРИОР: НАДГРОБНИ СПОМЕНИК ЈУПИТЕРА ДОЛИХЕНА И ДЕА СИРИЈЕ ИЗ ГЛАМИЈЕ I

Кључне речи – Дунавски лимес, Деа Сирија, Јупитер Долихен, свештенство, светилишта

Током археолошких ископавања на локалитету Гламија – Ртково 1982. године пронађен је у југозападном углу зида римске фортификације, као сполија, вотивни споменик посвећен божанствима Јупитеру Долихену и Деа Сирији. Дедикант споменика је извесни Јулијус Аполинарис, свештеник култа божанског пара, чије име *Апо̄линарис* имплицира његово оријентално порекло, али представља и често име поштовалаца култа Јупитера Долихена, вероватно изведено из имена бога Аполона који је и епиграфски и скулптурално потврђен као члан Долихенове божанске заједнице.

Посвете Јупитеру Долихену и Деа Сирији изузетно су ретке. Осим споменика из Гламије, позната су још само два споменика са територије целог Римског царства на којима се изражава пошта божанском пару. Први споменик је пронађен у Апулуму и посвећен је Јупитеру Долихену и сиријској богињи, уз чије име стоји и име картагинске врховне богиње Целестис, што не чуди ако се има у виду да су те две богиње често биле изједначаване услед истоветних иконографских и култних карактеристика. Други споменик потиче из Рима и посвећен је Јупитеру Долихену и Јунони Долихени асиријској, где епитет „асиријска" заправо представља архаичан термин истога значења као „сиријска".

Удруживање Јупитера Долихена са Деа Сиријом засновано је заправо на старијем моделу божанског пара локалног бога Долихе, Хадада и сиријске богиње Атаргатис, чији се култни центар налазио у Хијераполису. Откриће вотивне стеле са представом пара најзначајнијих сиријских божанстава у светилишту бога Јупитера Долихена, на локалитету Дулук Баба Тепеси у Долихи 2007. године, довело је до сазнања о непрекидном култном континуитету божанстава од периода гвозденог доба па све до периода римске доминације. Тада локални бог Долихе бива синкретизован са врховним римским богом Јупитером у обличју Јупитера Долихена, а локална богиња Долихе, сродна богињи Атаргатис, бива поистовећена са врховном римском богињом Јуноном у лику Јуноне Долихене.

Будући да је споменик из Гламије посветио свештеник култова Јупитера Долихена и Деа Сирије, отвара се питање о присуству и улози сиријског свештенства на простору дунавског лимеса провинције Горње Мезије и римских провинција централног Балкана. За разлику од култа Деа Сирије, који је потврђен још само на територији Скупа, дедикације Јупитеру Долихену познате су од стране још неколико свештеника, и то са локалитета као што су Арчар (Ratiaria), Видин, Кличевац поред Виминацијума (Viminacium) и Карабаш (Diana). Поред војске, трговаца, робова и ослобођеника који су представљали главне носиоце оријенталних култова, сиријски свештеници су свакако били присутни у центрима где су култови сиријских божанстава потврђени и где су постојали њихови војни и цивилни поштоваоци, а који су били активни учесници у свечаним процесијама и ритуалним банкетима одржаваним у част божанстава.

Чињеница да је споменик из Гламије посветио свештеник који је био изузетан зналац теологије и ритуалних радњи божанстава у чију част се и подиже споменик, као и то да га посвећује богињи Деа Сирији, а не Јунони Долихени, паредри Јупитера Долихена, јасно имплицира не само његово оријентално порекло већ и конзервативност и привржености традицији и обичајима отаџбине божанског пара. Откриће споменика унутар римске фортификације на локалитету Ртково – Гламија такође упућује на могућност да је свештеник Јулијус Аполинарис истовремено био у активној војној служби или да је пак био можда ветеран, што није био редак случај широм Римског царства, као што потврђују натписи са споменика Јупитера Долихена из Рима, Карнунтума итд.

С обзиром на то да је на локалитету Ртково – Гламија подигнуто мање утврђење, у којем нису потврђени други култови нити светилиште једног божанства, као и да је вотивни споменик Јупитера Долихена и Деа Сирије пронађен као сполија у зиду старијег утврђења из 4. века, поставља се питање о могућности преношења споменика с неког другог оближњег локалитета на коме су култови сиријских божанстава били познати. У том случају би као претпостављени локалитети одакле је споменик могао бити пренесен дошли у обзир најпре Дробета и Карабаш (Diana), где је потврђен не само култ сиријских божанстава већ и постојање светилишта са свештеницима који су бринули о свечаностима и ритуалним радњама извођеним у част Деа Сирије и Јупитера Долихена, чија популарност доживљава врхунац у периоду владавине династије Севера, да би већ током друге половине 3. века споменици посвећени божанствима постали ретки. Ипак за сада, у светлу тренутних сазнања, могућност преношења споменика Јулијуса Аполинариса са неког другог оближњег локалитета на локалитет Гламија остаје само у домену претпоставке.

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BUILDING WITH OCTAGON FROM THE LOCALITY OF „GRADSKO POLJE" IN NIŠ (*NAISSUS*). NEW ARCHAEOLOGICAL EXCAVATIONS

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Abstract – After three decades of exploring and excavating the so-called building with octagon at the locality of „Gradsko polje" in Niš, new archaeological research has been conducted. The main goal of the new excavations was, based on a previously led geophysical survey, to determine the dimensions of the western part of the building and to continue the exploration of the approach in front of the room with octagon. Despite modest finances and the short duration of the excavations, this year's archaeological research has allowed us to conclude that the building with octagon had at least three building phases, starting with the beginning of the 4th century and was in use until the 6th century. Also, a clear stratum of Middle Age houses, dating to the 11th–12th century, was also confirmed in this year's excavations, along with many fragments of ceramics belonging to the same period.
This paper discusses in detail the archaeological and architectural results obtained from the new excavations led in 2018.

Key words – Building with octagon, Gradsko polje Niš, Late Antiquity, mosaics, Constantine the Great

Archaeological excavations in different localities in Niš started in an official capacity in the 1930's, on the territory of the locality of Mediana (a suburb of contemporary Niš) and on the area of the necropolis in Jagodin-Mala, in the very centre of the city. The first large archaeological research in the area of the antique city in the Niš Fortress and around it began after World War II at the localities of Glasija, Gradsko polje and again Jagodin-Mala, when the area of the Fortress came to the focus of the city management, because of their intention to explore and present the cultural heritage of the centre of Niš city.[1] The first archaeological excavations in Niš fortress were carried out during 1962–1963, in the area of Belgrade and Jagodin gate and around the mosque, and were continued a decade later in the area of the Turkish niches, arsenal, south-western area of the fortress and in the locality of „Glasija", on the area of the contemporary bus station.[2] With all the mentioned excavations,

[1] As archaeological excavations confirmed, the city of Niš (antique Naissus) was formed during the 1st century, from which time it spread on the right bank of the river Nišava, coinciding with the area of the later Turkish fortress and was bordered on the northern and eastern side by necropolises, Петровић 1993, 63. It can be presumed that the city became a municipium at the end of the 1st or the beginning of the 2nd century (during the reigns of the emperors Traianus or Hadrian), being an important city in the Central Balkans, particularly during the 4th century, when its size was approximately 20 ha, Петровић 1976, 34–35; Петровић 1993, 63.

[2] Archaeological excavations conducted in 1962–1963 by R. Ljubinković were first focused on the area of Belgrade gate and around the mosque (from 5. 6. 1962 – 3. 7. 1962 and continued on

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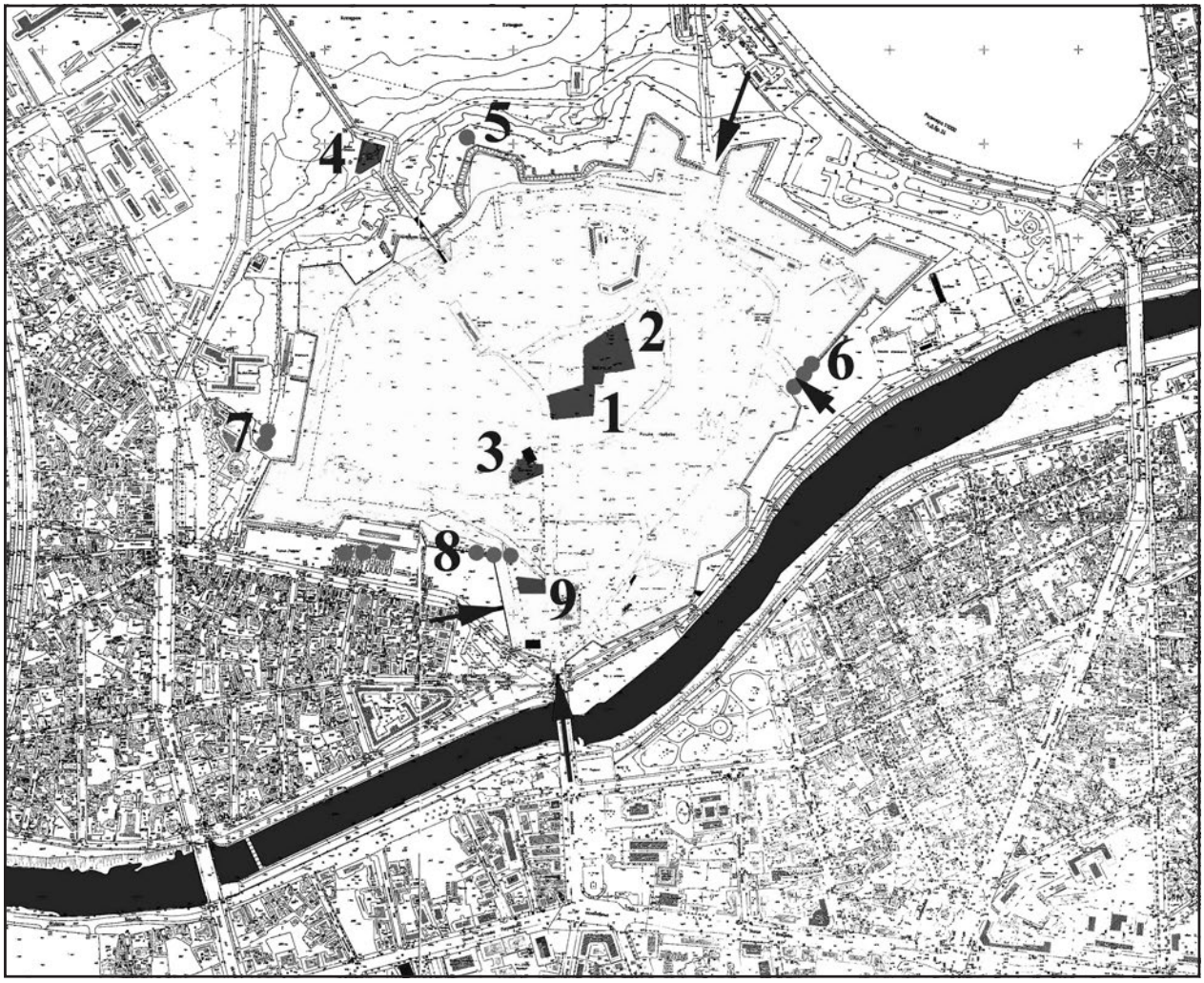

Fig. 1. Niš, situation plan of antique objects in the area of the Turkish fortress and in its vicinity: 1) Building under arches; 2) Antique street and basilica (?); 3) Byzantine street (Bali Beg mosque); 4) Building with Octagon; 5) Thermae; 6) Remains of the antique eastern rampart; 7) Byzantine rampart; 8) Remains of the antique and middle age rampart; 9) Public city thermae; 10) Islan Agin mosque (G. Milošević Jevtić)

Сл. 1. Ниш, ситуациони план античких грађевина на простору турске Тврђаве и њене околине: 1) Грађевина под сводовима; 2) Античка улица и базилика (?); 3) Византијска улица (Бали-бегова џамија); 4) Грађевина са октогоном; 5) Терме – античко купатило; 6) Остаци источног античког бедема; 7) Византијски бедем; 8) Остаци античког и средњовековног бедема; 9) Јавне градске терме – купатила; 10) Ислам-ага џамија (Г. Милошевић Јевтић)

the shape of the antique and middle age Niš started to appear more clearly, to which research carried out during the 1980's and 90's in the centre of the Niš fortress greatly contributed, which was carefully planned with the goal of discovering the narrow antique city centre with its accompanying buildings (Fig. 1).[3] The discovered parts of the antique city central area with a monumental building with two *cellae* (temple of Capitoline triad?), part of the street, the city basilica and city

15. 7. 1962 – 31. 7. 1962; excavations in 1963 were conducted from 17. 6. – 19. 7. 1963), official documentation (diary of excavations and report from 1962) of the Institute of Archaeology, Belgrade.

[3] As P. Petrović confirms, with thus far conducted archaeological research and discoveries, the debate concerning the exact location of the centre of the antique city, the *forum* in the area of Niš fortress, would be disputable, but the position and the quality of discovered buildings in it imply the presumption about the central urban area, Петровић 1993, 66.

Fig. 2. Locality of "Gradsko polje", Building with Octagon, excavations 1987–1988 (Documentation of the Institute of Archaeology, Belgrade)

Сл. 2. Локалитет „Градско поље", грађевина са октогоном, истраживања 1987–1988. (Документација: Археолошки институт Београд)

baths *thermae (extra muros*),[4] confirmed the opinion of ancient writers about the importance of Naissus as a significant strategic, military and economical centre (the third city of the province of Dardania by Ptolomeus, III, 9.4).[5] Although the discovered parts of the mentioned buildings are too small to allow their certain identification, it is clear that they belong to the beginning of the 4th century, the period of the reign of the emperor Constantine the Great, when large amounts of building and reconstruction was undertaken in the birth city of the monarch.[6] However, archaeologists have been able to debate with more certainty the history of antique building activity in the north-western area of Niš fortress since 1987, when, during the works on the new footpath, a building from Late Antiquity was discovered.[7]

Previous excavations

During the rescue excavations conducted in 1987 and 1988, the northern part of the building was excavated and six rooms were discovered: a central room of octagonal ground-plan and four square shaped rooms grouped around the central room (two rooms on the western side and two rooms on the eastern side of the central octagonal room) (Fig. 2).[8]

The building was elongated and of rectangular shape, oriented north-south. The discovered size of the building is approximately 350 m² (length 31 m, width 11.26 m).[9] The diagonal of the octagonal room was 7.7 m, while the dimensions of four square rooms were approx. 4.1 x 4.1 m. The building had two entrances on

[4] The part of the antique and early Byzantine street with porches was discovered around the mosque, oriented N–S, almost parallel with the contemporary footpath in the fortress. Also, in the central plateau of the fortress, a part of the street with a partial canal system was found (oriented E–W). The monumental building with two *cellae* was also discovered in the central area of the fortress, while the sanctuary of the god Asclepius was discovered next to the south-western rampart wall of the fortress.

[5] The antique city of Niš was situated at a very important crossroad, which connected Ratiaria, Singidunum,and Viminacium with Serdica and, further on, Constantinopolis. Its strategic position owed much to the existence of the River Nišava, which was partly navigable and, at the end of the 1st century, the city had its military camp, where the *cohors I Cretum* was stationed, Васић 2013, 91.

[6] The close connection between emperor Constantine and his hometown is confirmed not only by large building activity and monumental impressive sacral and profane buildings erected in Naissus in the period of his reign, but also by his several visits and stays in the town in 315, 319, 324, 334 etc., Петровић 1976, 39; Vasić 2008, 9–23.

[7] The excavations from 1987 and 1988, are not the first excavations conducted in the area of the locality of Gradsko polje. In 1982, archaeological excavations were conducted with the goal of locating the remains of the antique building with hypocaust and the antique necropolis, whose existence was known, but not the exact location of the objects. The only fact that was known about them was that they were situated north of the central area of the fortress. Therefore, sondage excavations were undertaken (one sector was just next to the so-called Turkish trench at the fortress and another sector was on the small hill towards the area where the building with octagon was discovered after five years). Unfortunately, neither the object with hypocaust nor antique necropolis were discovered during the sondage excavations at the site of Gradsko polje in 1982. However, besides numerous fragments of antique and Turkish ceramics, fragments of glass vessels, window glass and animal bones, seven graves belonging to the period of Late Antiquity were found. Around the skeletal remains of the deceased, many fragments of late antique ceramics were discovered; documentation of the Institute of Archaeology, official report of the archaeologist S. Drča, custos in National museum of Niš.

[8] The results of the excavations from 1987 and 1988 have never been published, yet the building is known as the building with octagon (some authors refer to it as a *villa*, *domus* or *palace*) and was briefly described by different authors such as Петровић 1993, 68–69; Гушић 1993; Petrović 1995a; Милошевић 2005: 153 etc; Јеремић 2007: 88 etc; Васић 2013, 93; Čerškov et al. 2016, 105. The building with octagon is situated approximately 300 m northwest of the central area of the Niš fortress where different buildings from the Late Antiquity period were discovered (see ft. 5).

[9] Гушић 1993, 168.

the southern wall of the building, one larger and one smaller, with the larger having three steps. The central room of the building was of octagonal form and had four semicircular niches made of bricks (openings of the niches were 1.5 m). The interior of the niches was painted red. Identical niches were found on the building's outer wall, on the main southern entrance to the octagonal room which was 1.9 m wide and up to which led two stone steps (1.93 m long, 0.3 m wide the height between the two steps was 0.3 m). Although no statues of fragments of statues were found in the thus far excavated parts of the building with octagon, it can be presumed that statues stood in the niches (most probably mythological), which presumably also adorned the other rooms of the building with octagon.

Next to the interior northern wall (wall no. 4) of the octagonal room, 0.95 m from the interior corner of wall nos. 3 and 4, in the layer of rubble (at an approx. depth from the floor of the room of 0.85 m), a skeletal grave (Grave 1) was found (oriented W–E). Just beside the elbow of the right hand of the skeletal remains from Grave 1, the remains of a second skeletal grave were found, unfortunately completely destroyed by the conduit for the electricity. In the layer of the rubble, an iron belt clasp was discovered, in the shape of the letter „S", with stylised snake heads at the ends and a square loop. In the north-eastern corner of room III, a third skeletal grave was discovered (depth from the floor of the room was 0.9 m), oriented E–W. It is presumed that the graves belong to the Middle Ages.

The building was mainly built using the *opus incertum* technique (a mixture of broken stone and mortar), while the openings and niches were built in the *opus latericium* technique (bricks).[10] The walls of the building with octagon were built in the *opus mixtum* technique and are approx. 0.9 m thick, while the walls of the octagonal room are not of the same width, but were saved, *in situ* (as the other walls of the building), over 2 m in height. The floors of the rooms were made from thick mortar and in the octagonal room a mosaic floor (approx. size 42.6 m²), damaged in some parts, was discovered.[11] The other rooms also had mosaic floors, badly damaged due to the building's demolition and use in later periods.[12] The thus far discovered mosaics (composed of motives like octagons, hexagons, squares, rhomboids, a Solomon's knot and composition schemes) in the building with octagon bear a strong resemblance to the mosaics from the peristyle of Constatine's villa at Mediana.[13] Every room had a floor heating system (*hypocaust*), the north-western room even had wall heating and a ceramic tube which served for water drainage from the building's roofs (it entered the canalisation system). Traces of fresco-painting and fragmented marble architectural plastic implied that the building represented a luxury and monumental object, tastefully decorated with marble plastic, mosaics and fresco-painting. Although no statues or fragments of statues have been found in the thus far excavated parts of the building with octagon, it can be presumed that in the niches stood statues (analogous to similar objects, most probably mythological statues), which presumably also adorned the other rooms of the building with octagon. The finding of a Maximinus Daia coin from 309–310 in the plaster of the building's wall confirms

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[10] Ibid.

[11] The mosaic floor in octagonal room was made from stone tiles (*tesserae*) of white, black, red and green colour and the composition scheme consisted of octagons with squares that connect them, octagons and crosses that form elongated hexagons, squares and rhombuses that are connected and floral motives such as a Solomon's knot, propellers, circles, and motives in the shape of the tip of a spear, Јеремић 2007, 91–92.

[12] Heavier damage to the building with octagon occured from trenches dug for military exercises held on the site of Gradsko polje up to the 1950's.

[13] Vasić et al. 2016, 21–25.

[14] The analysis of ceramics showed that numerous fragments belong to the period from the 4th to the 6th century, and finds of various discs and pieces made of red deer antler cortex, one bronze ring and tools for the processing of wool and leather (which could indicate the existence of a workshop), date from the last phase of the building with octagon (the 6th century), documentation of the Institute of Archaeology (official report of the archaeologist Toni Čerškov).

[15] The sondage excavations in 2016 were conducted by the Institute of Archaeology in cooperation with the Institute of Balkan Studies and colleagues from the Institute Ausonius, Bordeaux, Јеремић, Петровић 2016, 85–87. The sondage excavations (6.5 x 5 m) were carried out in the area south of the south-eastern room (room VI in the nomenclature of the 1987 and 1988 excavations), documentation of the Institute of Archaeology from 2017.

[16] We would like to express our gratitude to the director of the Institute of Archaeology in Belgrade, Dr Miomir Korać, for his support and help and to our colleagues Jelena and Vladimir Miletić, for their assistance and interpretation of the results.

[17] Archaeological excavations at the site of "Gradsko polje" in Niš were led by: leader of the team Dr Nadežda Gavrilović Vitas, Institute of Archaeology Belgrade; Dr Gordana Milošević Jevtić, architect, Architectural Faculty Belgrade; Ljiljana Mandić, archaeologist, National Museum Užice; Slobodan Mitić archaeologist National Museum Niš; Aleksandar Aleksić, archaeologist, Institute for the Protection of Monuments of Cultural Heritage Niš; Dr Igor Bjelić, architect, Institute of Archaeology Belgrade; Milan Zeković, MA student; and two PhD students from the Institute of Ausonius, Bordeaux – Laura Barataud and Alice Ognier.

that the building with octagon was probably erected in that period, but the archaeological material along with the find of a Justinianus coin from 529, imply the use of the building from the 4th to the 6th century.[14] After the excavations were finished, the researched area of the building was conserved and mosaics were covered and protected with a wooden construction. In 2012, because of the celebration of 1700 years of Milan edict in Niš, The Institute for the Protection of Monuments of Cultural Heritage in Niš, undertook conservation works on the discovered parts of the building with octagon (walls, mosaics) and denivelation works.

Small sondage excavations were conducted in 2016, in the area south-east of the main entrance to the octagonal room.[15] In 2017, due to the planning of new archaeological excavations in the area of the building with octagon, the Institute of Archaeology conducted geophysical research on the area to the south and west of the building with octagon (south in the direction of the contemporary market and west in the direction of the Boulevard Nikola Tesla), with the goal of defining the dimensions of the building.[16] The research showed in both areas certain deviations which implied the existence of the walls of either the same building (building with octagon) or a different one (Fig. 3). Guided by the results of the geophysical research, the team from the Institute of Archaeology planned the excavations in 2018, with the goal to define the outer western wall of the building and to continue with excavations in the area south of the main entrance of the octagonal room.[17]

Archaeological excavations in 2018.

The archaeological excavations conducted in the area of the building with octagon in the locality of „City field" in 2018 lasted three weeks and, considering certain facts (like the very thick layer of the contemporary horizon which took much time with limited finances), it was decided that the excavations would be

Fig. 3. Locality of "Gradsko polje", Building with Octagon, geophysics 2017 (Documentation of the Institute of Archaeology, Belgrade)

Сл. 3. Локалитет „Градско поље", Грађевина са октогоном, геофизика 2017. година (документација: Археолошки институт Београд)

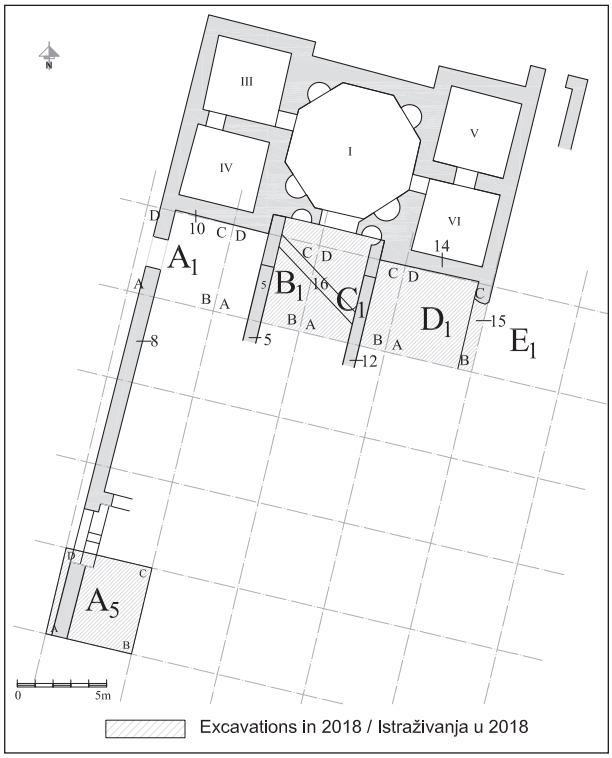

Fig. 4. Locality "Gradsko polje", Building with Octagon, plan of the building in grid system, excavations 2018 (Igor Bijelić)

Сл. 4. Локалитет „Градско поље", Грађевина са октогоном, план са квадратном мрежом, истраживања 2018. године (Игор Бјелић)

carried out in two sectors of the locality. ***Sector 1*** which represented the area where the end of the outer western wall of the building could have been expected (implied by the results of geophysics from 2017) and ***Sector 2*** which presented the area south of the entrance of the octagonal room (south to east and west of the entrance). Before the beginning of the archaeological works, it was decided to conduct the excavations in a grid system (squares 5 x 5 m) and the grid system was positioned in accordance with the discovered northern part of the building with octagon, given of the precise connection between the discovered antique architecture and the new archaeological finds in the space (Fig. 4).[18]

Stratigraphy

The excavations in sector 1 were carried out in square A5 and, by the end of the excavations, five cultural layers could be differentiated in the northern and eastern profile of the square, and six cultural layers in the western and southern profile of the square (Fig. 5–8). The most recent layer (layer A) is of dark loose soil, with fragments of stone and contemporary material.[19] The upper border of the layer was between an elevation of 200.74 and 200.40, while the lower border of the layer A was between an elevation of 200.50 and 200.04. The second layer (layer B) is composed of dark-grey loose soil, with a minor concentration of stone and a small number of bricks. The upper border of the layer is between an elevation of 200.60 and 200.04, while the lower border of the layer B is between an elevation of 200.39 and 199.79. There is a very thin, visible layer of mortar (0.10 m), probably from the floor of a contemporary building.[20] The third layer (layer C) is composed of grey loose soil, with an intensive concentration of stones and bricks. The relative thickness of the layer in the southern profile varies by around 0.40 m (in northern profile it varies by up to 0.60 m, while in western profile of the square A5 it varies by up to 0.80 m). The base of this layer varies between an elevation of 199.44 and 199.04. The fourth layer (layer D) is composed of intensive rubble of yellowish-whitish colour, with large fragments of stone, bricks and lumps of mortar. In the eastern half of the southern profile, it is interrupted with digging 1, while in the western half of the same profile of square A5, a wall with surrounding bricks was discovered. In the western profile, layer D can be followed along half of the profile. The base of layer D varies between an elevation of 199.26 and 199. The fifth layer (layer E) is of compact reddish-yellow soil, which is visible only around the wall and bricks that were discovered in the

[18] The grid units were squares of dimensions 5 x 5 m, and were marked alphabetically (starting from A) going from the left to right side and Arabic numerals (from 1 to 5) going from north to south, starting from the south-western corner of the building with octagon (first square is A1).

[19] During the sondage excavations in 1987, a layer of rubble made of filling of broken stones and of a thickness of approximately 1.9 m, was covering the object – the layer was clearly visible in the profiles of the discovered part of the building with octagon. That layer was formed from the broken stones with which military trenches (dug in the past century for the purposes of the military exercises) were backfilled. The presence of the army was frequent up to the 1950's at the site of Gradsko polje and this year's excavations confirmed again a very high layer of rubble with contemporary finds.

[20] In one part of the southern profile of square A5, the thin layer of mortar is interrupted by an iron pipe (probably a pipe from the canalization).

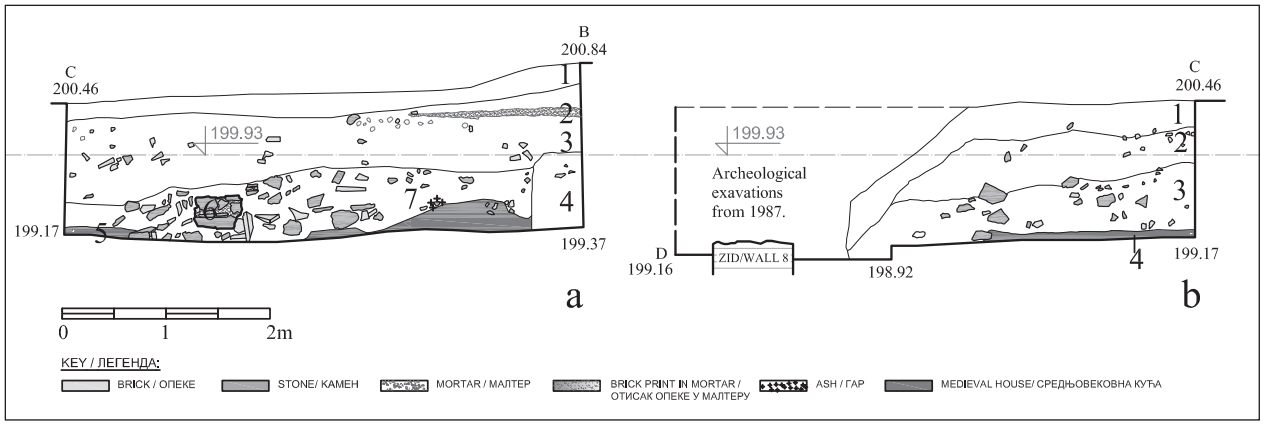

Fig. 5. Sector 1, square A5: a) eastern profile; b) northern profile (Igor Bijelić)

Сл. 5. Сектор 1, квадрат А5: а) источни профил; b) северни профил (Игор Бјелић)

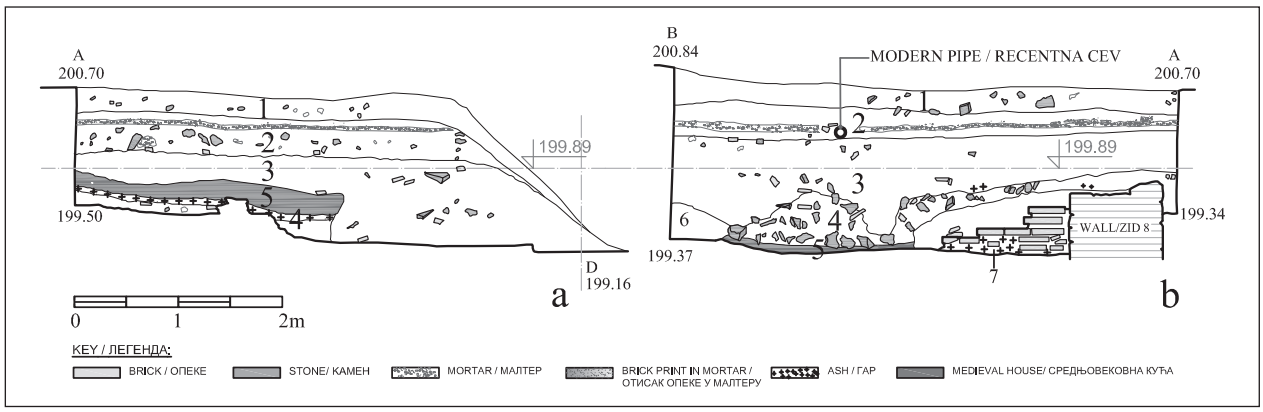

Fig. 6. Sector 1, square A5: a) western profile; b) southern profile (Igor Bijelić)

Сл. 6. Сектор 1, квадрат А5: а) западни профил; b) јужни профил (Игор Бјелић)

Fig. 7, 8. Sector 1, square A5 – eastern profile (prospect from the west) and southern profile (prospect from the north) (Documentation of the Institute of Archaeology, Belgrade)

Сл. 7, 8. Сектор 1, квадрат А5 – источни профил (поглед са запада) и јужни профил (поглед са севера) (документација: Археолошки институт Београд)

previous layer, in the southern profile of square A5. In the eastern profile, a thin layer of grey loose soil can be recognised, which appears as previous digging from an earlier period in the southern profile on an elevation between 199.54 and 199.14. Layer E is not visible in the northern profile of square A5, while in the western profile of the square, traces of burning were confirmed.

The discovered archaeological material from square A1 contained numerous fragments of ceramics from the Middle Ages (cooking pots),[21] fragments of glass vessels (receptacles, upper edges, foot), window

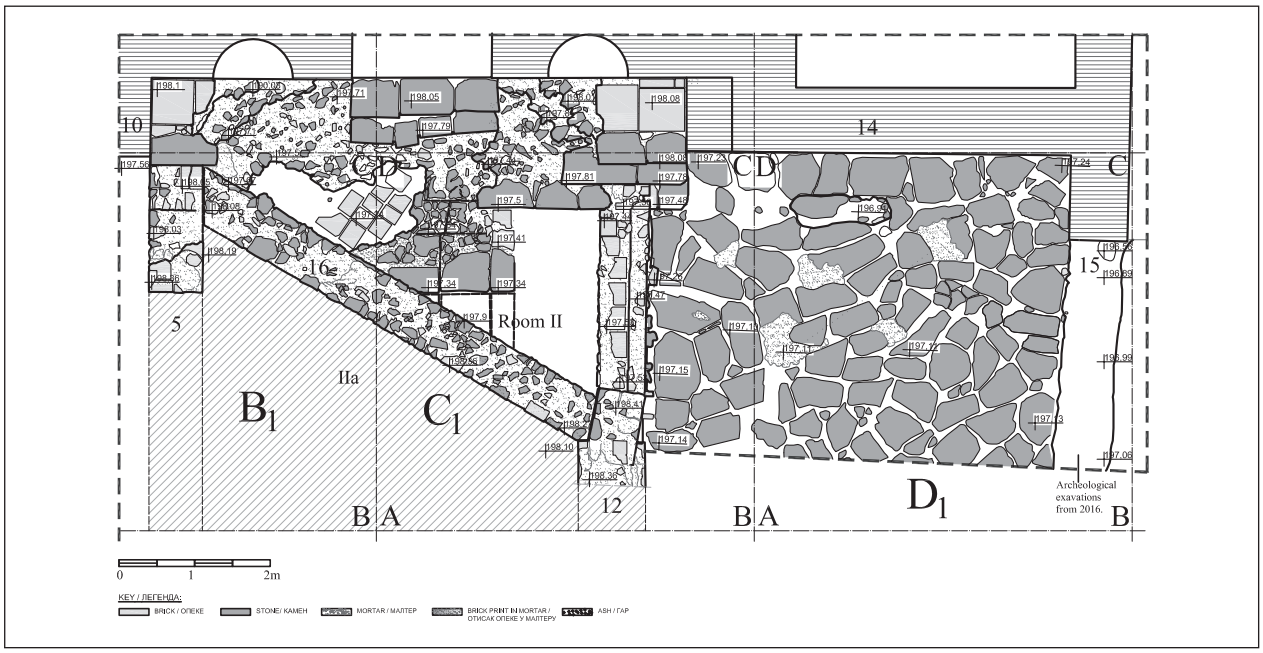

Fig. 9. Sector 2, squares B1, C1 and D1, layout (Igor Bijelić)

Сл. 9. Сектор 2, квадрати B1, C1, D1, план (Игор Бјелић)

Fig. 10. Sector 2, squares C1 and D1; northern part of room VIII:
a) layout of the floor of green stone slabs of irregular shape; b) room VIII from the south (Igor Bijelić)
Fig. 11. Sector 2, square C1, prospect from the south (Documentation of the Institute of Archaeology, Belgrade)

Сл. 10. Сектор 2, квадрати C1, D1; северни део просторије VIII:
а) план пода од зелених камених плоча неправилног облика; b) просторија VIII, поглед са југа (Игор Бјелић)
Сл. 11. Сектор 2, квадрат C1, поглед са југа (документација: Археолошки институт Београд)

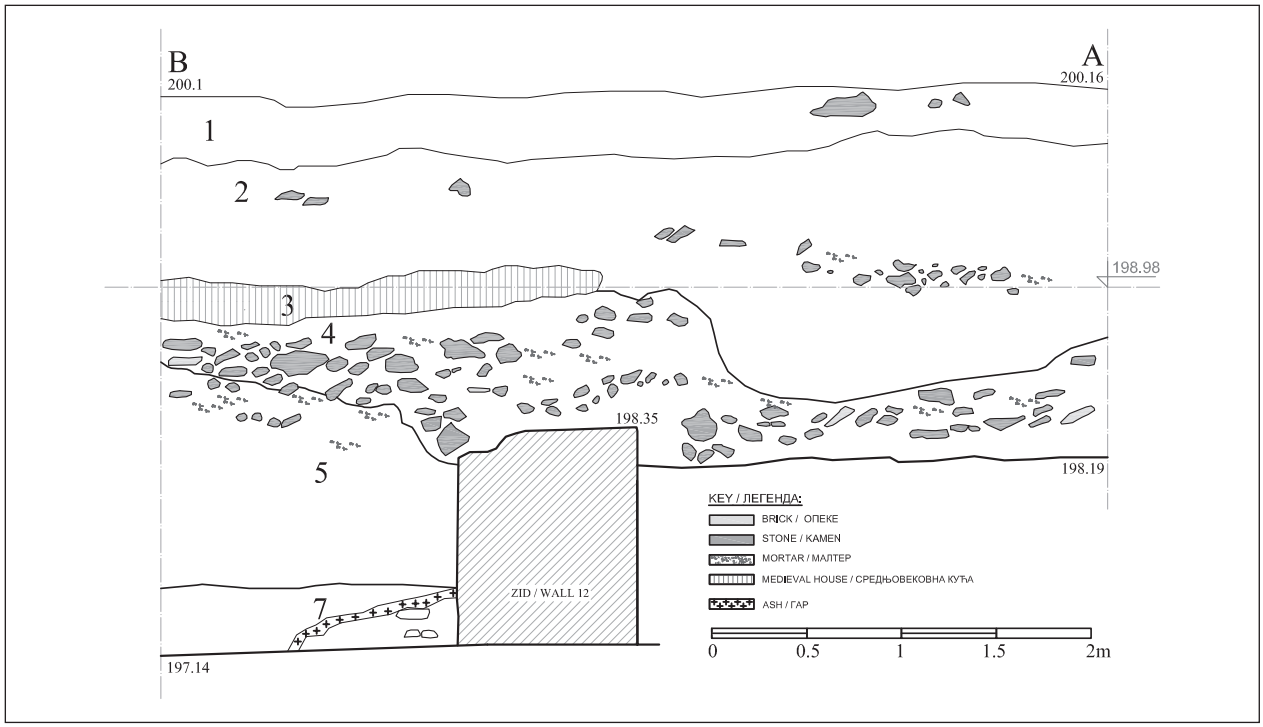

Fig. 12. Sector 2, square C1, southern profile (Igor Bijelić)

Сл. 12. Сектор 2, квадрат C1, јужни профил (Игор Бјелић)

glass and animal bones. In the eastern part of square A5, in layer E, two ceramic discs perforated in the centre were found, representing two fragments belonging to two different bone combs.

Sector 2 comprised the area of squares B1, C1 and D1 (square C1 continued with its eastern side on the sondage from the 2016 excavations).[22] The angles of squares C1 and D1 are right next to the southern wall of the octagonal room (Fig. 9–11).[23] Because of the stratigraphic situation and the fact that the excavations were carried out only in the south-western half from the southern entrance of the octagonal room (looking towards north), the division of the eastern and western half of the southern profile of square C1 facilitated the following stratigraphic layers in the mentioned area (Fig. 12). Southern profile, eastern half: first layer (layer A) is formed of humus with vegetation; relative thickness is around 0.35 m, with the lower border at an elevation of 199.73. The second layer (layer B) is dark grey soil with small fragments of bricks, stone and lumps of mortar. The relative thickness of this layer is 0.60 m. The third layer (layer C) is dark grey compact soil, probably representing the layer of nivelation, with the lower border at an elevation of 198.93. The fourth layer (layer D) is a layer of intensively loose rubble, consisting of plaster rubble with large and small fragments of stones and bricks with traces of plaster (lower border at an elevation of 198.70). The fifth layer (layer E) is dark grey intensively loose soil, with stones, bricks and lumps of mortar. In this layer, the crown of the wall (oriented N–S) was discovered at an elevation of 198.34. The lower border of layer E is at an elevation of 197.39 where a thin layer of burning (3–5 cm thick) is visible. The sixth layer (layer D) is light brown compact soil, around 0.25 m thick, above the level of the floor made of stone slabs (lower border of this layer is at an elevation of 197.15). Traces of intensive burning

[21] The authors would like to express their sincere thanks to Dr Vesna Bikić for kindness in offering her preliminary remarks about the ceramic finds from Sectors 1 and 2 of the building with octagon, which will be elaborated on Dr Bikić's analysis in near future.

[22] The northern side of square C1 is situated right before the southern entrance to the octagonal room of the building and was excavated in 1988.

[23] Angle B of square C1 is situated right above the floor of the building, as a result of of the landslide of the western profile of sondage 1 from the 2016 excavations.

Fig. 13. Sector 2, square C1, eastern part of the southern profile, prospect from the north (Documentation Institute of Archaeology Belgrade)

Сл. 13. Сектор 2, квадрат C1, источни део јужног профила, поглед са севера (документација: Археолошки институт Београд)

in the soil and small lumps of burnt soil were found lying on the stone slab floor (Fig. 13).

As has already been mentioned, sector 2 also comprised the area of square D1, which was included in the 2016 excavations, but not its corner (on the conjunction of the eastern and southern wall of the octagonal building). The area excavated in this year's excavations in square D is 0.7 x 0.5 m (the 0.7 m side is oriented E–W), and the approx. thickness of the excavated layer is between 0.3 and 0.5 m.[24] This layer, known in the 2016 excavations as level b, is a layer of dark loose soil, with an intensive concentration of smaller fragments of bricks and roof tiles *imbrices*. As during the excavations in 2016, many fragments of roof demolition (tegulae, imbrices, bricks, traces of burning) were discovered. Layer B lies directly on the stone slab floor of the building, which would confirm the demolition of the building in a fire.

In the excavations carried out in square B1, west of the southern entrance of the octagonal room (towards the southern profile of the investigated squares), the crown and lateral sides of the wall built in the *opus mixtum* technique were cleaned and it was discovered that during the building of the wall, mortars of different structure and colour were used (mortar of white-grey colour and mortar of reddish colour with smaller pebbles).

Architecture

As was already mentioned, the building with octagon is situated *intra muros* of the northern wall of the Turkish fortress, on the site known as „Gradsko polje" (Fig. 1).[25] The object is of a longitudinal plan, oriented with its longer side towards north, with minor deviations to the east. The northern part of the building has been completely researched (Fig. 2). It is of a complex ground plan, with outer dimensions of 19.20 x 11.5 m. It is formed of five rooms, with a central room of octagonal shape (each side of the octagon wall is 3 m long), inscribed in a square with outer dimensions of 9.2 x 9.20 m. Four minor square rooms were symmetrically situated – two rooms on the west side (III and IV) and two rooms on the east side (V and VI).

The inner dimensions of these smaller rooms are from 4.10 to 4.30 m. Communication between the rooms was facilitated by two entrances from the central octagonal room (I) and with entrances between rooms III and IV on the west side and rooms V and VI on the east side. In the central room (I), at a height of between 1 and 1.20 m, on the north-western, north-eastern and south-eastern wall, semicircular niches were discovered, around 1.35 m wide, 0.66 to 0.98 m deep and 0.70 m high. Another niche of similar or the same dimensions is presumed on the south-western wall, in the place where the object was mostly devastated. The floors in the rooms were covered with mosaic carpets with geometric motives.[26] The interior of all rooms

[24] This layer was, during the 2016 sondage excavations, marked as level b.

[25] Petrović 1993, 68–69; Petrović 1994, 19–20; Petrović 1995, 231–232; Gušić 1993, 167–168.

[26] Јеремић 2007, 87–97.

contained traces of fresco-painting. Under the room floors, hypocaust pillars were discovered and on the eastern side of the object, in room VI, wall heating was also confirmed.

The building has not been excavated in its southern part. Partial excavations were conducted on the area just in front of the monumental entrance to room I and on the western wall of the building (8) (Fig. 4, 9). The existence of two more rooms, south and south-east of the main entrance of the northern part of the building, is presumed. Room II was south of the entrance to the octagonal room and only its width (5.17 to 5.20 m) is known, with the western wall (5) and eastern wall (12) as its boundaries. According to archaeological documentation from 1987–1988, wall numbers 5 and 12 were made from bricks and were built in the second building phase, being of unequal thickness (the western wall is 0.75 m thick, and the eastern wall is 1.20 m thick). On an elevation of 197.50 m in front of the steps, a mortar floor is confirmed, which is 0.73 m lower than the floors of rooms I, III and IV. A wall (no. 16), oriented norwest-southeast, and 0.65 m thick, was discovered in room II. The area between walls 12, 14 and 15 is marked as room VIII, partly defined by the excavations from 2016. The existence of a floor made of stone slabs of irregular shape was discovered in it and on the western wall (15) there was a passage whose size is not known in detail, because it goes into the southern profile of the excavated area. It was concluded that the conserved part of wall no. 15 represents a northern jamb.[27]

On the western part of the building, in the narrow excavation, a western wall (no. 8) was discovered, with a length of around 31.5 m. Two entrances were confirmed in it; the first entrance was situated 1.70 m south of the wall no. 10 of room IV and was walled up with large pebbles (Fig. 2). The second, more monumental entrance was discovered at 28.5 m, is 2.76 m wide and has a stone step made of two large profiled stone blocks.

In the rubble on the elevation of the stone blocks, numerous fragments of fresco mortar with traces of colour, destroyed by a fire were found. On the opposite, eastern side, there is another wall which, at approximately 4 m in length, forms a corridor (Fig. 4).[28]

Based on the results of 1987–1988 excavations, it was presumed that the southern part of the building was resolved in the form of the approach corridor, divided by columns on three naves.[29] With the discovery of a coin of Maximinus Daia, it was presumed that the building with octagon was built in the first decade of the 4th century.[30]

The results of the archaeological research carried out in 2018, although of a modest range, contributed considerably to our knowledge of the building with octagon at the locality of „Gradsko polje" and raised new questions in connection with its architecture.

Room II (Sector 2 – parts of squares B1 and C1) (Fig. 9–11)

Room II is in front of the entrance to the central, octagonal area of the building. On this elevation of the excavations, its width has been determined (5.20 m), with walls on the east (wall no. 12), west (wall no. 5) and the wall of the octagonal room. A diagonally placed wall (no. 16), oriented northwest – southeast, postdates the room. The area between wall no. 16 and the southern profile has not yet been defined. On the discovered part of the room, different building techniques building materials can be observed.

The eastern wall (no. 12), oriented north – south, directed toward the northern part of the building, was cleared to a length of 4 m (Fig. 9, 14, 15). It is situated east of the main entrance to the octagon, between rooms II and VIII. The southern part of the wall goes in the profile and functions as a part of a column (or wall?) 0.90 m thick, supporting a structure above. It was built with bricks (0.05 m), placed in horizontal lines, in limestone mortar 0.03 m thick. A wall 0.60 m thick, discovered in a length of 3.40 m, is leant on the column.

On the southern part, the preserved part of the wall represents a jamb of dimensions 0.65 x 0.60 m, with a preserved height of 1.30 m. The southern jamb is also built from bricks (0.43 x 0.34 x 0.05 m), using a thick layer of white-grey mortar (0.05 m) with the addition of coarse gravel. At its highest preserved part, it was built with an alternation of stone and brick and is quite damaged in its lower, southern part. The jamb is leant on the column up to 1 m, from which point the building continues. The northern part of the wall is preserved on the elevation of the entrance's doorstep and

[27] This part of the building was marked as room VIII in the excavations from 1987–1988. (Documentation of the Institute of Archaeology in Belgrade, diary of archaeological excavations for 1988). Compare Jeremić, Petrović 2016, 86, Fig. 1.

[28] Gušič 1993, 167–168 and Fig. 90.

[29] Petrović 1995, 234, 242, Fig. 1.

[30] See page 4 in this paper, Јеремић 2007, 95.

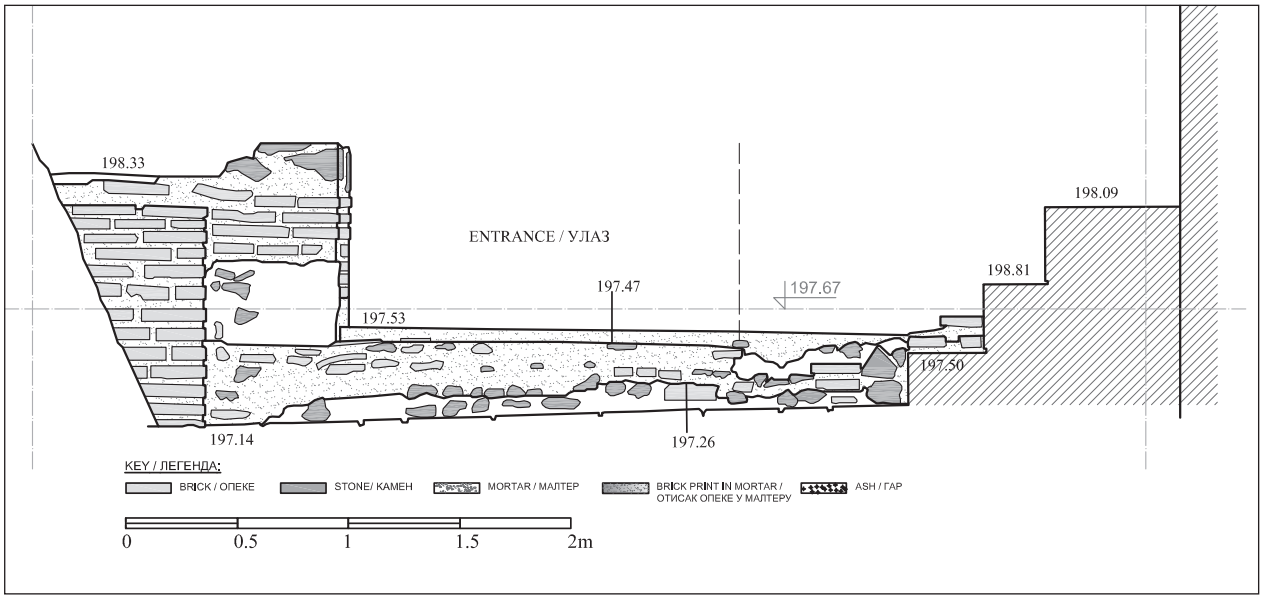

Fig. 14. Sector 2, square C, eastern wall no. 12 (Игор Бијелић)

Сл. 14. Сектор 2, квадрат С, источни зид бр. 12 (Игор Бјелић)

can be followed to the second step of the eastern postament on the entrance to the octagonal room I. In this part the wall is built from bricks and stone, bound together with white-grey mortar. It was built on the floor of green stone slabs in room VIII. Between the wall and stone floor, a substruction made from pebbles and brick fragments, with mortar poured on it can be seen extendingbeyond the line of the wall's face. According to the photo documentation from 1988 and 2007, it can be seen that the northern part of the wall was preserved in the upper level, and it went over the step of the postament and was leaning on the southern wall of the octagon, partly closing the eastern entrance niche (Fig. 2, 16).[31] It can be observed in the photographs that wall no. 12 is not leant directly on the south-western corner of room VI, but that it is moved towards the west by about 0.50 m and that the described area was also filled with bricks, leading researchers to assume that the wall was 1.20 m thick.[32]

The 1.80 m wide passage can be clearly seen on the wall. The doorstep of the entrance is built on two levels with an overall width of 0.62 m (Fig. 9, 17). The difference in the heights of the lower, eastern level and higher, western level of the doorstep is 0.06 m. The higher, western level of the doorstep (0.42 m) is built from large brick fragments (0.30 x 0.30 m), arranged in two lines and bonded with reddish mortar with gravel. On the eastern face of the wall, a thin layer of reddish mortar coating is preserved, which clearly implies the size of the entrance.

The eastern wall (no. 5) is situated in the north-western corner of rooms I and IV and goes over the approach staircase of the western postament of the access construction. The crown of the wall to a length of 1.70 m (Fig. 9) was discovered. Judging by the look of the building, the eastern wall no. 5 is built in the same way as the eastern wall no. 12 of room II.

The northern excavated part of room II represents the approach staircase with lateral postaments, situated between the walls of the eastern and western rooms (overhang, *risalto*), with a length of around 7 m. The main entrance to the northern part of the building is set in the axis of the southern wall of the octagonal room I. Two stone steps were preserved in the width of the entrance (0.90 m). The first, lower step, 0.30 m wide, was built from four large stone blocks of irregular size. The other, higher step was built from three large blocks with a tread width of around 0.50 m. The height of the tread

[31] We would like to express our gratitude to Dr Igor Bjelić for the photograph.

[32] With the conservations works in 2012, the upper layers of the wall nos. 12 and 5 were removed.

Fig. 15. Sector 2, square C, eastern wall no. 12, prospect from the east (from room VIII) (Documentation of the Institute of Archaeology, Belgrade)
Fig. 17. Sector 2, square C1, entrance and doorstep on wall no. 12, prospect from the north (Documentation of the Institute of Archaeology, Belgrade)

Сл. 15. Сектор 2, квадрат С, источни зид бр. 12, поглед са истока (из просторије VIII) (документација: Археолошки институт Београд)
Сл. 17. Сектор 2, квадрат С1, улаз и степеник на зиду бр. 12, поглед са севера (документација: Археолошки институт Београд)

Fig. 16. Building with octagon, object in 2007 (photographic documentation of Igor Bijelić)

Сл. 16. Грађевина са октогоном, стање објекта 2007. године (Игор Бјелић)

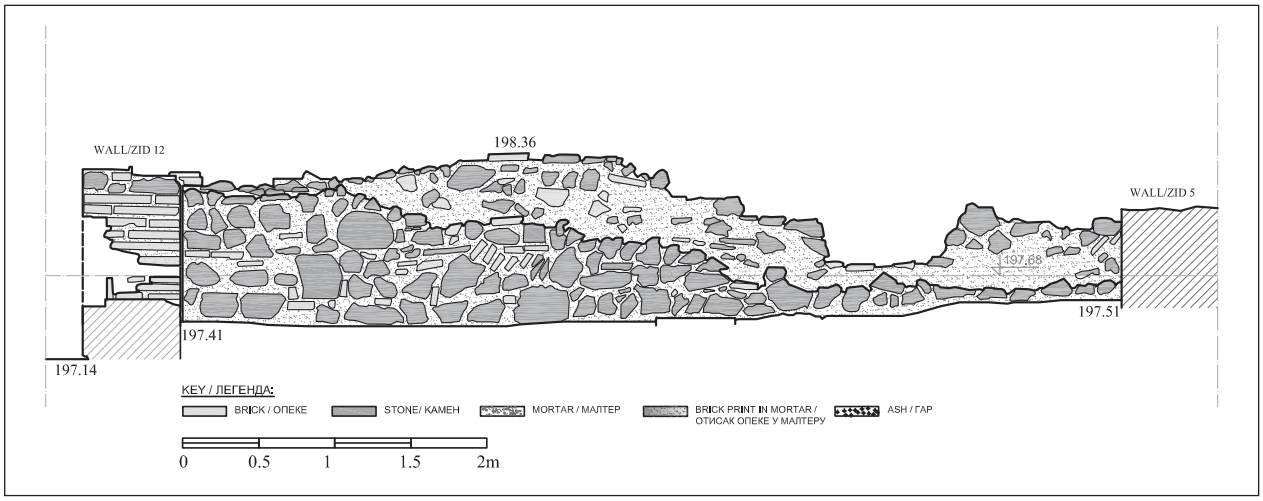

Fig. 18. Sector 2, square C1, north-eastern prospect of wall no. 16 (Igor Bijelić)

Сл. 18. Сектор 2, квадрат C1, поглед са североистока на зид бр. 16 (Игор Бјелић)

between these two steps was 0.30 m. The level of the doorstep was damaged and preserved only in negative. It can be presumed that it was slightly higher than the elevation of the higher step (Fig. 9).

Postaments of 2.60 m length (oriented east-west), 1.12 m width and 0.70 height, were formed on the lateral sides of the staircase (measured in relation to the floor of stone slabs in room II). Two steps of total tread width 0.60 m and of total height 0.60 m lead towards the postaments. The approach to the eastern postament is better preserved. The first, lower step is preserved to a length of 2.80 m, while the other, higher step is preserved to a length of 1.65 m. Stone blocks of similar dimensions to the blocks used for the staircase of the main entrance were used for the building of the postaments and the approach. The character, building technique and used building material implies that the staircase with the postaments was built at the same time. The finishing parts of the postaments and step tread were built from larger stone blocks, while the substruction of broken stones and bricks mixed with mortar to which rubble was added (Fig. 9).

The north-eastern and north-western angles of the postaments were built with bricks *bipedalis* (0.58 x 62 m). Two semicircular niches of similar construction and dimensions to the niches in the central room I were built in the walls above the postaments.

In front of the main entrance, a floor made of square, regular set, limestone slabs was discovered (Fig. 9). A few slabs were preserved in their entirety (0.65 x 0.75 m), along with many damaged, broken slabs of different sizes (0.65 x 0.45 m; 0.30 x 0.60 m).

The preserved parts of the slabs (0.50 x 0.50 m) go under the construction of the main approach staircase. East of the stone slab floor, towards the wall no. 12, with a total width of around 1.50 m (?) and on the same elevation, the remains of the mosaic carpet were discovered (Fig 2, 9). In the middle northern part of the room (1.20 x 0.80 m), a brick floor was confirmed (0.28 x 0.40 m), oriented northeast-southwest. Some fragments of the floor were ornamented without deviation. The elevation of this floor is slightly lower than the elevation of the stone slab floor.

In the middle part of the excavation, a crown and the north-eastern face of the wall no. 16 (Fig. 18) were discovered. The wall, oriented northwest-southeast, was set diagonally in room II. It was leant on partition wall nos. 5 and 12. Their total length is 5.87 m and width 0.67 m. The crown of the wall is not equally preserved: near wall no. 12 it is around 0.90 m, while on the north-eastern end, near wall no. 5 it is around 0.50 m. The discovered face of the wall was built from broken and cut stone, laid in relatively regular horizontal lines, in a mortar of poor quality and of grey-whitish colour, with added large gravel. On some parts, as an equalizing layer, bricks set in horizontal or slanted rows were used. The interior of the wall was filled with broken stones of different sizes and with brick fragments bonded with mortar of white-grey colour, with added coarse stone and gravel.

Room VIII* (*Sector 2 – parts of the squares C1 and D1 (Fig. 9, 10)

Room VIII (5.50 m in a west-east direction) is situated east of room II and south of room VI. Its southern part goes under the archaeological profile, so for now its exact size is not known in the north-south direction. The level with green stone slabs is mostly excavated, while in 2016 it was uncovered again and cleaned.[33]

In 2018, the excavations of the cultural layers towards the southern profile and wall no. 12 were continued. The floor slabs are cut from large pieces of green stone slabs, irregularly shaped and with a smooth surface. The floor slabs are bonded by mortar joins (white -gray mortar), with aggregates of small stones and gravel. On one slab a layer of mortar is preserved. In the middle of the northern part of the floor, where one of the slabs was forcibly moved, it was confirmed that the slabs were set on a mortar layer (10–15 cm), which comprised stone fragments and gravel.

Building material, construction and the chronology of the building in the Sector 2

The method of building the walls and floors in rooms II and VIII confirms the characteristics of the building documented in previous excavation seasons of the building with octagon, in which different techniques of building with stone and bricks have been recorded. Broken and cut stone with a combination of bricks in the techniques of *opus vitatum* or *opus mixtum* was used. For the construction of jambs, niches and the outer angles of the building, just bricks (*opus latericium*) of different sizes[34] were used, with a thin or thick layer of mortar joints. On certain parts of wall no. 12, on the uncovered part of the column and eastern face of the doorstep, areas of smooth plastering are preserved as a layer of thin reddish mortar.

Although the excavated area in Sector 2 was limited, certain presumptions about the building chronology can be made.

Preserved elevations of steps, postaments and floors imply the exact order of building (Fig. 9). The floor of bricks represents the lowest elevation in room II and goes under the staircase construction that is up to the edge of the first lower step. It can be considered as the first and oldest building phase. The floor made of large green stone slabs in room VIII and part of the column (or wall) in the southern profile of the excavation belong to the same building horizon. In the second, chronologically younger, building phase, a floor of stone slabs set in regular rows was put over a brick floor and to this building horizon the mosaic from the eastern part of room II could also belong. This floor of slabs also goes under the construction of the entrance staircase. The mortar layer preserved on one of the green stone slabs in room VIII implies that a higher quality floor could have been put in this room. The brick floors in room II and the floor of green slabs in room VIII could belong to the oldest building layer but also could be a subphase in the setting of the decorative floor from stone and mosaic in these rooms.[35]

The determining of the building phases of the main entrance with postaments is still a matter for debate. The method of setting of stone blocks and negation of existing floors imply the reconstruction of the entrance part which was done in the same time. The construction of the approach staircase and postaments covers and negates a part of the brick and stone floors in front of the entrance to the octagonal room, clearly implying that the reconstruction of the entrance part started when the floor in room II was already finished or at least started to be set. Therefore, it could be presumed that the older entrance was of a more modest appearance and that it did not meet the standards of the user or owner of the building. As a result, during this reconstruction, particular attention was directed towards achieving a representative entrance to the northern part of the building with octagon. The entrance space is emphasised with the setting of the main staircase, with two symmetrically set or reconstructed postaments, joined together with a stone step with a total width of 7 m. Two steps, which are set symmetrically, facilitate the approach to the postaments. A differently performed denivelation between the main staircase and the approach to the built postaments, emphasises the entrance to the octagon (Fig. 19). Semicircular niches where statues were put also emphasised the general impression and indicated the interior decoration of the main octagonal room.

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[33] Due to the lack of time and finances, the entrance on the eastern wall no. 15 of room VIII was not cleaned during the archaeological excavations in 2018.

[34] 0.30 x 0.30 x 0,04–0,05 m; 0.65 x 0,45 x 0,05–0,06 m; 0.65 x 0,75 x 0,05–0 06 m; 0.30 x 0,60 x 0,05–0,06 m; 0,48 x 0,28 x 0,04 m; 0.28 x 0.40 m.

[35] The analogy can be observed in the floors from bricks and mortar in Constantine's villa at Mediana, in the rooms where the finishing setting of mosaics or marble slabs on the floors wasn't finished.

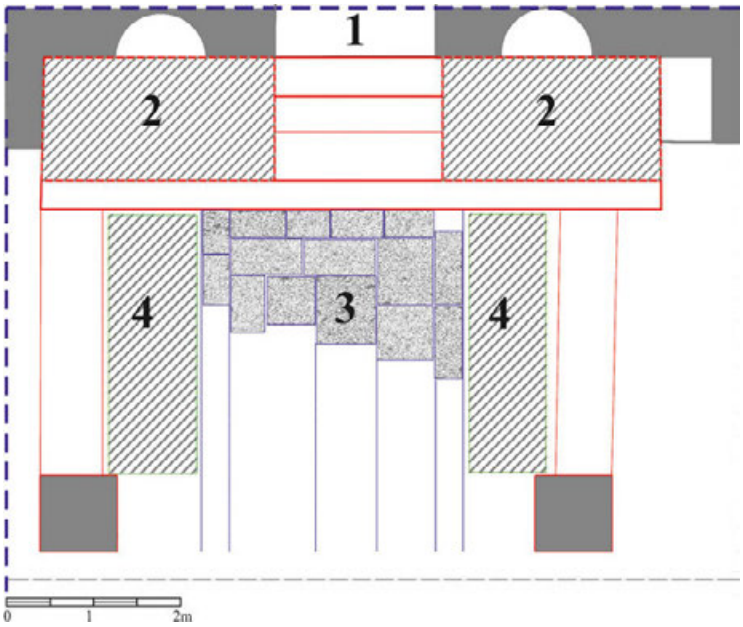

Fig. 19. Sector 2, squares B1, C1, D1, reconstruction of the access road
1) The entrance to the octagonal room;
2) Postament; 3) Stone slab floor;
4) Mosaic (G. Milošević Jevtić)

Сл. 19. Сектор 2, квадрати B1, C1, D1, реконструкција прилазног пута:
1) улаз у октогоналну просторију;
2) постамент; 3) под од камених плоча;
4) мозаик (Г. Милошевић Јевтић)

Important changes in the appearance of the building and the frontage of the south façade were made by building wall nos. 5 and 12 in room II. The walls were leant on the southern wall of the octagon and they do not fit with the appearance of the frontage of the approach and the construction of the platform, suggesting they are from a later building phase. Because of the lack of documentation from the first archaeological excavations, it is not possible to determine in which way the connection between the niche on the eastern side of the entrance and wall no. 12 was made.

The construction of the diagonally set wall no. 16 and the making of a new, triangle shaped foyer in front of the octagonal room belong to the youngest building phase in room II. The communication between the octagon, foyer and other southern rooms was possible only through the entrance on partition wall no. 12, which existed in this phase of the use of the building.[36]

The relatively insignificant extent of the archaeological excavations conducted in this area, which has been excavated several times makes any conclusion about the precise dating of the separate building interventions on the building in rooms II and VIII, quite difficult. On the basis of the archaeological material, architecture and the clear connection of the building techniques with the found coinage of the 4th century in the wall of the octagon, it could be presumed that the first three building phases (brick floors and floors from green stone slabs; floors from properly set square slabs, the floor in the mosaic in rooms II and VIII and the monumental entrance with postaments and the frontage on the southern wall of the octagonal room) can be dated in the period of the building activities of emperors Licinius and Constantine the Great in Naissus.[37]

As was already mentioned, with the building of the wall nos. 5 and 12, the appearance of the frontage of the northern rooms of the building changed, but not their function. Without more significant excavations and a more detailed analysis of the archaeological material, the question of whether these building interventions can be ascribed to the period of Constantine's heirs or the period of Justinian's reconstruction of the buildings in Naissus and its surroundings remains open. The question relating to the building of wall no. 16 in room II and the connection with the hypothesis of previous research regarding the existence of the workshop for the processing of leather and wool also, for now, remains open.[38]

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[36] It is not possible, without access to the complete documentation from the archaeological excavations in 1987–1988, to determine whether the level of the mortar floor mentioned in the diary of archaeological research also belongs to this building phase.

[37] Мирковић 1974, 139–150; Vasić 2000, 245–251; Vasić 2008, 9–23.

[38] The report from the archaeological excavations in "Gradsko polje" for 1987 and 1988 (Petrović, Čerškov), Documentation of the Institute of Archaeology in Belgrade.

[39] See pages 3–4 in this paper.

Remains of the house from the Middle Ages (Sector 1, square A5) (Fig. 20–21)

Archaeological excavations conducted in square A5 confirmed the assumption of previous research regarding the size of the southern part of the building with octagon. Over the total length of the square, at a distance of 0.15 m from the western profile, the continuation of the western wall of the building (wall no. 8) was discovered, which was partly excavated in 1987–1988. Wall no. 8, 0.80 m thick, was discovered in the western part of square A5, with a length of 5 m. The southern part of the wall was built from large stones, and broken stones with limestone mortar over them, in the technique of *opus incertum*. The core of the wall was filled with small stone and brick fragments, and again with limestone mortar. On the eastern part of the wall traces of coarse plastering are preserved. On the northern part of the square, on the wall, a change in the method of building can be observed. Only bricks of different size are used (*opus latericum*), bonded with limestone mortar (0.04 m) (Fig. 22). The similar conditions and the building technique on the walls of the northern rooms of the building with octagon allow us to presume that it could be a jamb of a monumental entrance documented in earlier research.[39]

In the southern part of the excavation, beside wall no. 8, a construction made of bricks, oriented west-east (length 1.20 m), was leant on it. The construction consisted of four rows of bricks (height around 0.50 m) (Figs. 6b, 8, 20). The first, lowest line is made of four

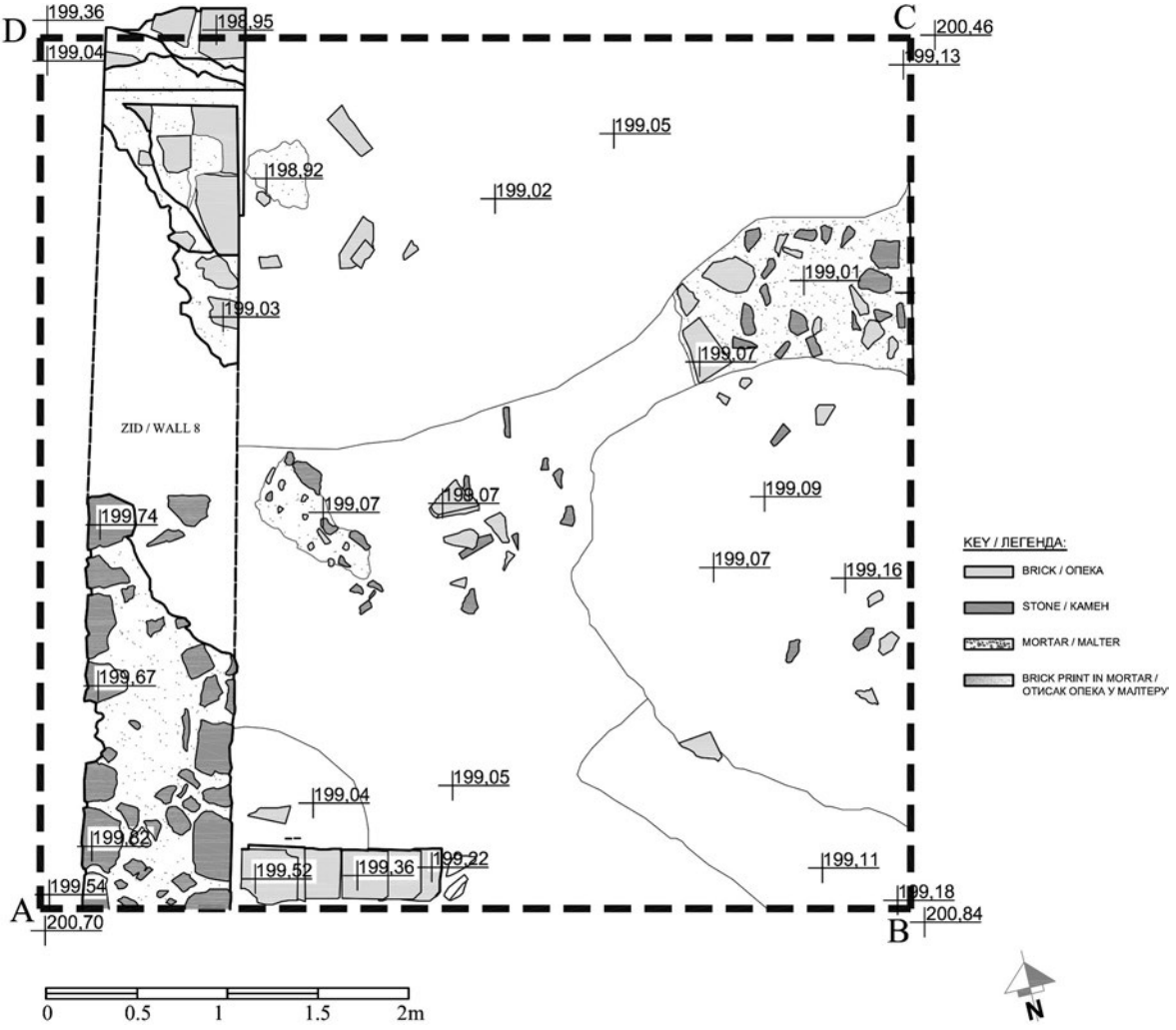

Fig. 20. Sector 2, square A5, layout on the level of the house from the middle age period (Igor Bijelić)

Сл. 20. Сектор 2, квадрат А5, план на нивоу средњовековних кућа (Игор Бјелић)

bricks, while the two upper lines of the construction have only one brick. In the corner that is bordered by wall no. 8 and the construction from bricks, a furnace (fireplace) was discovered. In the eastern part of the excavation, 3.80 m from wall no. 8, part of a wall built of broken stone can be observed.

Archaeological excavations in square A5 stopped in 2018 on a level of reddish-yellowish compact soil, which is the level of the house floor (Fig. 20–21). The house has not been discovered entirely yet, particularly its northern part. However, based on the stratigraphic situation in square 5, it can be assumed that the house was oriented north-south on its longer side and that its dimensions follow the orientation of square A4. The eastern part of the house is determined with an antique wall in the eastern profile of the excavation (the size of this part of the house, at 3.80 m in the direction west-east, corresponds with the size of the antique room). The place and construction of the northern wall are not clearly defined, which leaves the question of whether its northern border is beside the wall oriented west-east to the entrance on the western wall, open (Fig. 3).

The construction of secondarily used antique bricks found on the southern part of the building could have been placed beside the southern wall of the house. There are no traces of digging or burning of the wooden constructions of the walls or roof, which implies that antique walls were used for the planning and building of the house. The layer of antique building rubble from the larger area beside the eastern profile and in the middle of square A 5 (which is certainly from the wall observed in the eastern profile of the excavation) also suggests that which has been previously mentioned. In the period of the construction of the house, the antique walls of the building with octagon were preserved up to a certain height and probably presented a solid support for the roof of the house. Near the eastern profile of the excavation, several frag-

Fig. 21. Sector 2, square A5, layout on the level of the house from the middle age period, from the northwest (Igor Bijelić)

Сл. 21. Сектор 2, квадрат А5, план на нивоу средњовековних кућа, поглед са северозапада (Игор Бјелић)

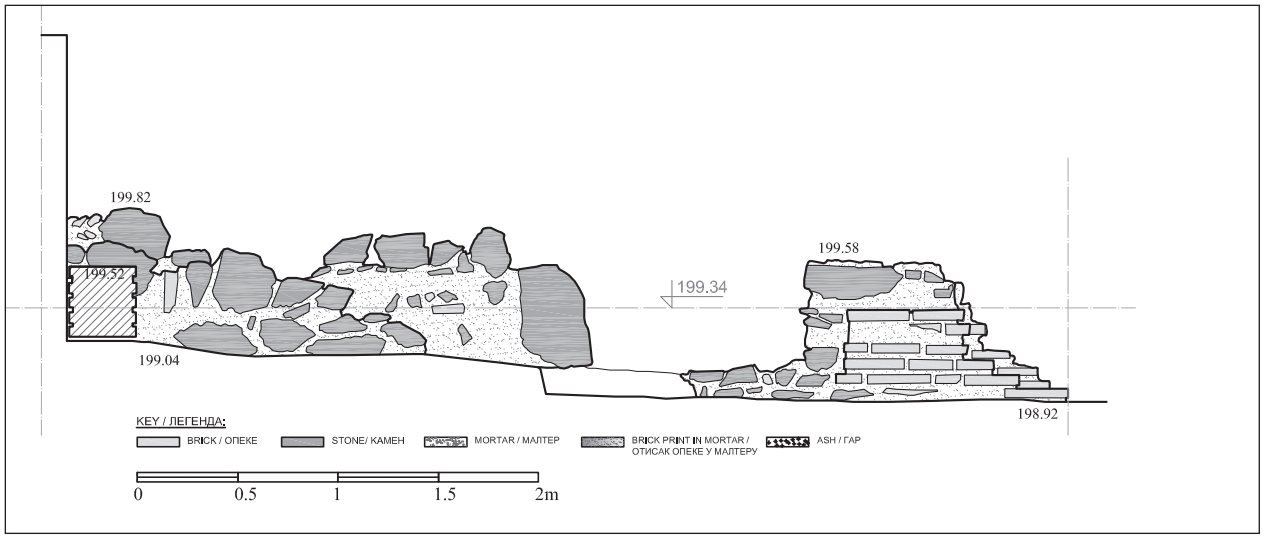

Fig. 22. Sector 2, square A5, eastern prospect of wall no. 8 (Igor Bijelić)

Сл. 22. Сектор 2, квадрат А5, источни изглед зида бр. 8 (Игор Бјелић)

ments of a fine polished clay with which the antique wall was coated, probably during the Middle Ages, were found.

It is very probable that the house in square A5 does not represent the only one on the area of the building with octagon. In the western profile of the square, on the same elevation, a layer of reddish-yellowish compact soil is clearly seen (length of the layer is 2.60 m, from south to north), which certainly indicates the floor of another house (object). Also, on the southern profile, on the same elevation, there is a layer of reddish-yellow compact soil (length of the layer is 2.35 m), which implies yet another house (object).

The house from the Middle Ages on the locality of „Gradsko polje" belongs to the residential settlement layer, from the period of the 11th–12th century, when late antique episcopal centres were reconstructed by Byzantine authorities.[40] Different privileges given to some of the renovated church and administrative centres characterised those centres as so-called „proto-urban" centres.[41]

All the settlements of rural character represented the beginning of the reconstruction of city life in the territory of the Central Balkans after a long period of the ruralisation of the antique centres, which began with the invasions of the Germanic tribes at the end of the 4th century until the complete defeat of the Romans in Northern Illyricum by the Avars and Slavic tribes in the 6th and the 7th century.[42]

Inside the area bordered with antique walls in Naissus, a new settlement was formed, which can be followed in the middle and south-western part of the later Turkish fortress.[43] Although devastated, the antique infrastructure was still visible, but it didn't significantly influence the forming of the settlement by the population to which the techniques of antique building were strange and unknown. The traditional way of building houses from wood was used for a long time in the middle age settlements, and the antique walls, although mostly damaged, were used as parts of wall constructions or represented secondarily used building material.

The origin and functions of octagonal form

Although the excavations of the building with octagon discovered only the northern part of the object,

[40] Naissus represented a very important Episcopal centre in the Central Balkans from the period of Late Antiquity. In the 9th and 10th century, the area of Niš belonged to Bulgaria, therefore the Niš episcopy belonged to the Bulgarian church. However, at the beginning of the 11th century, the Byzantine Empire ruled the Balkans, so Niš became once more a very important centre, Калић 1984, 6–7.

[41] The beginning of the restoration of city life and the forming of urban centres in the territory of the Central Balkans was archaeologically confirmed in Belgrade, Sirmijum, Niš, Mačvanska Mitrovica, Милошевић 1997, 113, 122–124.

[42] Popović 1982, 545–566; Максимовић 1980, 17–57.

[43] Милошевић 1997, 65.

some assumptions about its function can be made at this stage of the research. As historians of antique and late antique architecture frequently point out, the octagonal shape was quite fashionable in the architecture of the 4th century. However, the octagonal structure had its history before the 4th century and in that context rooms of that shape had different functions, as can be seen from the 1st century examples of Imperial palaces (like *Domus Aurea*) the *Domus Augustana* on the Palatine in Rome, the palace of Diocletian in Split, the imperial palace in Thessaloniki, baths in Ephessus etc.[44] From the 1st century to the period of Late Antiquity, octagonal rooms and halls are known to have been parts of *villae,* palaces, buildings of religious context (*baptisteria,* early Christian churches) or *memoriae* and *martyria* (like, for example, the martyrium at Nyssa).[45] Regarding Nero's *Domus Aurea*, the octagonal court in it was flanked by two of the principal dining rooms and probably had the function of a banquet room.[46] The closest parallels for Nero's Domus Aurea octagonal room are to be found among halls known as „nymphaea", like for example the Small Nymphaeum of the so-called Villa of Cicero at Formia from the 1st century B. C., but the precedents of the octagonal structure were probably derived from the East, which is suggested by the striking similarities between the octagon of *Domus Aurea* and a hall with additional chambers which belonged to the tomb complex of Souk el-Wardian near Alexandria.[47]

In the period from the 2nd to the 5th century, octagonal rooms became more frequent in baths,[48] although they had other functions as well: the function of nymphaeum (like in the villa Valdetorres de Jarama near Madrid),[49] peristyle (like in the Palazzo Pignano[50]or as a spectacular peristyle from villa of Rabacal in Portugal[51]) or dining room, like that from the villa of Desenzano.[52] Vestibules in the octagonal form are also known, such as the one behind the Hall of the Doric Piers in Tivoli, which led to the Piazza d'Oro.[53]Some octagonal spaces were mausolea, like the one in Diocletian's palace at Split (Spalato) or palace churches, as in one at Antioch in Syria.[54] For some octagonal rooms, their function is still unclear, like for example for the octagon in the Tetrarchic palace at Thessaloniki, where the octagon was situated at the north end of a peristyle and joined via a vestibule. The niches in the octagonal hall at the imperial palace at Thessaloniki could imply the function of a banquet room, but the octagon could have also been a reception room[55]or even a throne room.[56] Of course, from the 4th century,

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[44] Brandt 1601.

[45] In that context, in previous literature about the building with octagon from the site of "City field" in Niš, it was presumed that its architecture could have been inspired by the rooms in late antique *thermae* or mausoleums. In the opinion of P. Petrović, the building with octagon from Niš could have changed its function during this period of time, Петровић 1993, 68–69; St. Gregory of Nyssa described the martyrium at Nyssa as octagonal, Freze 2015, 279.

[46] The octagonal court (hall) in *Domus Aurea* led to rectangular vaulted rooms on five sides, of which two rooms were principal dining rooms. The room of an octagonal plan in *Donus Aurea* had a concrete dome, probably originally covered in glass mosaic, and was top-lit through a broad oculus in the dome (it had no windows). However, since it opened on five sides to rooms which were lit from above by concealed light wells (around the outer edge of the dome), it had sufficient light. As D. Watkin suggests, the open dome "may have been surmounted by a structure described by Suetonius as "rotunda" and thus, as Suetonius writes, created the effect of revolving constantly and looking "like the heavens", Watkin 2005, 72–73; Svetonije 1978, 237.31

[47] The tomb complex of Souk el-Wardian near Alexandria belongs to the underground type of tomb complex, dating to the late 1st century. Although the tomb complex from Souk el-Wardian is of a later date than *Domus Aurea*, its design could reflect earlier domestic architecture present in Alexandria that could predate the type of structure presented in Nero's *Domus Aurea*, Hemsoll 1989, 14–15.

[48] As O. Brandt writes, octagonal halls are found in the baths of the Heliocaminus in the Villa Adriana at Tivoli (the 2nd century), in the baths of the Olympieion in Athens (the 2nd century), the bath of Butrint in Albania (early 2nd century), the Antoninian baths of Carthage in Tunisia, the Forum baths at Ostia (the 2nd century), the southern baths of Bostra (the 2nd or the 3rd century), the baths of Dchar Jdid, "C" baths in Antiochia (the 3rd century), Diocletian's baths in Rome (298–305/6), the baths of Maxentius on the Palatine in Rome (306–312), the baths of Constantine (315), the baths of Piazza Armerina in Sicily (320–340), the northeastern baths of Bulla Regia (maybe the 4th century) and the baths of Toprak-en Naroidja from the 5th century, Brandt 2011, 1601.

[49] A very famous villa when considering the topic of Late Antiquity statuary, the villa in Valdtorres de Jarama was built in the late 4th century and had an octagonal structure with four apses, because of which it is presumed that it belonged to a bath or *nympheum*, Stirling 2005, 179.

[50] The northern Italian villa, Palazzo Pignano was built in the 4th century and occupied throughout the 5th century. Besides having a basilical reception room and polychromatic mosaics (like the building with octagon in Niš), it had an octagonal peristyle, Stirling 2005, 177.

[51] The villa of Rabacal in Portugal was built in the 4th century, in the period of the Tetrarchy when building activity was booming in the area of Conimbriga, Kulikowski 2011, 132.

[52] The villa of Desenzano, near Milan, was built in the 2nd century but was renovated in the early 4th century. The octagonal room in the villa was near the garden and was probably part of a dining complex, Stirling 2005, 177.

[53] Coarelli 2014, 486.

[54] Armstrong 1974, 12–13.

[55] Mayer 2014, 115.

many baptisteries in Italy, Southern France and the East, were of an octagonal structure.[57]

However, in the context of the analogies with the building with octagon from the locality of „City field" in Niš, the villa Valdetorres de Jarama in Spain dated to the late 4th century should be mentioned. The villa is known not only as a unique villa in Spain for its octagonal form, but it is also famous for its numerous finds of late antique statuary.

In the central octagonal room of the villa, pieces of carved ivory panels were found, dating to the late 4th or early 5th century and analogous to the find from the building with octagon from the locality of „City field" in Niš, where a large number (210 pieces) of decorative fragments made from red deer antler cortex, was found.[58] It is presumed that ivory panels from the villa Valdetorres de Jarama, which are stylistically similar to the fragments (particularly those with abstract decorations) from the building with octagon in Niš, decorated some furniture piece or chests.[59] It is interesting that both ivory and red deer antler finds were discovered in the central octagonal rooms of the buildings, where they probably decorated some luxury piece of furniture, thus emphasising (beside other architectural elements like niches with monumental statues and mosaics) the grandeur of the centrally positioned octagonal room.

Bulgarian researchers consider that a large number of public buildings in Serdica were reserved for members of the imperial family and that they were used as residences of the emperors Galerius and Constantine. The octagonal form was quite popular (for example St. George's octagonal atrium with apse, and the smaller *balneum* with octagonal caldarium etc.), as part of public and private buildings.[60]

A close analogy can be also found in an octagonal building discovered during archaeological excavations in locality 85 in Sirmium in 2014 and 2015. The building of sacral function, where around 50 fragments of porphyry sculptures were discovered,[61] was actually a building of a complex construction, actually a hexadecagon (with 16 sides), massive walls (1.80 m wide), firmly rooted column bases and a diameter of exactly 80 Roman feet.[62] Its building chronology (the beginning of the building of the object is defined by coins of Maximian Herculius, from 301 and the last building phase is defined by coins of Valentinian, 367–375)[63] and its monumentality represent a close analogy to the building with octagon from the locality of Gradsko polje in Niš.

The inclination of the builders of the 4th century towards the use of the octagonal form in private rooms of a ceremonial character can also be observed in the organisation of the villa with octagon from the locality of Medijana (Mediana) in Niš. The building was of a complex and rugged plan, with the western part of the octagon having a deep apse to the west. The archaeological context of the villa with octagon at Mediana shows that the users and / or owners of this villa belonged to the upper classes of Roman society and that their need for luxury in decoration was, besides high quality architectural plastics, mosaics and marble sculptures, also expressed in the shaping of the large reception rooms like the one in the shape of an octagon. The building of the villa with octagon at Mediana is directly connected to the organisation of the imperial domain and the Constantine Villa at Mediana[64]

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[56] As M. Vickers points out, the octagon in Tetrarchic palace at Thessaloniki couldn't be a mausoleum or a church, although both suggestions have been made in the scientific literature. In his opinion, the octagon from imperial palace at Thessaloniki was a secular building of great importance within the palace, perhaps a throne room as its monumental proportions imply, Vickers 1973, 119–120.

[57] As O. Brandt writes, the earliest known central-plan baptistery is the octagonal hall of the Lateran baptistery, dated to the middle of the 4th century. He suggests that octagonal design may have spread from the Lateran to Milan and North Italy (Ravenna, Albenga, Aquileia) and influenced the architecture of the baptisteries in Constantinople (octagonal baptistery of Haya Sophia, early fifth century) and martyr churches in the East (baptistery of St. John at Ephessus, baptistery of Qal'at Sim'an in North Syria, baptistery of St. Menas, Abu Mina in Egypt, all dated to the 5th century), Brandt 2011, 1592–1593.

[58] A large quantity of decorative antler fragments with abstract, floral and zoomorphic (fish and birds) ornaments, was found in the centre of the octagonal room, in the layer of ashes and charcoal, right above the mosaic and red burnt soil. The pieces are heavily burnt and it is presumed that they represent decoration of one single object, probably furniture piece like chair or chest. Whether the find was an import or locally manufactured can't be established with certainty, Čerškov et al. 2016, 104–111.

[59] The ivory panels found in octagonal room of villa Valdetorres de Jarama were imported from probably Egypt and confirm expensive taste of villa's owner for imported luxury goods, Stirling 2005, 181–182.

[60] De Sena 2014, 66 – 72.

[61] Popović 2016, 371–374; Поповић 2017, 49–53.

[62] We would like to express sincere thankfulness to colleague Dr Stefan Pop-Lazić, for his kindness in informing us in more detail about the octagonal building excavated in 2014 and 2015, in locality 85 in Sirmium.

[63] Поповић 2017, 51–53.

[64] The villa with octagon at Mediana is dated to the 4th century, Milošević,Vasić, Gavrilović 2013, 7–26.

Conclusion

In light of the new archaeological excavations in 2018, the significance of the building with octagon on the site of „Gradsko polje" is confirmed as a very important *topos* in the urban development of antique Niš. It is very probable that at the end of the 3rd, and particularly in the 4th century, Naissus was a large military, commercial and economic centre and that, according to its status, it had public buildings for the needs of the city administration, but also appropriate rooms for the accommodation of emperors and their administration in the city.[65]

The architecture of these buildings was different by its appearance, construction and, particularly, its decoration. In the organisation of the building with octagon at the site of „Gradsko polje" in Niš, the mentioned elements are identified through the combination of the central layout with the octagon to the north and the longitudinal layout on the southern part.

The construction of the central room is projected as an octagon surrounding a square base. In the triangular parts, deep niches were set, which allowed a simpler transition to the roof form of a dome, but also lessened the weight of the walls and gave to the interior layout an indented character. Fresco painting on the walls, mosaics on the floors, architectural plastics and sculptures decorated the rooms of the building with octagon. The lateral rooms with their dimensions exit the central plan with the dome and, in the form of shallow overhangs, which on the northern and southern part of the building give the impression of an indented layout, emphasise the magnificence and splendour of the building's facade.

The central room (I) was the reception hall, while the lateral rooms could have been part of an official area or private rooms. Room II was a part of the yard, on the western and eastern side of which were situated half-open or closed rooms. A strongly accentuated communication through this yard led to the central octagonal room. The transition between these two different building constructions is emphasised with the representative entrance with two niches and the approach construction with the staircase and built postaments.

The building with octagon was a part of the city district, in the north-western area of the antique city[66], in which different public buildings were situated, according to the rules and standards of Roman architecture. Besides public baths (*thermae*), which were close to the building with octagon, other public buildings can be expected in its vicinity, mentioned by Vitruvius in his book „On architecture": „*For persons of high rank, who hold office and magistracies, and whose duty it is serve state, we must provide princely vestibules and broad avenues finished in a majestic manner; further, libraries and basilicas arranged in a similar fashion with magnificence of public structurism because, in such palaces, public deliberations and private trials and judgments are often transacted".*[67]

Based on the currently discovered monumentality and luxury of the architecture and decoration of the building with octagon in the locality of „City field" in Niš (marble architectural plastics, fresco-painting, mosaics, etc.) and the structure and central location of the octagonal room, which implies the function of that space for some grandeur or celebration,[68] at this stage of the research of the building with octagon we can conclude that it was probably a public building, belonging to those buildings (complexes) of the highest importance in the period of the Late Antiquity in the Central Balkans' Roman provinces.

Translated by N. Gavrilović Vitas

65 Petrović 1993, 60–62; Vasić 2008, 9–23.

66 Милошевић 2005, 157, 158, Сл. 7.

67 Vitruvius: On Architecture, 1970, Book VI, Cha. V/2, 37, 39.

68 Brandt 2011, 1602.

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Nadežda M. GAVRILOVIĆ VITAS, Gordana D. MILOŠEVIĆ JEVTIĆ
Building with Octagon from the locality of „Gradsko polje" in Niš (*Naissus*). New Archaeological Excavations (247–272)

Резиме: НАДЕЖДА ГАВРИЛОВИЋ ВИТАС, Археолошки институт, Београд
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ГРАЂЕВИНА СА ОКТОГОНОМ НА ЛОКАЛИТЕТУ „ГРАДСКО ПОЉЕ" У НИШУ (*NAISSUS*) – НОВА АРХЕОЛОШКА ИСТРАЖИВАЊА

Кључне речи – Грађевина са октогоном, Градско поље у Нишу, касна антика, мозаици, Константин Велики

Прва археолошка ископавања на простору нишке Тврђаве започета су после Другог светског рата, а нов замах добила су током 80-их и 90-их година прошлога века када су и откривени делови античког града у централном делу Тврђаве код Арсенала, испред Хамама, уз југозападни бедем и на простору „Градског поља" (делови бедема византијског утврђења са делом улице констатовани су код Џамије, код Јагодинмалске капије и на централном платоу Тврђаве). Поред откривања дела улице са тремовима, улице са делом канализације, објекта под сводовима, базилике, јавних терми и храма бога Асклепија, приликом радова 1987. године на пешачкој стази на простору „Градског поља" (на око 300 м северозападно од централног платоа Тврђаве, између турске Тврђаве и комплекса техничких факултета) откривен је северни део веће античке грађевине (16 м x 31 м по извештају археолога Тонија Чершкова из 1987. године), са централном октогоналном просторијом (октогон уписан у квадратну основу), са чије су се источне и западне стране налазиле по две мање просторије. Грађевина је оријентисана у правцу север–југ и у свим њеним просторијама констатовани су остаци мозаика, фреско-сликарства, архитектонске пластике и подног грејања (у једној просторији су откривени и трагови зидног грејања), док су се у централној октогоналној просторији налазиле и нише за смештај скулптура (у нишама су пронађени трагови црвене боје и беле бордуре, што потврђује да су и оне биле осликане). У централној и северозападној просторији грађевине су констатовани и гробови из средњовековног периода (извештај Тонија Чершкова), као и бројни налази фрагмената керамике, животињских костију, стакла (посуда), већи број коштаних жетона и фрагмената оплате, делови архитектонске пластике и оруђа за обраду коже и вуне. Грађевина са октогоном је опредељена у период Максимина Даје – на основу налаза новчића у северном зиду просторије III.

После дуже паузе, од скоро 30 година, током 2016. године обављена су археолошка ископавања сондажног типа на простору јужне шкарпе ископа из 1987, 1988. и 2012. године (јужно од крајње југоисточне просторије грађевине), која су, на основу геофизичких снимања предузетих 2017. на ширем делу локалитета „Градско поље" ради утврђивања габарита грађевине, године 2018. настављена. С обзиром на ограничена финансијска средства која су добијена, одлучено је да се на основу постављене квадратне мреже у циљу повезивања откривене архитектуре и налаза са новом архитектуром и налазима (квадрати дим. 5 м x 5 м) паралелно ископава у два сектора – *сектору 1*, односно простору где је по резултатима геофизичких снимања очекиван крај спољног западног зида грађевине и *сектору 2*, односно простору јужно од улаза у октогоналну просторију грађевине. Ископавања у сектору 1 потврдила су претпоставку ранијих истраживача о величини јужног дела грађевине (квадрат A5 у сектору 1 је отворен јужно од улаза на западном зиду 8), те су ископавања у 2018. години вођена до нивелете византијског слоја (компактна земља црвенкасто-жућкасте боје, заправо слој подница куће из средњег века), у коме је уједно у јужном углу квадрата A5 (уз зид бр. 8) откривено и огњиште (пећ) од опека. Средњовековна кућа није у целости откривена (њен северни крај), али се на основу стратиграфске ситуације може претпоставити да она својим габаритом прати оријентацију квадрата A4, односно распон античких зидова. Кућа у квадрату A5 не представља усамљен случај на простору грађевине са октогоном, јер се и у западном профилу квадрата, као и на јужном профилу на истој нивелети види слој компактне црвенкасто-жуте земље, односно слој подница средњовековних кућа из периода 11–12. века, када су у доба византијске власти обнављани касноантички епископски центри. Претходно речено потврђују и бројни фрагменти средњовековне кухињске керамике локалног порекла.

Ископавања у сектору 2 (квадрати B1, C1 и D1) настављена су на поплочаном простору испред улаза на јужној страни у централну октогоналну просторију у квадратима констатованим и током ранијих истраживања, као и на простору према јужном профилу квадрата D1 и према квадрату C1. Начин градње зидова и подова у просторијама II (просторија испред улаза у централну октогоналну просторију) и VIII (просторија источно од просторије II и јужно од просторије VI) потврђују карактеристике градње документоване у претходним истраживањима грађевине са октогоном, са различитим техникама зидања каменом и опеком (*opus vitatum* или *opus mixtum*). За конструкцију довратника, ниша и код спољних углова грађевине користи се искључиво опека различитих формата (*opus latericium*).

Истраживањима обављеним у 2018. години утврђена је и хронологија градње откривеног дела грађевине са октогоном: најстарији грађевински хоризонт припада периоду градитељске активности царева Лицинија и Константина Великог и тај је хоризонт представљен нивоом пода од опека у просторији II, као и подом од масивних комада каменних плоча зелене боје у просторији VIII и делом ступца у

јужном профилу ископа. У другом грађевинском хоризонту, преко пода од опека положен је под од камених плоча ређаних у правилним редовима и, можда, мозаик у источном делу просторије II. Слој малтера сачуван на једној од камених плоча зелене боје у просторији VIII указује на могућу израду завршног квалитетнијег пода у тој просторији. Подови од опека у просторији II и под од масивних камених плоча зелене боје у просторији VIII могли би бити најстарији грађевински хоризонт, али и само потфаза у постављању декоративног пода од камена и мозаика у тим просторијама. Највеће промене у другој грађевинској фази огледају се у реконструкцији улазног дела у централну октогоналну просторију, где је највећа пажња градитеља била усмерена ка репрезентативности изгледа улазног прочеља у северни део грађевине са октогоном. Улазни простор бива наглашен постављањем главног степеништа са два симетрично постављена или реконструисана зидана постамента што су међусобно повезана каменим степеником у распону укупне ширине резалита (7 м). Полукружне нише осликане фреско-сликарством и са скулптурама додатно су наглашавале општи утисак монументалности и раскоши грађевине.

У просторији II је током истраживања у 2018. години откривен и зид оријентације СЗ–ЈИ, од крупнијег ломљеног, приглачаног камена, негде и са опеком (унутрашњост зида је израђена од ситнијег и крупнијег ломљеног камена и опеке, са малтером бело-сиве боје који у саставу има крупнији камен и шљунак), у скоро три правилна хоризонтална реда, који својим правцем негира касноантичку архитектуру и свакако припада млађој фази рановизантијског периода. Археолошки материјал у оба сектора што су истраживана у 2018. години састоји се углавном од фрагмената стаклених посуда, архитектонске пластике, животињских костију и бројних фрагмената средњовековне керамике у квадрату А5 и касноантичке и рановизантијске керамике у сектору 2.

Простори октогоналне форме, у римској архитектури познати од 1. века (у функцији свечаних трпезарија, нимфеума, перистила, делова приватних и јавних купатила итд.), постају нарочито популарни у 4. веку, када је форма октогона, услед симболике коју броју осам приписују хришћански писци, била нарочито омиљена за просторе баптистеријума. Међутим, у случају грађевине са октогоном на локалитету „Градско поље" може се с приличном сигурношћу претпоставити да је централна октогонална просторија представљала салу за аудијенцију, у чијим су се троугаоним исечцима постављале дубоке нише које су омогућавале једноставнији прелаз у куполни завршетак, олакшавале тежину зидне масе и унутрашњем уређењу давале разуђен карактер основе. Бочне просторије су могле бити део официјелног амбијента или приватне одаје, а просторија II је представљала део дворишта, на који су са западне и источне стране биле постављене полуотворене или затворене просторије. Прелаз између дворишта и централно надвишене октогоналне просторије био је наглашен репрезентативним улазом са две нише и прилазном конструкцијом са степеништем и зиданим постаментима. Раскош и монументалност грађевине са октогоном додатно су наглашавали зидови украшени архитектонском пластиком од мермера, фреско-сликарством и мозаицима, који својим мотивима, композицијама и техникама извођења представљају директну аналогију мозаицима из перистила Константинове виле на Медијани. Директну архитектонску аналогију представља и вила са октогоном на Медијани, сложене и разуђене основе у којој доминира западни део октогона са дубоком апсидом на западу (вила је такође била декорисана фреско-сликарством, мозаицима и скулптурама), чија је градња везана за организацију царског домена и Константинове виле на Медијани.

Као луксузан јавни објекат грађевина са октогоном на локалитету „Градско поље" била је део градске четврти смештене у северозападном делу античког утврђеног града, у коме је кореспондирало више зграда јавне намене као што су јавне терме откривене у близини и други објекти који су служили за привремени боравак високих достојанственика, чланова царске породице и царева.

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LEAD SEALS WITH TETRARCHIC BUSTS FROM THE IMPERIAL PALACE IN SIRMIUM

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Abstract – In the course of archaeological excavations of the north section of the imperial palace in Sirmium (locality 85), conducted in 2015, as many as 39 lead seals were found to the south of column IV of the polygonal structure encountered in 2014. Nine specimens of imperial seals with a representation of four busts, i.e. images of the tetrarchs, are particularly interesting in this group. These seals appear in three iconographic variants (a-c) depending on whether the four busts are positioned in two rows or in a single row and whether they are of identical size. The discovery of imperial lead seals with the busts of tetrarchs bears witness to the importance of Sirmium at the time of the tetrarchy, not only as an army base for Diocletian's wars against the Sarmatians, but also as a commercial centre where the deliveries of various products also arrived. They were, among other things, intended for building and decorating the polygonal structure used for celebrating the imperial cult.

Key words – Sirmium, lead seals with four busts, tetrarchy, imperial palace, polygonal structure

Lead seals were mass produced throughout the entire Roman period as they were used to mark the ownership of some goods or packages by adding an inscription or a particular sign. Thus, these tiny objects became a declaration of ownership and guaranteed the safety of the road networks, in particular the channels used for supplying the army. Depending on the merchandise or package, the seals could have been official, municipal and private[1] or, more precisely, they could be imperial, official, customs, provincial, municipal, civic, military (seals of legions, alae and cohorts), of the consular beneficiaries (*consularii beneficiaris*), or of guards (*equites singulares*). Additionally, there were also seals that cannot be classified into any distinct group regarding the representations on them (miscellaneous seals).[2] The shape of the seal did not identify the ownership, so they could be classified into a few groups: those consisting of two circular small plates with a narrow band between them (A), seals of a conical shape with a channel for a string (B), circular seals with an uneven reverse side (C), relatively thick plates with a stamp on both sides (D) and seals shaped as a label, fixed to the package (E).[3] Many variants could be distinguished among these main groups of seals.[4]

Despite the fact that lead seals have been found in large quantities at sites throughout the Empire, a large number of them have remained unpublished. As a result

[1] Turcan 1987, 16.
[2] Still 1995, 54–134.
[3] Turcan 1987, 15–16.
[4] Still 1995, 35–53.

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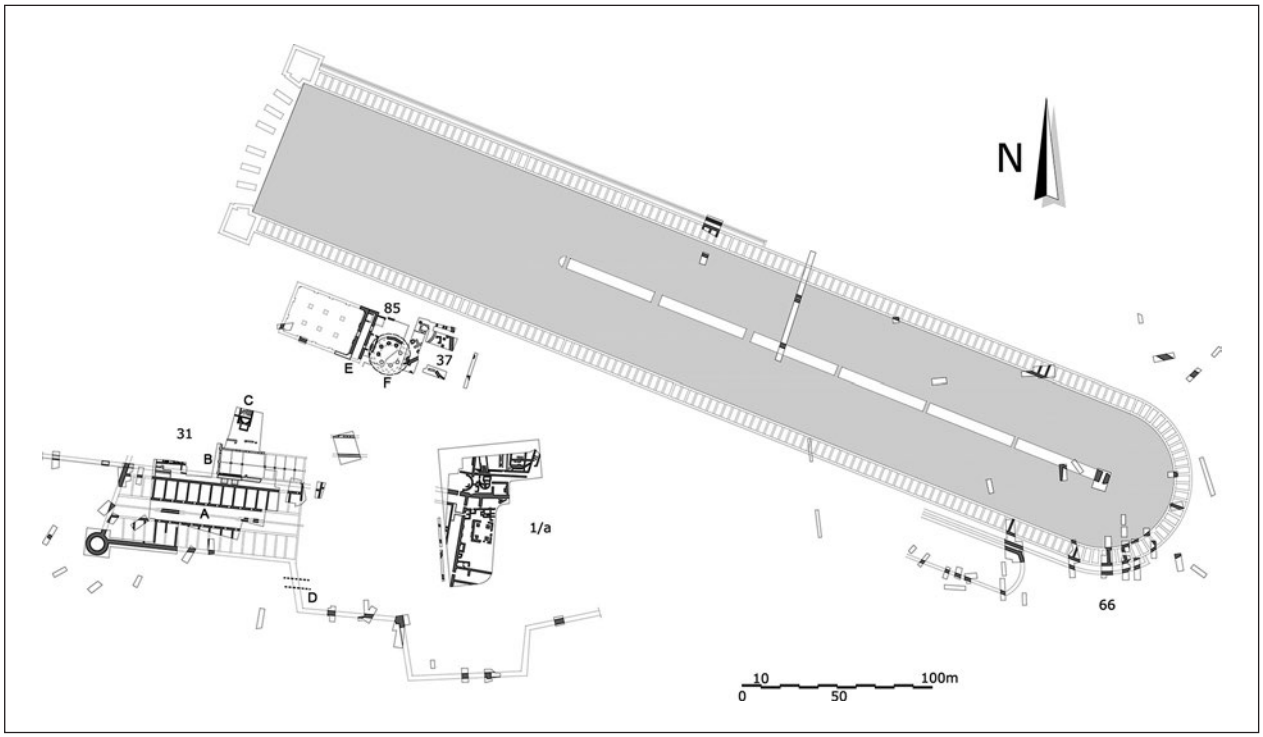

Fig. 1. Investigated localities (1/a, 31, 66, 85) of the palatial complex in Sirmium: A, B – economic structures, C – baths, D – southern city gate, E – economic structure (?), F – polygonal structure (plan by Bojan Popović)

Сл. 1. Истражени локалитети (1/а, 31, 66, 85) палатијалног комплекса у Сирмијуму: А, В – економски објекти, С – термални објекти, D – јужна градска капија, Е – економски објекат (?), F – полигонални објекат (план Бојан Поповић)

of that group of material, including 1,810 catalogued specimens, the discussion regarding the distribution of certain groups of seals within the provinces[5] is deficient to a great extent and the conclusions are open to discussion. Unfortunately, of all the Roman lead seals discovered in Serbia as a whole only specimens from Viminacium, now housed in the National Museum in Požarevac,[6] and those found at the site of Zindan in the village Čičin, in the Aleksinac valley (*Praesidium Pompei*),[7] have been published, but when the above mentioned corpus was published they were not taken into consideration. Many lead seals discovered during sixty years of systematic investigations in Sirmium are, unfortunately, unpublished. We would like to point out that in the course of archaeological excavations of the northern section of the imperial palace in this city (locality 85) (fig. 1) as many as 39 lead seals have been recorded. They were found to the south of column IV of the polygonal structure. Within and around that structure, fifty fragments of porphyry sculptures were found in the course of excavations conducted between 2012 and 2015. These sculptures were, after conservation, identified as imperial portraits and busts.[8] The erection of four pillars of a polygonal structure (fig. 2) is dated by coins of Maximianus Herculius from AD 301[9], which were found in the soot around the base of pillar III of the structure (fig. 3) at an absolute depth of 79.80 m. Porphyry fragments were discovered above floor *g* in a layer of debris consisting of brick fragments, gravel, earth and fragments of frescoes, at the absolute depth of between 80.86 and 79.71 m.[10] All the lead seals were discovered to the south of pillar IV in a levelling

[5] Still 1995.

[6] Иванишевић / Ivanišević 1992, 47–52.

[7] Рашковић / Raškovic 2015, 211–220.

[8] Popović 2016, 371–390; Поповић 2016, 2017, 115–131; Popović 2017; Popović 2018, 68–79

[9] *RIC* VI, no 316.

[10] Popović 2016, 371–373.

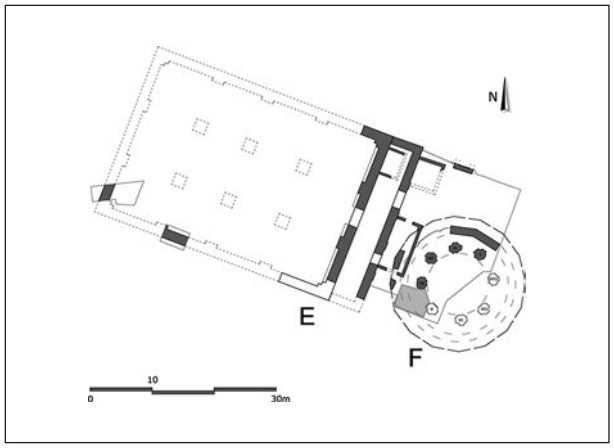

Fig. 2. Polygonal structure, view (with marked finding location of seals) (plan by Bojan Popović)

Сл. 2. Полиīонални објекаш, изīлед (са означеним месшом налаза īломби) (īлан Бојан Пойовић)

Fig. 3. Bases of four pillars of polygonal structure (documentation of the Institute of Archaeology, Belgrade)

Сл. 3. Базе чешири сшуба īолиīоналноī објекша (докумен шација Археолошкоī инсшишуша у Беоīраду)

layer of gravel and brown earth above floor *g,* recorded in this area at an absolute depth of 79.58 m. In the levelling layer, besides the seals, three coins of Constantine the Great, one from AD 320, second from AD 324–325 and third from AD 330–335, three coins of Constantius II (335–361), two coins of Constantine II (324–330 and 330–335) and one coin of Valens from AD 364–367 were also found .[11]

The most important among the 39 lead seals found to the south of pillar IV of the polygonal structure are nine specimens with representations of four busts. For these pieces it could be claimed that they are imperial seals from the time of the tetrarchy. A representation of four busts – four tetrarchs – appears depicted in three variants that is unrecorded so far. Such a scene is represented on seals consisting of two small circular plates with a narrow band between them (A) and on seals shaped as a cone with a channel for a string (B). The seals will be presented according to the characteristic of the depicted scenes (variants a-c) and their shape is denoted by the letters A and B, considering that the scenes we are talking about are depicted on seals of these two shapes. The seals will be marked using the numbers from the field inventory book (C).

I Imperial seals with four busts

a) Four busts arranged in two rows, in pairs, each pair facing each other; all busts are of the same size (fig. 4)

1. C-44, shape B, R = 25 mm, ▼80.06 m
2. C-51, shape B, R = 20 mm, ▼80.06–79.85 m

b) Four busts arranged in two rows, in pairs, each pair facing each other; busts in the second row are smaller than those in the first row (fig. 5)

3. C-62, shape A, R = 290 mm, ▼79.85 m
4. C-80, shape A, R = 170 mm, length 30 mm (bust in upper row to the left has short curly hair and the one to the right has a short beard) ▼79.92–79.58 m
5. C-90, shape A, R = 180 mm, length 30 mm, ▼79.92–79.58 m
6. C-92, shape A, R = 160 mm, length 230 mm, ▼79.92–79.58 m
7. C-96, shape A, R = 175 mm, length 410 mm, ▼79.92–79.58 m

c) Four busts arranged in a row with the two end busts being smaller than the central two (fig. 6)

8. C-79, shape A, R = 180 mm, length 230 mm, ▼ 79.92–79.58 m
9. C-52, shape B (?), seal is damaged; conical back side of the seal is missing, three busts are discernible but the scene is unclear due to damage, R = 190 mm, ▼ 80.06–79.85 m.

Nine seals with four busts are certainly imperial seals, which guaranteed the exemption of the merchandise from duty and other taxes. Despite the fact that representations on seals could be, although not often, of

[11] Preliminary identification of the coins was carried out by Miroslav Jesretić, custodian of the Museum of Srem, in Sremska Mitrovica.

Fig. 4. Lead seals with representations of four tetrarchic busts, variant a (inv. C-44, C-51) (documentation of the Institute of Archaeology, Belgrade)

Сл. 4. Оловне пломбе са представом четири тетрархијске биста, варијанта а (инв. С-44, С-51) (документација Археолошког института у Београду)

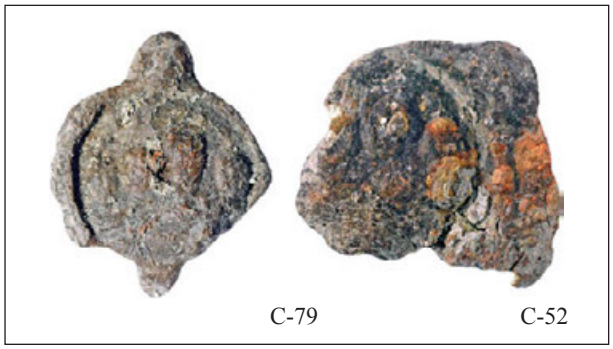

Fig. 6. Lead seals with representations of four tetrarchic busts, variant c (inv. C-79 , C-52) (documentation of the Institute of Archaeology, Belgrade)

Сл. 6. Оловне пломбе са представом четири тетрархијске биста, варијанта с (инв. С-79 , С-52) (документација Археолошког института у Београду)

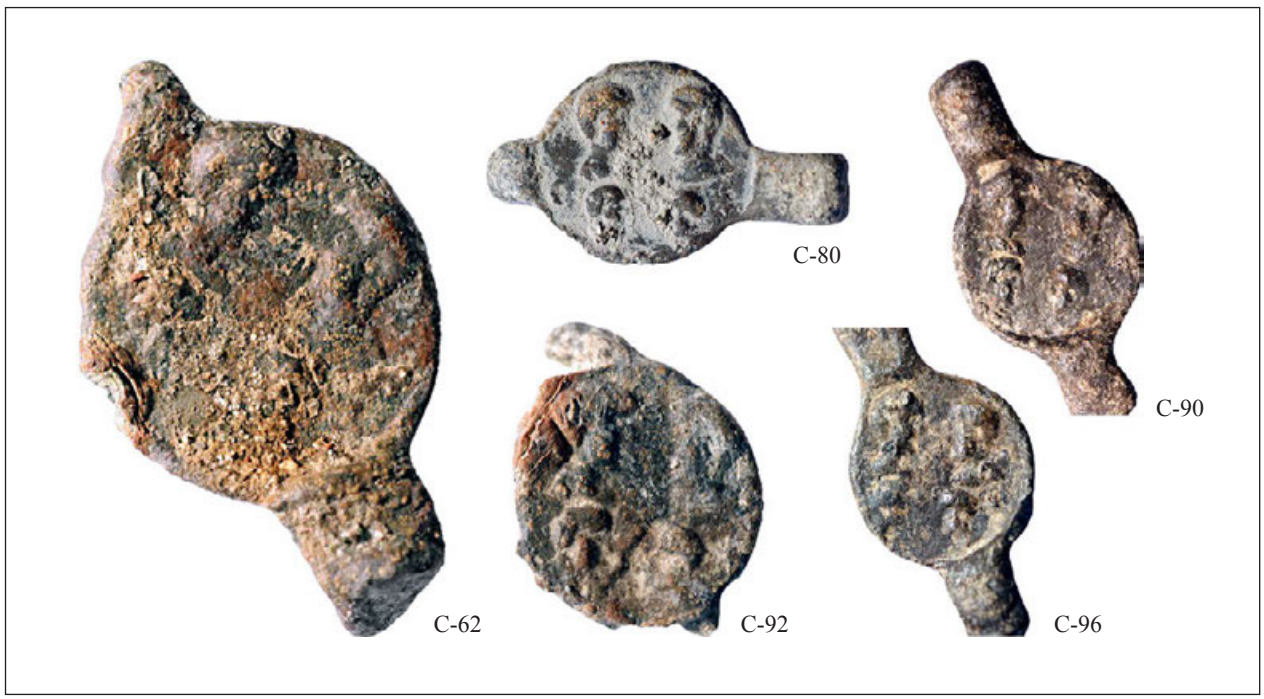

Fig. 5. Lead seals with representations of four tetrarchic busts, variant b (inv. C-62, C-80, C-90, C-92, C-96) (documentation of the Institute of Archaeology, Belgrade)

Сл. 5. Оловне пломбе са представом четири тетрархијске биста, варијанта b (инв. С-62, С-80, С-90, С-92, С-96) (документација Археолошког института у Београду)

the same quality as those on coins, seals with representations of four busts of the tetrarchs were not modelled on monetary material of that time as there were no coins with a representation of the four busts. That scene on the seals was supposed to guarantee that merchandise marked in such a way had been sealed following the orders of all members of the tetrarchic collegium.[12]

[12] Still 1995, 194–195.

Lead seals with representations of four busts had been discovered within a geographically confined territory including eastern Gaul (*Gallia Belgica*), *Noricum*, *Pannonia*, Moesia Superior (*Moesia Prima*) and Thrace (*Thracia*). Two specimens from Trier (*Augusta Treverorum*) are of the B shape with a representation of four busts of the same size in two rows[13] (variant a). Analogous specimens are one from Enns (*Lauriacum*)[14] as well as four seals from Pannonia,[15] three from *Carnuntum* and one from an unknown site. Two somewhat worn specimens from Sotin (*Cornacum*) also probably belong to this variant.[16]Although in their first publication they were not identified as imperial seals with representations of the busts of the tetrarchs, three seals from unknown sites in Viminacium,[17] and one somewhat worn and damaged specimen from the site of *Praesidium Pompei*[18] should also be classified in the above mentioned group. One of two seals from Kalugerovo (Haskovo province) in Bulgaria also belongs to this variant of seals.[19] On the other seal, the two busts in the bottom row are smaller than those in the top row (variant b) and between the busts in the top and bottom rows is a vertically depicted dolphin. A scene conceived in this way caused suspicion that it was a representation of the tetrarchs but it has since been assumed that it was a representation of Septimius Severus, his wife Iulia Domna and sons Caracalla and Geta and that the image of the dolphin, which is a sign on coins from Byzantium suggests that the seal was also made in that city.[20] There is also a dilemma over whether representations on the seals from the site of Izvoarele (*Sucidava*) in Dobrogea are imperial busts or busts of the emperor with his wife and children.[21] A seal at the National Museum in Belgrade, unfortunately from an unknown site, certainly depicts the tetrarchs arranged in pairs in two rows, but this representation is specific as between the tetrarchs in the upper row and those in the bottom row stands Victoria who is crowning them.[22] The scene distinguishes this seal as a distinct variant, which is so far unknown elsewhere.

A brief typological and iconographic analysis of seals with a representation of four busts reveals that their distribution could be followed from Trier via Noricum, Pannonia and Moesia to Thrace. As the greatest number of specimens has been discovered in Sirmium and that among these specimens are also identified so far unknown variants, it is logical to assume that Sirmium in the time of tetrarchy was an important centre for products with imperial seals. Bearing in mind that these seals played an important part in sealing goods intended for the army, it is important to mention that Sirmium was a military base during the wars waged by Diocletian and his Caesar Galerius against the Sarmatians at the very end of the 3rd century. Diocletian stayed in the city in AD 289/90, 293 and 294.[23] The Emperor and his Caesar accepted the consulate in Sirmium in AD 294.[24] The Sarmatians against which Caesar Galerius waged war from Sirmium were defeated, so Diocletian and his co-rulers were given the title *Sarmaticus Maximus*.[25] The sojourn of Diocletian and Galerius with their army, and the celebration of their consulate and triumph offered many reasons for the arrival in the city of various packages bearing imperial seals. It is an open question whether different variants of seals were used for distinct types of packages and also whether those with all four busts depicted in the same size are contemporaneous with those having busts in the bottom row smaller than those in the top row.

Official, civic and miscellaneous seals

This group includes some seals which could have been of an official character, and others, because of damaged representations, where it could not be established to which group they belong, bearing in mind that we are not talking about epigraphic specimens (fig. 7).

10. C-50, bust to the right, worn, shape B, R = 17 mm, ▼79.85 m

11. C-61, bust to the right, partially preserved, shape B, R = 210 mm, ▼79.85 m

12. C-72, bust to the right, worn, shape A, R = 14 mm, length 20 mm, ▼79.92–79.58 m

13. C-88, The bust of emperor (?) *en face*, second bust of emperor (?) to the left, wearing paludamentum,

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[13] Leukel 2002, 20–21, no 10, Taf. 1. 10; Lescheider 2007, 1.4.39; 1.4.40.

[14] Demski 1975, 49–64, no 8.

[15] *Ibid*., no 9–11; Still 1995, no 0200–0202, 0225.

[16] Ilikić 2006, 59, cat. 3–4.

[17] Иванишевић / Ivanišević 1992, 50, no 12–14 (for seal No. 12 the author (with question mark) suggests the possibility that these are busts of the tetrarchs).

[18] Рашковић / Rašković 2015, 214, T. 3. 1.

[19] Still 1995, no 0261.

[20] *Ibid*., no 0262.

[21] Culică 1975, 249, no 73–74, pl. 7, 73–74; Culică 1976, 117, 121, 125, pl. 7. 73–74; Still 1995, no 0157–0158.

[22] Stamenković, Ivanišević 3013, 241, sl. 1, 245, no 5.

[23] *Cod.Iust*. IV, 9,1; 34, 8.

[24] *Cons. Const.*, 230 (a. 294).

[25] Mócsy 1974, 268.

Fig. 7. Official, civic and miscellaneous seals (inv. C-50, C-61, C-72, C-88, C-98, C-68, C-103, C-53, C-101, C-55, C-104, C-95, C-100) (documentation of the Institute of Archaeology, Belgrade)

Сл. 7. Официјалне, цивилне и мешовите пломбе (инв. C-50, C-61, C-72, C-88, C-98, C-68, C-103, C-53, C-101, C-55, C-104, C-95, C-100) (документација Археолошког института у Београду)

profile to the right, edges of seal chipped, shape B, R = 15 mm, ▼79.92–79.58 m

14. C-98, bust to the left, helmet on head; from top to the back of the head ambiguous inscription: LONGIN OS (?), shape A, R = 150 mm, ▼79.92–79.58 m

15. C-68, standing figure *en face*, right leg bent at knee in a half jump; in the outstretched hands there are some objects (baskets?, bunch of grapes?), representation of Eros ?, shape B, R = 140 mm, ▼79.80 m

16. C-103, standing figure *en face*, right leg bent at knee in a half jump; in the outstretched hands there are certain indiscernible objects, representation of Eros?, shape B, R = 180 mm, ▼79.92–79.58 m

17. C-53, standing figure *en face*, right leg bent at knee in a half jump; arms below shoulders are missing, representation of Eros?, shape B, R = 160 mm, ▼80.06–79.85 m

18. C-101, standing figure running to the right, head facing left, right arm bent at elbow holding round object, shape B, R = 165 mm, length 20 mm, ▼79.92–79.58 m

19. C-55, two figures hugging or wrestling (?), shape B, R = 20 mm, ▼80.06–79.85 m

20. C-104, standing figure in a long dress represented *en face*; bent arms and holding, under the breasts, a rather large shallow plate with four rounded objects; crown on the head?; to the right of the figure a representation of a gate?, shape B, R = 150 mm, ▼79.92–79.58 m

21. C-95, representation within three concentric circles: seated figure in profile, to the right, right arm bent at elbow and raised; approached by standing figure in profile to the left, shape B, R = 275 mm, ▼79.92–79.58 m

22. C-100, seal damaged and deformed along the middle; representation analogous to that on specimen No 21, R = 220 mm, ▼79.92–79.58 m

Some of the described seals could be official specimens, but the worn busts on specimens C-50, C-61, C-72 do not provide sufficient elements for the identification of the images. Such representations inspired by those on coins are frequent on official seals used to mark goods for transportation to army units, or those intended for commercial activities involving subjugated barbarian tribes. Such a use of official seals is confirmed by the specimens found in Svištov (*Novae*) from the time of the wars with the Dacians in the years 98/99,[26] but also the seals from the site of Izvoarele (*Sucidava*) issued after the victory of Valens over the Visigoths in AD 369.[27] Judging by the representation of the bust in profile with helmet on the head, seal C-98 from the Sirmium find is undoubtedly of a military character, but the inscription LONGINOS (?) does not indicate any distinct military commander. Also of an official character are the seals C-95 and C-100, where a seated figure is depicted in profile to the right who is approached by a standing figure in profile to the left. If the seated female figure has on her back a pair of wings (not clearly visible), the subject could be the goddess Victoria. However, if wings are not depicted, the interpretation of this picture could be different. The shown scene is probably inspired by the reverse representation of Roma on the throne approached by the emperor, as depicted on the coins of Constantine the Great, minted in Trier in AD 313–315,[28] although it shows certain iconographic deviations from the monetary pattern. Regarding Constantine's campaign from Trier toward Pannonia, completed with the victorious battle against Licinius, near *Cibalae* in October 316, the transportation of goods from Trier to Sirmium seems logical, considering the fact that Constantine established one of his capitals in that city. The possibility that dies for the procuction of lead seals may have been produced in the Treviri mint is suggested by seals with scenes resembling those on the coins of Constantius II minted in that mint.[29]

The figure depicted on seal C-104 is holding, under the breasts, a shallow plate with rounded objects. To the right of the figure a gate is represented (?). This was, by all appearances the personification of a city or province, as with common representations in Late Roman art. The plate that the figure is holding corresponds in its shape to one depicted in the mosaic from the vicinity of Sousse in Tunisia but also to shapes encountered in Gallic finds of silver vessels from the second half of the 3rd century.[30] If the figure is wearing a city crown (*corona muralis*) on her head, as could be assumed, that would confirm the suggested identification. Since the seal has been severely damaged, the interpretation of this presentation is questionable. Although the figures of Erotes (C-15, 16, 17) could look like the segments of some genre scene, these motifs could have

[26] Mrozewicz 1981, 82.
[27] Still 1995, 63.
[28] *RIC* VII, 166, no 23.
[29] Sill 1995, 75–76, no 0283–0285.
[30] Baratte 1997, 130, fig. 21.

special characteristics in the creation of a civic and a private seal, as is also the case with signet rings.[31]

Damaged and worn seals

Seals C-46, C-48, C-54, C-67, C-70, C-71, C-73, C-74, C-78, C-81, C-82, C-87, C-89, C-91, C-99 and C-102 are damaged or worn to such an extent that they are illegible and will not be taken in further consideration.

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The number of lead seals discovered in Sirmium during the investigation campaign in 2015 is not particularly surprising. Also, the considerable quantity of seals with representations of four busts of the tetrarch depicted in various ways[32] should not draw special attention, bearing in mind the already mentioned role of Sirmium in the historical events of the time of the tetrarchy. Something that is surprising is their finding place – the area to the south of pillar IV of the polygonal structure (temple), constructed in the time of the first tetrarchy. Bases of four massive pillars of that structure were discovered in the course of archaeological excavations conducted in 2014. The base of pillar V was destroyed in the process of modern street reconstruction (*sic!*), while the bases of pillars VI, VII and VIII are situated underneath the recently constructed concrete and grass area, so archaeological excavations in that area are out of the question, according to the municipal authorities (*sic!*). The ground plan of the polygonal structure could have been identified according to the arrangement of the bases of the pillars (fig. 2). Around the structure was encountered a large perimeter wall and next to it an irregularly built supporting wall. The foundations of the perimeter wall are at an absolute depth of 79.73 m and those of the supporting wall at 79.60 m. Taking into consideration that coins of Maximianus Herculius from AD 301 were found in soot around the base of pillar III at an absolute depth of 79.80 m,[33] it could be concluded that walls were built simultaneously with the pillars of the structure. The concentration of lead seals in the area to the south of pillar IV suggests the possibility that various supplies intended for the building and decoration of the temple, after customs and sealing, were deposited there, probably next to the perimeter wall. Among the deposited supplies there were packages sealed with imperial tetrarchic seals, but also others marked with different official seals. In order to carry in the supplies, the wall between pillars IV and VI must have been interrupted, so the entrance to the polygonal structure could be supposed in that zone. The depositing of supplies along the wall surrounding the temple brings into question the course of transport and place of storage of the goods arriving in Sirmium via the Sava River. As has been proven without doubt, the main southern city gate facing the river, harbour and bridge was in the southern city rampart (fig. 1, D) and to the south of the granary (*horreum*), a storehouse – economic structure A (locality 31)[34] (fig. 1, A). Archaeological objects from that structure bear witness to its activity in the second half of the 4th and the beginning of the 5th century.[35] There is no archaeological evidence of the existence of that structure or the nearby economic structure B (fig. 1, B) in the time of tetrarchy. The interior of a massive Late Roman structure (locality 85) assumed to have been of an economic character,[36] (fig. 1, E) and which has been recorded to the west of the polygonal temple (fig. 1, F) has not yet been explored, so we can draw no conclusions regarding its purpose in the time of the tetrarchy. However, if we accept the suggested position of the southern city gate, the goods would have been transported from the gate to the polygonal structure along an almost straight 120 metre long line (fig. 1, D –F). That course assumes that the western wing of the residential complex of the imperial palace (locality 1/a) had not yet been constructed or that existing structures did not obstruct such a communication. In any case, the area at the entrance to the polygonal temple, to the south of its pillar IV was a temporary place for the depositing of delivered merchandise, while the location of its permanent storage is still unknown.

Judging by the monetary finds from the layer where the lead seals were found[37], packages were deposited in the zone to the south of pillar IV of the polygonal structure until the final quarter of the 4th century. Scenes on seals C-95 and C-100 bear witness to the packages' dating to the post-tetrarchic period. Nevertheless, the most interesting seals, those with representations of four busts, are difficult to date precisely, either because of their poor state of preservation or because of the fact that the images of the tetrarchs are schematised and

[31] Still 1995, 128, 196–197.
[32] Cf. *infra*, notes 8, 10
[33] Cf. *infra*, notes 8, 10.
[34] Jeremić 2009, 481–484.
[35] Поповић / Popović 2011, 325–370.
[36] Jeremić 2009, 490.
[37] Cf. *infra*, note 11.

Fig. 8. Sites where lead seals with four tetrarchic busts have been found

Сл. 8. Налазишта оловних пломби са представом четири тетрархијске бисте

almost identical to each other. The somewhat better preserved busts in the top row of seal C-80 reveal certain individual features in the depiction of the hair and beards of the represented persons, but this does not make possible their precise dating. Only one, to a certain extent, reliable fact for dating the seals with busts of the tetrarchs is offered by the seal from the unknown site, housed in the National Museum in Belgrade. On that seal Victoria is depicted standing between two busts in the upper row and two busts in the bottom row while crowning the emperors.[38] Very similar to this representation is the one from pilaster C of the east gate in Gamzigrad (*Felix Romuliana*), where on a military standard (*signum*) are depicted groups of figures arranged one above the other and being crowned by Victoria. The scene has been explained as a representation of the ruling Augusts, Constantius Chlorus and Galerius and Caesars, Severus and Maximinus Daia, as well as two earlier Augusts (*seniores Augusti*), Diocletian and Maximianus Herculius. The carving of the pilaster is dated to the time of the Second Tetrarchy, more precisely between May 305 and July 306.[39] It is an open question as to what extent this scene was a model for the seal from the National Museum in Belgrade, bearing in mind that there only four busts are depicted, two Augusts and two Caesars being crowned by Victoria. Nevertheless, the idea conveyed by the scene on this seal and the scene on the Gamzigrad pilaster are identical – Victoria is crowning a pair of tetrarchs with a laurel wreath. As the place and circumstances of the

[38] Stamenković, Ivanišević 2013, 241, sl. 1, 245, no 5.

[39] Srejović 1994, 145–146, fig. 8–9.

finding of the lead seal in the National Museum in Belgrade are unknown, we cannot analyse the Sirmium seals with four busts regarding their iconographic design. However, for the time being, we can only assume a date of the time of the tetrarchy, without any more precise chronological data. Their discovery certainly confirms that Sirmium was an important point where significant events of military, ceremonial and religious character took place. It was followed by the construction of a cult polygonal structure and the acquisition and storage of packages of various materials.

Lead seals with representations of four busts produced in the time of the tetrarchy continued to be used in a somewhat later period. If we map the places where they have been found (fig. 8) we see that it is the route leading from Trier via Noricum, Pannonia and Moesia to Thrace, the route, in fact, taken by Constantine the Great during his clash with Licinius. The first battle between these two opponents ended with Constantine's victory in Pannonia in the battle near *Cibalae,* in AD 316 and Licinius suffered his final defeat in Thrace in the battle near *Chrysopolis,* in AD 324. Finds of lead seals with representations of four busts of tetrarchic rulers along Constantine's victorious route confirm that packages were also sealed with such seals in a time when Constantine had already abandoned the idea of the tetrarchic ruling system. However, according to the scene on one lead seal found in *Serdica*, at the same time, i. e. between AD 320 and AD 330, the production of seals with a representation of Constantine the Great with his two sons (Crispus and Constantine II or Constantine II and Constantius II)[40] had already begun. It should be noted that different types of seals dated to the different periods of Constantine's reign have been found in several locations across the Empire. Our opinion is that lead seals with representations of four busts, registered in a limited area (fig. 8), were used only in the early part of his reign,[41] developing into some kind of pattern for the representation of Constantine the Great with his sons.

Translated by Mirjana Vukmanović

[40] Vladimirova-Aladzhova 2016, 82–88.

[41] Several types of seals dated to this time have been registered in different locations. In the period of the Diarchy and good relationships between Constatine I and Licinius I, a seal with a representation of these two rulers was made in AD 313; cf. Casey, 2010, 151–156. However, after the summer of AD 315, the political situation changed and the representations on the seals followed the new political ideas.

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Ivana POPOVIĆ
Lead seals with tetrarchic busts from the imperial palace in Sirmium (273–285)

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ОЛОВНЕ ПЛОМБЕ СА ТЕТРАРХИЈСКИМ БИСТАМА ИЗ ЦАРСКЕ ПАЛАТЕ У СИРМИЈУМУ

Кључне речи – Сирмијум, оловне пломбе са тетрархијским бистама, тетрархија, царска палата, полигонални објекат

Током археолошких ископавања северног дела царске палате Сирмијума (локалитет 85), спроведених 2015. године (сл. 1), јужно од базе стуба IV полигоналног објекта, регистрованог 2014. године (сл. 2, 3), нађено је 39 оловних пломби. У полигоналном објекту и око њега откривено је у периоду 2012–2015. године 50 фрагмената порфирних скулптура, које су после конзервације идентификоване као царски портрети бисте. Градња полигоналног објекта је монетарним налазима датована у период прве тетрархије. У налазу оловних пломби издваја се девет примерака царских пломби са представом четири бисте, односно приказом тетрарха. Ове пломбе се појављују у три варијанте иконографског решења (a–c), у зависности од тога да ли су четири бисте постављене у два реда или у низу, као и да ли су једнаке величине (сл. 4–6). Поред њих, нађене су и пломбе од којих неке могу бити официјалног, провинцијског или приватног карактера (сл. 7). Оловне пломбе са представом четири бисте што су израђене у доба тетрархије наставиле су да се производе и у нешто каснијем периоду. Ако картирамо места на којима су нађене (сл. 8), можемо увидети да је то пут који од Тријера, преко Норика, Паноније и Мезије, води до Тракије, заправо да је то траса којом се кретао Константин Велики током свог окршаја са Лицинијем. Налази тих оловних пломби дуж трасе Константиновог победоносног напредовања у борби за власт са Лицинијем сведоче да су пошиљке печаћене пломбама са бистама тетрархијских владара и у време када је Константин већ био напустио идеју тетрархијског система власти.

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Original research article

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THE STATUS OF THE *COLONI* IN THE MINING DISTRICT OF VIPASCA IN VIEW OF THE PROVISIONS OF THE *LEX METALLIS DICTA*[1]

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Abstract – This paper discusses changes in the Roman mining policy that took place during the Empire, based on the provisions found on the second tablet of the *Lex metallis dicta*[2] *(Vip* II, 1, 2,5,6,7,8,9) from Vipasca. The main stress is placed on the position, rights and obligations of the *coloni* and miners and the status of mining pits after their sale. By examining the efficiency of the indirect model of silver and lead exploitation in the mining district of Vipasca, the authors present their solution to the unresolved issue of the means by which the Roman state obtained large quantities of metals necessary for the operation of state-run factories and imperial mints.

Key words – coloni, miners, Roman mining, procurators, Vipasca, mining law

Roman mining legislation from the time of the Republic is sparse despite the continuing development of Roman law over the centuries. The absence of legal sources is a result of the way the Roman state collected revenues from mining. The fiscal regime implied that the collection of tax revenues from customs and mining (*ager publicus*)[3] was carried out by companies of publicans (*societates publicanorum)*[4], to whom lessees of mining concessions paid taxes.[5] Hence, legal regulations related to the publicans covered the mining sector of the economy as well. This means that the Roman Republic was not directly involved in the mining process at all. The miners, predominantly slaves, were left to the mercy of the lessees[6], and the latter to the mercy of the *societates publicanorum*.[7] The radical changes that were introduced only as late as the time of Vespasian[8] included the disappearance of associations of publicans[9], legislation for each aspect of mine exploitation, and a new status for the *coloni*, the former lessees of mining pits. Owing to the Vipasca laws, we are in a position to follow these changes and to gain an insight into the new mining

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[2] The *Lex metallis dicta* is a mining law inscribed on the second of two bronze tablets unearthed at Vipasca/mod. Aljustrel, Portugal, on May 7, 1906, by the Companhia Mineira Transtagana (*AE* 1906, 151). The original Latin text quoted in this paper is borrowed from Girard, Senn 1977, 586−589. The provisions of the Vipasca laws, *Lex territorio metalli Vipascensis dicta (Vip I)* and *Lex metallis dicta (Vip II)*, presented in the paper have been translated into English by the authors of this paper.

[3] Mateo 1999, 96−120.

[4] *Dig.* 50, 16, 16: *eum qui vectigal populi Romani conductum habet "publicanum" apellamus. Nam "publica" appellatio in compluribus causis ad populum Romanum respicit:civitates enim privatorum loco habentur*. Cf. Cic. *Ad Atticum* 6, 1, 15: *in quo est… omnia de publicanis*. On the publicans and their associations, see: Badian 1972.

[5] In the role of the leaseholders of mining pits we found the Italics, mostly from Campania. On their names and the scope of their activites, see: Gabba 1954, 297−305; Wilson 1966, 22−27; Brunt 1971, 204, 209−214; Nicolet 1976, 62−63. Cf. Domergue 1965, 9−27; Domergue 1990, 321−322. On the presence of freedmen as lessees in Spain during the Republic, see: Treggiari 1969, 101−106; Garnsey 1981, 364−367; D'Arms 1981, 103−104, 141−142; Domergue 1985, 202−203.

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policy, whose main feature was partnership between the *coloni* and the *fiscus*.[10] The mining region of Vipasca was constituted as a mining district, with clearly defined boundaries (*fines metallorum),* and governed by a senior administrative official, *procurator metallorum*, who was either an imperial freedman or a member of the equestrian order.[11] The imperial procurator at Vipasca held both executive and judicial powers as a representative of the *fiscus* in the field.[12] In order to show the position, rights and obligations of the *coloni* as the main carriers of the process of mine exploitation in this region, we will direct our attention to seven provisions of the *Lex metallis dicta*. The first two provisions regulated the procedure of selling mining pits in the mining district of Vipasca:

> . . . . . Aug. praesens numerato. Qui ita non fecerit et conuictus erit prius coxisse uenam quam pretium, sicut | supra scriptum est, soluisse pars occupatoris commissa esto et puteum uniuersum proc(urator) metallorum | uendito. Is, qui probauerit ante colonum uenam coxisse quam pretium partis dimidiae ad fiscum pertinen|tis numerasse, partem quartam accipito.[13]

> .....Aug(ustus), he shall immediately make a payment. Whoever has not done thus and has been accused of smelting ore before the price has been paid, as stated above, the plot that he occupied shall be confiscated and the entire mining pit shall be sold by the procurator of mines. Whoever proves that a *colonus* smelted ore before paying the price for the half belonging to the *fiscus* shall receive a quarter.

> Putei argentari ex form[a] exerceri debent quae || hac lege continetur; quorum pretia secundum liberalitatem sacratissimi imp(eratoris) Hadriani Aug. obser|uabuntur, ita ut ad eum pertineat proprietas partis, quae ad fiscum pertinebit, qui primus pretium puteo fecerit | et sestertia quattuor milia nummum fisco intulerit.[14]

> The mining pits containing silver ore shall be exploited according to the provisions of this law. Their prices shall be maintained in accordance with the generosity of the most sacred Emperor Hadrian, so that the ownership over the part which belongs to the *fiscus* shall belong to whoever shall first offer the price for the mining pit, and shall pay to the *fiscus* four thousand sesterces.

In the mining district of Vipasca, there was a sort of contractual relationship between the *coloni* and the *fiscus* in which the latter, respecting the rights of the former, did not impose unfavourable conditions on him and the whole relationship was based on mutual interest. As can be seen from the first and second provisions of the *Lex metallis dicta*, during the Empire, former leaseholders of mining concessions, designated as *coloni* in law,[15] had the opportunity to become

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[6] Diod. 5. 36, 3; 4. 38; Vitr. 8. 6, 11; Lucr. *Rer. Nat*. 806.

[7] Liv. 45, 18, 3−5.

[8] Literary sources that cover the period from the reign of the emperor Augustus until the beginning of the reign of the emperor Vespasian show an evident lack of a general mining legislation effective throughout the whole empire. Exploitation of gold deposits strongly developed in the newly conquered territories in Hispania, Asturias and Gallaecia (Flor. *Epit*. 2, 33: *Itaque (Augustus) exerceri solum iussit. Sic Astures nitentes in profundo opes suas atque divitias, dum aliis quaerut, nosse coeperunt*. Cf. Domergue 2008, 189−190.) and the pacified provinces, such as Dalmatia (Flor. *Epit*. 2, 25: *Augustus perdomandos Vibio mandat, qui efferum genus fodere terras coegit aurumque venis repurgare.)*, owing to the direct participation of the Roman army and forced domestic labour. On gold and silver exploitation in Britain during the reign of Emperor Claudius, see: Tac. *Agr*. 12, 19. Cf. *CIL* VII 1201, 1202. Pliny the Elder praised the mines in the area of Baetica where exploitation was still in progress during Nero's reign, and also the gold deposits in Dalmatia. See: Plin. *Nat. Hist*. 33, 114, 118. Cf. Cic. *Phil*. 2, 48; Pliny 33, 21. It seems that Augustus had not completed the reform of the mining system inherited from the Republic, in spite of the fact that Cassius Dio attributed to Maecenas the statement about the necessity to estimate all the revenues derived from mines and also to introduce a new system of taxation. See: Cass. Dio 52, 28, 4.

[9] Cf. Mateo 1999, 151−156.

[10] The Vipasca laws passed by the emperor Hadrian, most likely represented only a revised addition to the existing mining law that had originally been passed during the reign of Emperor Vespasian. On Vespasian's legal activities and reforms of the management of public domains, see: Mateo 2001, 179−195.

[11] *Vip* II, 1, 2; 6, 1. Cf. Hirschfeld 1905, 160; Christol, Demougin 1990, 170.

[12] *Vip* I and *Vip* II distinguish between three different territorial units within the area of the mining district: *vicus, metallum* and *territoria metallorum* (*Vip* I, 5, 1; *Vip* II, 10, 3). Cf. Dušanić 2004, 249; Hirt 2010, 48−49. Roman legal sources, unlike the Vipasca laws, rarely use the term *territoria* to signify a mining territory (*Dig*. 50. 16. 239. 8: *Territorium est universitatis agrorum intra fines cuiusque civitatis…*). On *fines metallorum* at Vipasca, see: Burian 1955, 49−52; Burian 1957, 535−560; Flach 1979, 440−446.

[13] *Vip* II, 1. Cf. D'Ors 1953, 103−104; Domergue 1983, 123−126; Mateo 2001, 156−161.

[14] *Vip* II, 2. Cf. D'Ors 1953, 119; Flach 1979, 415; Domergue 1983, 134−137.

[15] *Vip* I and *Vip* II use two terms to designate those individuals who exploited mining pits: *occupator*, at the moment of occupation of a mining pit, and *colonus*, after ore had been discovered and the

owners of mining pits (*ita ut ad eum pertineat proprietas partis, quae ad fiscum pertinebit*), and they became owners after paying the price for one half of a mining pit belonging to the *fiscus*.[16] A *colonus* first occupied a mining pit and then invested his own financial resources, labour and material in the search for ore. This investment was precisely the reason why the *fiscus* claimed ownership solely on one half of the mining pit (*partis dimidiae ad fiscum pertinen|tis*), which was put up for sale only after it had been established that the mining pit was productive, i.e., after the *colonus* had found ore. *Coloni* were forbidden to start melting ore before they had obtained *proprietas* over the mining pit.[17]The penalty for this violation was confiscation of the mining pit and its re-sale.[18] Those who reported such a violation were rewarded by being given a quarter of the pit's total value.[19] The price at which the procurator of the mines sold the part belonging to the *fiscus* varied and was based on its mineral wealth, i.e., on an assumption of its future yield.[20] The sale of a mining pit was effected at an auction[21] and the *colonus* who had previously occupied it had the pre-emptive right to purchase the part belonging to the *fiscus*. If he decided to buy it, he obtained ownership of it. The generosity of the emperor Hadrian, mentioned in the second paragraph, refers to the permission given to a *colonus* to immediately pay four thousand sesterces for the *pars fisci* and the rest of the amount when he began to smelt ore, i.e., after the first profit was made.[22] Two days after the auction, the *colonus* had to make the payment, as well as pay the *pittacium* fee, thus officially becoming the full owner.[23] If the price for the half of the mining pit was too high, he could refrain from the purchase or find a partner willing to buy it at the price set by the *fiscus*. If he failed to find a partner, he could initiate the sale of his own part of the mining pit, *pars occupatoris*, whereby the entire mining pit would be sold, i.e., both the *pars occupatoris* and the *pars fisci*.[24] After buying a mining pit, a *colonus* became entitled to smelt ore, but he could also, if he wanted, re-sell it at the highest price. This is clearly stated in the eighth provision of the law:

> Colonis inter se eas quoque partes puteorum, quas | a fisco emerint et pretium soluerint, uendere quanti quis potuerit liceto. Qui uendere suam partem | quiue emere uolet, aput proc(uratorem), qui metallis praeerit, professionem dato ; aliter emere aut uendere | ne liceto. Ei qui debitor fisci erit, donare partem suam | ne liceto.[25]
>
> The *coloni* shall have the right to sell among themselves at the highest price those parts of the mining pits which they have bought from the *fiscus* and for which they have paid the price. Whoever wishes to sell his share, or who wishes to purchase it, shall make a declaration before the procurator of mines; otherwise he shall neither have the right to buy nor sell it. Whoever is indebted to the *fiscus* is not permitted to give away his share.

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process of exploitation had started. See: Flach 1979, 415−417; Domergue 1983, 128−131; Hirt 2010, 267. On *colonus* in the sense of any inhabitant of the mining district of Vipasca, see: D'Ors 1953, 109.

[16] Various interpretations of the provisions related to the sale of mining pits owned by the *fiscus* and also those related to sales among the *coloni* themselves have given rise to a long discussion among the scholars. See: Cuq 1907, 87−133; Mispoulet 1908, 345−391, 491−537; D'Ors 1953, 71−133; Flach 1979, 399−448; Domergue 1983, 134−137. Cf. Mateo 2001, 87−166; Domergue 2004, 221−236; Domergue 2008, 198−201; Mateo 2012, Cherchi 2014, 63−101.

[17] *Vip* II, 1, 2.

[18] *Vip* II, 1, 2−4.

[19] Alice Cherchi considers that the reward for a denunciator was a quarter of the value of the extracted material, but such amount would be rather small, taking into account that it was the very beginning of the exploitation process. If the legislator wanted to motivate other colons to report and to prove fraud to the fiscus the reward for such activity must have been much higher. See: Vip II, 1, 5. Cf. Cherchi 2014, 70.

[20] Mateo 2001, 166.

[21] The first provision of *Vip* I stipulates that all sales within the mining district of Vipasca must be carried out through an auction that was leased out. See *Vip* I, 1: *Conductor ea[rum uenditionum, quae per auctio]|nem intra fines metalli Vipascensis fient, exceptis iis, quas proc(urator) metallorum iu[ssu imp(eratoris) faciet, centesimam a uendito]|re accipito.* ("The lessee of these sales by auction within the boundaries of the mining district of Vipasca shall receive one percent from the seller, except to those sales made by the procurator of mines at the command of the emperor") Cf. *Vip* I, 2: *Si quas [res proc(urator) metallorum nomine] fisci uen|det locabitue, iis rebus conductor socius actorve eius praeconem praestare debeto.*("If the procurator of mines sells or leases out any property on behalf of the *fiscus*, for this property the lessee, his partner or representative shall provide an auctioneer") Cf. Domergue 1983, 68−73.

[22] Mateo 2001, 158.

[23] *Pittacium* was a fee paid to the lessee by a *colonus* on the second day after his purchase of a mining pit, or after taking over those mining pits that had been abandoned. This is clearly stated in the ninth provision of *Vip* I entitled: *Usurpationes puteorum sive pittaciarium*. The fee was named after the lead tablet that was placed at the very entrance of the mining pit. Cf. D'Ors 1953, 105; Domergue 1983, 100.

[24] Mateo 2001, 166.

[25] *Vip* II, 8. Cf. Domergue 1983, 142−145.

According to this provision, the *coloni* at Vipasca were allowed to make great profit by selling mining pits among themselves, but, at the same time, the *fiscus* strived to prevent such resales without the presence of the procurator of the mines because, otherwise, the *coloni* would be able to avoid paying taxes. The inclusion of this provision into the law best testifies to the extent to which resales were causing financial damage to the *fiscus*. Antonio Mateo thinks that this provision refers to both the case of reselling mining pits and the case of selling the *pars occupatoris* when a *colonus* refrained from the purchase of the *pars fisci*.[26] The shares of the mining pits mentioned in this provision imply the existence of business associations of the *coloni* at Vipasca who acted as legal entities at auctions. They should not be identified with the associations (*corpora)* of *coloni* whose activities were of a social and cultural character.[27] These business partnerships were probably rather common and justified by the high price that needed to be paid for one half of a mining pit belonging to the *fiscus*.[28] The agreement of partnership between *coloni* obliged them to exploit a mining pit jointly in order to make profit. For a *colonus* to be considered a partner, it was necessary that he contribute a certain amount of money to the partnership and participate in the distribution of the profit and the expenditures commensurate with his share.[29] The sixth and seventh provisions of the *Lex metallis dicta* established the rules according to which *coloni* were allowed to establish business partnerships both prior to buying a mining pit and after they gained *proprietas*.[30] These provisions also regulated the methods of resolving disputes, fraud and financial issues arising among partners.

> [Occ]u|patori puteorum socios quos uolet habere liceto, ita ut, pro ea parte, qua quis socius erit, impensas | conferat. Qui ita non fecerit, tum is qui impensas fecerit rationem impensarum factarum a se || continuo triduo in foro frequentissimo loco propositam habeto et per praeconem denuntiato | sociis ut pro sua quisque portione inpensas conferat. Qui non ita contulerit, quiue quid dolo | malo fecerit quominus conferat, quoue quem quosue ex sociis fallat, is eius putei partem ne | habeto, eaque pars socii sociorumue qui inpensas fecerint esto.[31]
>
> Whoever occupies a mining pit is permitted to have as many partners as he wishes, provided that each one shall bear the expenses in proportion to the amount of his share. Whoever fails to do this, the one who has borne the expenses shall make out a statement of the expenses borne by himself and place it for three consecutive days in the most frequented spot in the forum, and shall demand through the public crier that each partner must bear the expenses for his share. The partner who does not contribute, or who wilfully does anything to avoid bearing the expenses or who deceives one or more of his partners, shall not retain his share of the mining pit and his share shall belong to the partner, or partners, bearing his expenses.
>
> [V]el ii coloni qui impensam fecerint in eo puteo, in quo plures socii fuerint, repetendi a sociis quod || bona fide erogatum esse abparuerit ius esto.[32]
>
> The *coloni* who bear the expenses of a mining pit, where there are several partners, shall be entitled to reclaim from their partners what they have evidently spent in good faith.

By this rather detailed provision, the legislator wanted to avoid, or resolve as soon as possible, any disputes that might arise between the members of a business association of *coloni* in order to ensure that excavation of mining pits ran smoothly. This

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[26] Domergue 1983, 142−146. Cf. Mateo 2001, 162−166.

[27] *Dig*. 3. 4, 1: …*ut ecce vectigalium publicorum sociis permissum est corpus habere vel aurifodinarum vel argentifodinarum et salinarum*. Inscriptions testifying to the existence of such associations of *coloni* were found in the mining districts in Upper Moesia. A society of *coloni* in the territory of *municipium D.D.* at Sočanica (*coloni argentariarum*) built a temple dedicated to Antinous, Hadrian's lover, after his deification. (Čerškov 1970, 65, n. 15). An association of *coloni* is presumably mentioned at the end of the epitaph of a son of the *decurio* of the colony of Scupi and the *municipium* Ulpiana, *l(oco) d(ato)d(ecreto)co(lonorum*) found on a tombstone erected at Sočanica. (Čerškov 1970, 62, n. 3. Cf. Dušanić 1977, 87.) Associations of *coloni*, i.e., *[cor]porib(us) suis*, are also mentioned in the fragmentary inscription erected by the emperor Caracalla on the occasion of his renovating a building for them (*balneum, scholae* or *basilica*) at Sočanica. See: Dušanić 1997, 35. Cf. *ILIug* 505.

[28] Domergue 1983, 141.

[29] D'Ors 1953, 124.

[30] On a different interpretation of the mining companies at Vipasca based on the provisions of the Vip II, 6, 7, 8 see: A. Cherchi 2014, 63−101. Starting from the premise that the terms *occupator* and *colonus,* mentioned in the provisions, designated two different legal categories, A. Cherchi tries to explain their presumably different status within the mining *societates* at Vipasca, and consequently their obligations towards the fiscus.

[31] *Vip* II, 6. Cf. Domergue 1983, 141−142.

[32] *Vip* II, 7.

provision refers to those *coloni* who did not take their obligations and responsibilities seriously, or those who even attempted to defraud their partners. The importance of a continuous process of excavation to the *fiscus* is revealed by the fact that a *colonus*' ownership of a mining pit was limited, not because of his obligation to share ore with the *fiscus* after the purchase, as has long been believed,[33] but because of the legal provision that enabled the *fiscus* to confiscate the mining pit and regain ownership in the case of a six-month interruption of excavation of the mining pit. This also implied its resale to a new buyer at auction.[34]

> Puteum a fisco uenditum continuis sex mensibus intermissum alii occupandi ius | [es]to, ita ut, cum uenae ex eo proferentur, ex more pars dimidia fisco salua sit.[35]
>
> Others shall have the right to occupy a mining pit sold by the *fiscus* in which excavation is interrupted for six consecutive months, provided that, when ore has been extracted, one half shall be reserved for the *fiscus*, according to custom.

The essential question that must be raised here is: what was the reason for the great interest of the *fiscus* in the continuous process of mining excavation, given that the *coloni* did not share half of the extracted ore with the *fiscus* after their purchase of mining pits? The importance of this particular matter is shown by the legal provision which allowed other *coloni* to take over a mining pit that was already in the initial phase of excavation if the *colonus* who had first occupied it stopped his operations for ten consecutive days.[36] Confiscation of a mining pit, referred to in the fifth provision of the law, was more than a radical measure, as *coloni* purchased mining pits at very high prices. Claude Domergue, after adopting Mateo's thesis on the sale of mining pits in the mining district of Vipasca, suggesting that *coloni* were under no obligation to share ore with the *fiscus*, justifiably raises the question of the model through which the Roman state was obtaining large amounts of metals necessary for the operation of state-run factories and imperial mints.[37] Perhaps the answer to both questions lies in the very process of silver and lead production in the mining district of Vipasca. After it had been excavated, the ore was transported to smelters and workshops (*officinae*), where final products, i.e., silver and lead ingots, were produced.[38] Smelters situated in the vicinity of mining pits were owned by the *fiscus* and the process of production was carried out under the strict control of state officials, mostly members of the *familia Caesaris*.[39] The State held a monopoly over the production of metals, because *coloni* had to lease smelters in the district where the ore was being excavated, and the price for the rent was likely paid with finished products, i.e., silver and lead ingots. It was easier for the *coloni* to pay the rent with products

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[33] J. B. Mispoulet, E. Cuq, J. Vendeuvre, M. Rostovtzeff, D. Flach and Cl. Domergue believed, with minor differences in their interpretations, that the main characteristic of the legal regime at Vipasca was sharecropping, i.e., the division of ore into halves between the *fiscus* and the *coloni* (*colonia partiaria)*. Such a relationship between the *fiscus* and the *coloni* would have been identical to the one in force in the fiscal domains in northern Africa (*saltus Africanus*). See: Mispoulet 1907, 20−32; Mispoulet 1908, 345−391, 491−537; Cuq 1907, 87−133; Vendeuvre 1910, 46−87, 106−117; Rostovtzeff 1910, 353−360; Flach 1979, 99−448; Flach 1989, 133−137; Domergue 1983. Alvaro D'Ors was one of the major advocates of the idea that mining pits were being sold to the *coloni* at Vipasca. His rather extensive thesis on the issue was presented in: *Epigrafía jurídica de la España* romana (D'Or*s* 1953, 71−133) and was later adopted by many scholars. On the latest conclusions on the status of mining pits after their sale, see: Mateo 2001, 62−66, 131−145, 161−166, 178−187; Domergue 2004, 221−236; Domergue 2008, 198−201; Mateo 2012, 245–254.

[34] Mateo 2001, 166.

[35] *Vip* II, 5. Cf. Mispoulet 1907, 368; D'Ors 1953, 123; Domergue 1983, 139; Mateo 2001, 131−138.

[36] *Vip* II, 4: *Qui post dies XXV praeparationi impensarum datis opus quidem || statim facere coeperit, diebus autem continuis decem postea in opere cessauerit, alii occupandi | [i]us esto*. ("Whoever starts excavating after the twenty-five days granted for the collection of funds but thereupon stops the work for ten consecutive days, the right of occupancy shall be granted to another."

[37] Domergue 2004, 221−236; Domergue 2008, 211.

[38] The *Lex territorio metalli Vipascensis dicta* strongly forbade *coloni* to carry the ore out of the mining district of Vipasca or bring ore to the district from other mining areas. *Vip* I, 7, 2: *Qui ex alis locis ubertumbis ae[raria argentariaue ru]tramina in fines metallorum inferet, in p(ondo) C X I conductori socio actoriue eius d(are) d(ebeto)*. ("Whoever brings copper or silver ore from another place to within the boundaries of the mines shall pay to the lessee, his partner, or his representative one denarius per one hundred pounds.") Cf. Domergue 1983, 92−94.

[39] There is ample epigraphic evidence on the presence of imperial freedmen (*vilici, dispensatores, tabularii, commentarii*) in the mining *officinae* in the areas of gold mines in Dacia (e.g. *CIL* III 1301, 7837, 1286, 1297; *AE* 1959, 305), iron mines in Dalmatia (e.g. *ILIug* 158, 161, 162, 779, 781), and silver mines in Upper Moesia (e. g. CIL III 14 209, 8279. Cf. Mocsy 1970, 16; Dušanić 1977, 89, n. 232). During the reigns of the emperors Trajan and Hadrian, special coins, the so-called *nummi metallorum*, were minted for the employees of the mining administration in the area of Illyricum. See: BMC III, 234, 235: *Metalli Pannonici*; BMC III, 534, 1854, 1856: *Metal(lis) Delm(aticis)*; BMC III, 53: *Metal(lis) Pannonicis*. Cf. Dušanić 1971, 535−554; Dušanić 1977, 57, 79.

rather than cash, and for the *fiscus* it was an effective way of obtaining the metals necessary for the operation of state-run factories and imperial mints. This could be the reason why the State confiscated those mining pits that had been sold if they had not been exploited for six consecutive months.[40] The idea was to secure a regular flow of ore to smelters. Michael Hirt believes that the reluctance of the *fiscus* to give up control of the exploitation of the mines at Vipasca, even after mining pits had been sold, may stem from the necessity to ensure that the market was supplied with sufficient quantities of the desired metals.[41] However, we believe that such a radical measure as confiscation of sold mining pits can only be justified and understood if interrupted excavation caused financial damage directly to the *fiscus* rather than the market. The entire monetary and economic system depended on the regular flow of ore to smelters, as large quantities of their final products belonged to the *fiscus* itself. We consider this to be the real reason behind the strict Roman control over all aspects of mining exploitation at Vipasca.

The legislator regulating the status of *coloni* also took into account the workforce, i.e., the miners who excavated mining pits. During the Republic, miners, who were predominantly slaves, were deprived of all legal rights and were subjected to ruthless exploitation by the lessees of mining pits, who forced them to work day and night.[42] The ninth provision of the *Lex metallis dicta* testifies to the attempt of the *fiscus* to prevent such a practice during the Empire:

> Venas, quae ad puteos prolatae || [i]acebunt ab ortu solis in occasum, ii quorum erunt in officinas uehere debebunt; qui post occa|sum solis uel noctu uenas a puteis sustulisse conuictus erit, HS (sestertios) nummos fisco inferre debeto. Venae furem, si seruos erit, procurator flagellis caedito et ea condicione uendito, ut in perpetuis | uinculis sit neue in ullis metallis territorisue metallorum moretur; pretium serui ad dominum | pertineto; liberum procurator comfiscato et finibus metallorum in perpetuum prohibeto.[43]
>
> The ore extracted from pits shall be transported to smelting factories by those to whom it belongs from sunrise to sunset; whoever is convicted of having carried ore from the mining pits after sunset, or at night, shall pay one thousand sesterces to the *fiscus*. If an ore thief be a slave, the procurator shall whip him and sell him under the condition that he be perpetually fettered and shall not reside at any mine or mining territory. The price obtained for a thieving slave shall go to the owner. If the thief be a free man, the procurator shall confiscate his property and expel him for ever from the mining district.

According to this provision, the process of extracting ore from mining pits, as well as its transport to smelters, had to be conducted from sunrise to sunset. Any *colonus* found violating the law had to pay a fine of one thousand sesterces.[44] The punishment was obviously less severe compared to those listed in the second part of the provision concerning thieves of ore.[45] According to the authors who defend the sharecropping regime at Vipasca, i.e., the fifty-fifty share of ore between the *coloni* and the *fiscus*, the ultimate aim of banning the removal of ore from the mines after sunset and at night was to prevent the *coloni* from secretly transporting ore to smelters in order to misrepresent the quantity of excavated ore and reduce the quantity they had to share with the *fiscus*.[46] However, the disproportion in the punishments points in another direction. It shows that the purpose of this provision was not to prevent *coloni* from committing fraud, as in that case we would expect a more severe punishment, but rather that it represented a kind of police measure aimed at preventing uncontrolled exploitation of the workforce.[47] Diodorus[48] testifies to the inhumane treatment of miners in Spain during the Republic.[49] The ninth provision of the law shows the efforts of the Roman state to improve general working conditions. In the mining district of Vipasca, besides freedmen, there were also numerous prisoners condemned to penal servitude in the mines, the so-called *damnati ad metalla*.[50] For many of them, the punishment was of limited du-

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[40] See n. 35.

[41] Hirt 2010, 367.

[42] See n. 6.

[43] *Vip* II, 9.

[44] Vip II, 9, 1.

[45] Mateo 2001, 139−144.

[46] Mispoulet 1907, 381; Cuq 1907, 129; Domergue 1983, 181. Cf. Mrozek 1989, 163−165.

[47] D'Ors 1953, 129. Cf. Mateo 2001, 141−145.

[48] Diod. 5, 36, 38.

[49] The reason for high mortality among miners in Spain during the Republic, aside from physical exhaustion, was constant exposure to great quantities of lead, which caused lead poisoning (Lat. *colica pictorum*), with fatal outcomes. See: Retief, Cilliers 2006, 147−164.

[50] *Vip* I, 3. Cf. Mateo 2001, 142, n. 134.

ration and the *fiscus* sought to secure adequate working conditions that would ensure the survival of both convicts and slaves.[51] It should not be forgotten that the primary concern of the *fiscus* was the continuous process of excavation, and the biggest danger was a shortage of available labour.[52] This provision of the law was truly progressive because it limited working hours and prohibited all activities in the mines after sunset and during the night.[53]

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In spite of its fragmentary character, the *Lex metallis dicta* provides highly important information for the research of Roman mining. Its provisions reveal an indirect model of exploitation used by the Roman state as the basic form of silver and lead exploitation founded on a partnership between the *fiscus* as the owner of mining districts and the *coloni* as investors. The Roman state contributed its property to this business partnership, while the *coloni* provided funds and a workforce. By selling mining pits to the *coloni*, the *fiscus* secured a huge influx of money to the state treasury, and on their part the *coloni* were able to make some profit. However, the ownership of mining pits by *coloni* was limited, not because of their obligation to share half of the ore with the *fiscus*, but by the legal provision that allowed the latter to regain ownership in the case of an interruption of excavation that lasted six months. A very important question that still needs to be answered is how the Roman state was obtaining such large quantities of metals necessary for the operation of state-run factories and imperial mints. According to the hypothesis presented in this paper, the *coloni* most likely paid the rent for the lease of state smelters situated in the vicinity of the mining pits with finished products, i.e., gold, silver and lead ingots, depending on the ore in question. This could explain the enormous interest of the *fiscus* in a continuous process of excavation. When regulating the relationship between all the participants involved in the mining process, the Roman state also took miners into account by limiting working hours. This decision made by the *fiscus* was truly progressive compared to the time of the Republic. The fairness and financial efficiency of the indirect model, which emerged from reforms launched under Emperor Vespasian, is best confirmed by its successful application. Mines were exploited using this model not only in Hispania, but also throughout the Roman Empire, especially in the mining districts of Illyricum, where the exploitation process continued until the 4th century AD.

Translated by the authors

[51] *Dig.* 48, 19, 23: *sine praefinito tempore in metallum dato imperitia dantis decennii tempora praefinita videntur*.

[52] This particular problem came to the fore during the Late Empire. On the lack of a sufficient workforce in the mines, testified to by numerous provisions of the *Codex Theodosianus* and the *Codex Iustinianus*. See: Cod. Theod. 10, 19; Cod. Iust. 11, 7. See also: Šajin 2015, 91−105; Cherchi 2017.

[53] Mateo 2001, 145. In texts written by St. John Chrysostom we can find testimonies to the limitation of working hours in mines already in the 4th century AD ("*Et ad metalla damnati quidem, vespere autem adveniente a laboribus solvuntur*...") Translations of his works into Latin are found in *Patrologia Graeca*, a huge collection of the writings of the Church Fathers and other ecclesiastical writers, published by Jacques Paul Migne. See: Migne 1857–1912, 196−197.

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Gordan MARIČIĆ, Željka ŠAJIN
The Status of the *Coloni* in the Mining District of Vipasca a in View of the Provisions of the *Lex Metallis Dicta* (287–296)

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ПОЛОЖАЈ КОЛОНА У РУДНИЧКОМ ДИСТРИКТУ ВИПАСКЕ У СВЕТЛУ ОДРЕДАБА ЗАКОНА *LEX METALLIS DICTA*

Кључне речи – колони, рудари, римско рударство, прокуратори, Випаска, рудничко право

Lex metallis dicta је закон који, и поред фрагментарности, пружа сазнања од непроцењиве важности за истраживање римског рударства. Одредбе овог закона откривају индиректни модел експлоатације сребра и олова у доба Царства који је почивао на партнерском односу између фиска и колона, главних носилаца експлоатације. У то пословно партнерство римска држава уносила је имовину, а колон је улагао новчана средства и радну снагу. Продајући колонима рудничке јаме, фиск је обезбеђивао огроман прилив новца у царску благајну, а колони су имали прилику да остварују велику добит. Власништво колона над рудничким јамама било је ипак ограниченог карактера, и то не због обавезе да са фиском деле руду напола после куповине, већ законском одредбом која је фиску омогућавала повраћај власништва у случају напуштања експлоатације на шест месеци. Једно од питања које је остало неразрешено јесте начин на који је римска држава обезбеђивала велике количине метала неопходних за рад државних фабрика и ковница новца. Сада знамо да након куповине рудничих јама колони нису имали обавезу да руду деле напола са фиском. У складу са хипотезом коју смо изнели у овом раду, велике количине метала неопходних за рад државних фабрика и ковница новца римска држава је добијала на име закупа државних топионица на тлу рудничких дистрикта, јер су колони, највероватније, плаћали закупнину у готовим производима, сребрним и оловним слицима. Отуда можемо да схватимо велико интересовање фиска за непрестани процес рудничке експлоатације. Уређујући положај, права и обавезе колона, законодавац је водио рачуна и о обичној радној снази, рударима, тако што је ограничио радно време забранивши све активности у рудницима након заласка сунца и током ноћи. Ова мера представљала је прави прогрес у поређењу с временом из доба римске Републике. Финансијску ефикасност али и правичност целокупног индиректног модела који је настао реформама управе над јавним добрима у доба цара Веспазијана најбоље потврђује његова успешна примена. По овом моделу експлоатисани су рудници не само на тлу Шпаније већ и широм римске државе, а нарочито на подручју рудничких региона Илирика где ће процес експлоатације потрајати све до четвртог века нове ере.

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THE OUTER FORTS OF CARIČIN GRAD: VISUALISATION OF DIGITAL TERRAIN MODELS AND INTERPRETATION

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Abstract – The erection of a new polis, Justiniana Prima, on the site of Caričin Grad, was part of a larger engineering project in a rural hilly setting of the western areas of Dacia Mediterranea, which had also included the construction of nearby fortlets. The article presents LiDAR data which has provided new information related to their ground-plan and dimensions. Located in a 12 km² area around the metropolis, St Elias, Kulište–Jezero and Gornje Gradište in Svinjarica were LiDAR scanned in 2011, while the Sekicol fort, with its 4 km² surroundings, was subjected to the same technology in 2015. Our analysis of the outer fortifications of Justiniana Prima is based on a visualisation of the obtained digital terrain models and field observations; in the case of the St Elias fort, we also used the results of the 1976 excavations. These fortlets had manifold functions. On the one hand, they overlooked the approaches to the city and its infrastructure – Kulište–Jezero was a watchtower – and on the other, they also served as shelters for the local population – refugia. In the middle of the St Elias fort there was a large three-nave church; this may well have been a fortified monastery. Future research of these forts should provide more detailed information on their chronology and function, complement the outstanding results of the LiDAR and geophysical surveys, and contribute to a better understanding of Justiniana Prima itself.

Key words – Justiniana Prima, outer fortifiations, refugia, watchtower, monastery, LiDAR, digital terrrain models

LiDAR technology was introduced to Serbian archaeology in 2011, as a major benefit from the involvement of the Institute of Archaeology, Belgrade, in the ArchaeoLandscapes Europe project. Following wide-area scanning of Caričin Grad and Margum/Morava,[1] within the scope of the same project, other important localities in Serbia have also been LiDAR surveyed – Krševica, Romuliana, and the Ras Fortress – along with fortifications from the surroundings of Caričin Grad, Sekicol and Rujkovac/Radinovac. While several other projects have just been completed or are near completion, the outcomes are studied together with other data obtained from different prospection methods, such as UAV[2] and geophysical surveys. Entered into the GIS, they are not only used for the detection of new structures, but for different space and urban-planning analyses as well.[3]

So far, only the results of the LiDAR survey of the Velika Morava and Danube confluence have been published in a more elaborate fashion.[4] Remarkable

[1] Иванишевић, Бугарски 2013.
[2] Иванишевић, Бугарски 2015.
[3] Иванишевић *et al*. 2016.
[4] Иванишевић, Бугарски 2012.

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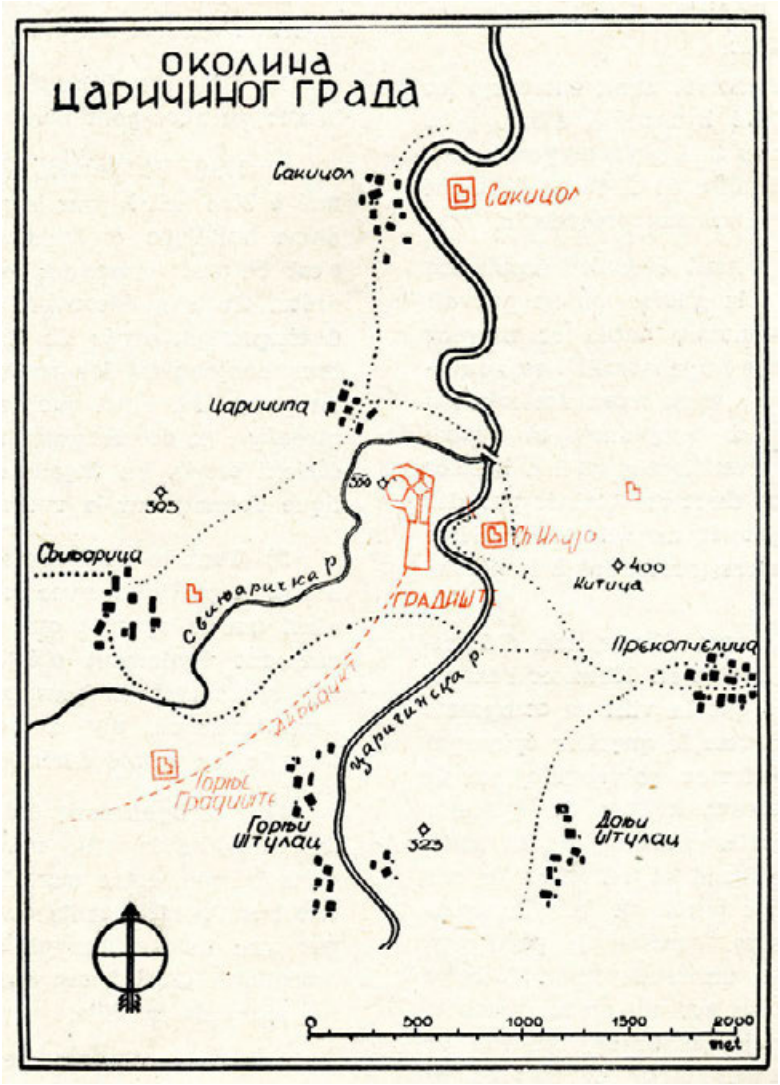

Fig. 1. Ground-plan of Caričin Grad and nearby fortlets and localities (Дероко, Радојчић 1950а, сл. 50)

Сл. 1. План околине Царичиног града са утврђењима и локалитетима (Дероко, Радојчић 1950а, сл. 50)

scans of Caričin Grad and its vicinity were mentioned in the introductory article on the application of LiDAR in Serbian archaeology, notably those indicating the existence of a rampart enclosing the north-eastern outer town.[5] After the excavations which followed, we concluded that this was the fourth line of fortifications built in opus mixtum there.[6] In addition, part of the LiDAR data was presented in the publication of the settlement at the Upper Town's northern plateau.[7] The same LiDAR survey provided useful information on subsurface structures in the city's vicinity. Covering part of the aqueduct route, it led us to resolve the question of the Caričin Grad water-supply system; after performing the analysis of satellite imagery and field surveys, we were able to find its source on the Radan Mountain,[8] which enabled a significant revision of the earlier conclusions.[9]

Earlier Knowledge of Fortifications around Caričin Grad

The construction programme of a new polis, Justiniana Prima, at the site of Caričin Grad, executed during the first decade of Justinian's reign (527–565), also envisaged the establishment of an outer fortification system. For many decades, researchers have justifiably focused on numerous monuments within the city limits, but the nearby fortifications were somewhat neglected.[10] Although described as early as 1950, their

[5] Иванишевић, Бугарски 2013, 82–84.
[6] cf. Бугарски, Иванишевић 2014, 255–256.
[7] Иванишевић *et al*. 2016, 148, 151–155.
[8] Иванишевић 2012.
[9] Петровић 1970.
[10] Кондић, Поповић 1977; Иванишевић 2011.

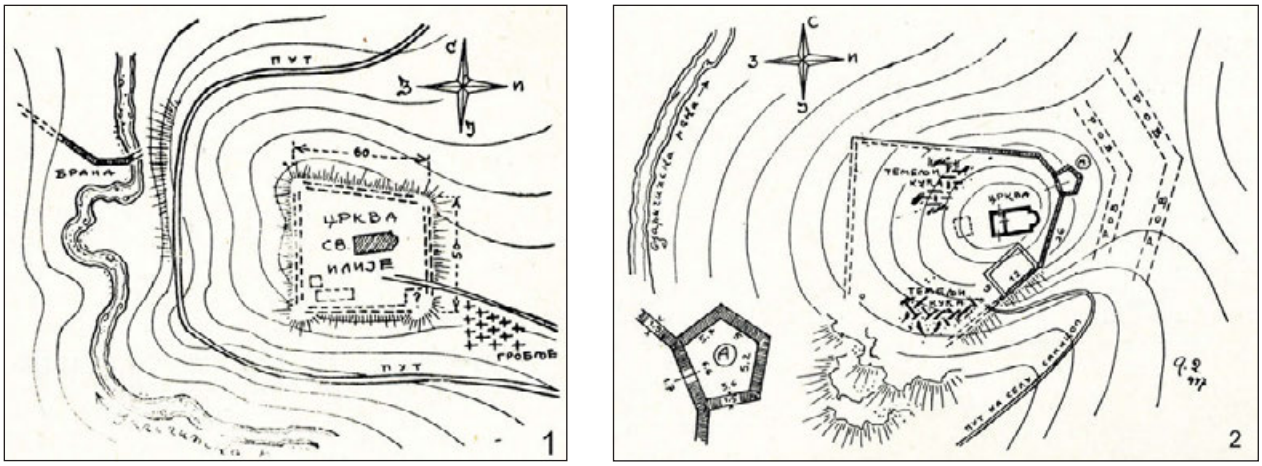

Fig. 2. 1) Ground-plan of St Elias; 2) Ground-plan of Gradište in Sekicol (Дероко, Радојчић 1950b, сл. 2, 4)

Сл. 2. 1) План утврђења на Св. Илији; 2) План Градишта у Секицолу (Дероко, Радојчић 1950b, сл. 2, 4)

ground-plan, chronology and function have so far not been discussed in more detail; it has only been suggested that they probably served as outposts.[11]

Aleksandar Deroko and Svetozar Radojčić briefly commented on the fortifications at St Elias, Gornje Gradište in the village of Svinjarica and in Sekicol. Another fort was mentioned as well – Kulište, situated on the stretch called Jezero (Fig. 1). The fortlet at St Elias Hill was described as a rectangular castellum strengthened with an inward tower in the most accessible, south-eastern corner. The ground-plan was sketched of a 60 m by 50 m large fort, with its ramparts drawn with broken lines and undefined corners (Fig. 2.1). The Gornje Gradište fortification in Svinjarica was, and still is, covered with vegetation. Only a rampart with a rectangular trench in front of it were mentioned, some 150 m long, together with another wall directed towards the Svinjarička rivulet. Deroko and Radojčić noticed that this fortlet had been erected on the aqueduct route.

The fortification in Sekicol was only briefly described, with its stone rampart encompassing the hill summit and a two-metre-high protruding tower facing the approach from the east, where two trenches were registered as well – a small outer trench and a larger inner one. Particularly important is the ground-plan left by the authors, showing a polygonal fort with a clearly defined eastern rampart and suggesting its western route. A pentagonal tower, a church, and a 12 m by 6 m large building next to the south-eastern rampart were also recorded, along with the foundations of houses in the northern and southern sections of the fortification (Fig. 2.2).[12]

Slobodan Nenadović supplied further information on the Sekicol fortification, claiming that the traces of two additional towers could be seen on the terrain surface, one of them in the lower part of the fort. He also mentioned two or three lines of walls, the lower one bordering a trench, and the foundations of buildings leaning on the ramparts. The author's article also includes a ground-plan with the dimensions of the single-nave church. With regard to Kulište–Jezero, Novaković left an important piece of information, namely that the fortlet was built along a Late Roman road, ruined by the locals, which had led from St Elias towards the village of Vrbovac. Furthermore, he described the church at St Elias and architectural sculpture found at the end of the 19th century in the debris cleared from the site to make room for its construction; at the time some sculptural elements had been built into the church and can still be seen today.[13]

Several new insights into these fortifications were briefly published in the well-known 1977 catalogue by Vladimir Kondić and Vladislav Popović. They suggested that the fortlet at St Elias Hill had round corner towers, at that time visible in the terrain, and that the

[11] Дероко, Радојчић 1950b, 175–176; Ненадовић 1950, 147–160.

[12] Дероко, Радојчић 1950b, 175–176.

[13] Ненадовић 1950, 147–159.

	Caričin Grad, St Elias, Svinjarica, Kulište–Jezero	***Sekicol***
Date	05.12.2011.	01.12.2015.
Scanned and processed by	Flycom d.o.o. Slovenia	GeoGIS Consultants, Serbia
Area	12 km²	4 km²
Helicopter	Eurocopter EC120B	Robinson R44 Raven II
Flight speed	93 km/h	60 km/h
Scanning height	600 m	≥ 500 m
Trajectories	21 N-S trajectories and one across	24 N-S trajectories and 7 across
Laser scanner	Riegl LM5600	Riegl VUX-1-SYS
Laser frequency	180 kHz	50 kHz
Point-cloud density	20 pts/m²	40 pts/m²
Software package	*Microstation v2004 Terrasolid*	*RiPROCESS*
GPS/ GNSS/IMU processing	*Grafnav IGI AeroOfjice*	*RiPROCESS*
DTM resolution	0.25 m	0.25 m

Table 1: Flight, scanning and processing parameters (2011 and 2015 surveys)

entrance had been positioned in its north-western part. The church was described in more detail, with its original construction dated to the 15th century. Basing themselves on the results of a single-trench excavation conducted in 1976, Kondić and Popović dated the fortification to the Early Byzantine period; they also underscored that there were no remains of an earlier Roman settlement or fort. The Kulište–Jezero fortlet was interpreted as a watchtower, while the rest of their text built upon two earlier articles quoted above.[14]

LiDAR Data for Fortifications around Caričin Grad and DTM Visualisations

This article presents new data on fortifications in the neighbourhood of Caričin Grad, obtained through LiDAR technology and evaluated during field surveys which followed. Located in a 12 km² area around the metropolis of Justiniana Prima, St Elias, Kulište–Jezero and Gornje Gradište in Svinjarica were LiDAR scanned during the first campaign (December 2011), while the Sekicol fort with its 4 km² spacious surroundings was subjected to the same technology – which has, in the meantime, improved the accuracy of different tasks – four years later, in December 2015.[15]

The 2011 scanning was performed with a point-cloud density of 20 points per square metre, while the obtained DTM (three-dimensional terrain model without vegetation) was in a 0.25 m resolution. Although the results were highly satisfactory, the second survey was performed with more trajectories and even more accuracy, with 40 points per square metre, whereas the DTM was the same in resolution.[16] The trajectories overlapped to at least 30 per cent above a flat surface and 50 per cent above hilly terrain. The second survey saw more transverse trajectories as well, with reduced flight height and speed (Table 1).[17]

Our analysis of the outer fortifications of Justiniana Prima is based on visualisation of the obtained digital terrain models and field observations; in the case of the St Elias fort, we also use the results of the 1976 excavations.[18] To present digital data and extract three-dimensional georeferenced models, one needs to employ different techniques and methods of visualisation,[19] creating greyscale or colour rasterised images. In interpreting our models, we first used standard visualisation techniques, available in most GIS environments. The first result was the creation of two-dimensional heat

[14] Кондић, Поповић 1977, 147–152.

[15] Elaborat 2012; Технички извештај 2019.

[16] For comparison, even 1 m data records most archaeological features, except in woodland (Crutchley 2013, 144), while the greatest density used for an archaeological project, at least up until recently, was 60 points per square metre, taken at the Hill of Tara in Ireland (Corns, Shaw 2013).

[17] Elaborat 2012; Технички извештај 2019.

[18] Documentation of the Institute of Archaeology, Belgrade. Unpublished.

[19] Devereux *et al.* 2008, 470–479.

maps using the Heatmap tool in QGIS; then the contour lines were interpolated using Contour Extraction. The hill-shading technique is probably the most widely applied tool for the analysis of LiDAR-derived digital models,[20] resulting in a clear and most natural impression of the relief. Moreover, hillshade models are simple to use and interpret. As one can apply different colour scales to heat maps and choose contour intervals, light angles and intensity, the combination of these techniques makes the possibilities for visualisation limitless.

Regarding our case studies, already the application of standard methods has given fascinating results, and some advanced visualisation freeware has recently become accessible, such as Relief Visualisation Toolbox (RVT)[21] and RTIViewer.[22] The choice of RVT techniques depends on the relief conditions; we had the best results with Sky View Factor and Local Dominance. While the former technique is used for modelling terrains most exposed to the sun, which makes wall-like structures brighter than e.g. trenches (Figs 4.3, 7.1, 8.2, 8.4),[23] the latter is based on computing, for every pixel of the model, how dominant an observer standing at that point would be for a close surrounding area (Figs 4.3–4; 5.3; 8.3–4).[24] RTIViewer is, on the other hand, based on hill-shading; yet, this application enables interactive illumination of a model from any direction and at any angle, revealing details not usually visible to the naked eye (Figs 5.4; 8.1). A series of images of the same model can be taken quickly with different illuminations and shadows.

The Focal Statistics function of the ArcGIS software package, a tool for space analysis, compares the values of neighbouring pixels, recognises parts with sudden changes in height and contrasts their colours (Fig. 5.3). This method has proved to be one of the most successful, especially for the analysis of the terrain configuration, structure and urban planning of Caričin Grad.[25]

The importance of Geographic Information Systems in the visualisation goes beyond the creation of rasterised two-dimensional images; they also create a virtual space and transform it into a three-dimensional model. The 3D application ArcScene permits the handling and measurement of digital models in three spatial dimensions as well as displaying the scene from different viewpoints. Such three-dimensional DTM greatly helps in understanding the topography and the anthropogenic structures – in our case, trenches, flattened terraces and plateaus. ArcScene also provides additional tools for interpreting the model, such as Vertical exaggeration of terrain, very useful for highlighting subtle surface changes. In our analysis, barely visible ramparts became clearly defined after the exaggeration of LiDAR data.

The digital visualisation process is only one step towards the even more important process of data reading and interpretation. Along with an understanding of different visualisation techniques, practice and experience in interpreting the LiDAR data are of key importance for reaching sustainable conclusions. In what follows, we will present the results of our analyses.

St Elias Fortification

This fort was built just east of Caričin Grad, on a hill above the right bank of the Caričinska rivulet, which encircles it from three sides. St Elias was to defend the eastern approach to the city and a dam between them which, according to earlier researchers, at the same time served as a bridge.[26]

The fortlet was briefly excavated in 1976 in order to gain some knowledge of the ramparts and the stratigraphy.[27] The archaeological trench, oriented north-south and 8 m by 2.5 m in plan, was opened on the route of the northern rampart, near the north-eastern corner of the fortification. The rampart was 2.3 m wide, built with stone in the lower and brick bound with hydraulic mortar in the upper part. The bricks measured 36 by 30 by 4.5 cm and 34 by 30 by 5 cm. In the southern part of the trench, a corner of a building made out of stone was excavated – the northern wall to a length of 1.5 m, and the eastern to a length of 1.9 m (Fig. 3). Its floor was apparently paved with stone and brick.[28]

Five different layers were identified in the course of the excavation. A natural hill surface, composed of rock and yellow virgin clay, was labelled layer E; it was superposed by layer D – a cultural layer with the remains of a paved fire-place and a significant number of potsherds and animal bones. Matching the evidence from

[20] Zakšek *et al.* 2011, 400–401; cf. Horn 1981, 38–42.

[21] https://iaps.zrc-sazu.si/en/rvt; cf. Kokalj *et al.* 2018.

[22] http://culturalheritageimaging.org/What_We_Offer/Downloads/View/

[23] Kokalj *et al.* 2011, 266–268; Kokalj *et al.* 2018, 32–35.

[24] Hesse 2016, 116.

[25] Иванишевић *et al.* 2016, 148.

[26] Ненадовић 1950, 146–147.

[27] The excavations of the Institute of Archaeology, Belgrade, directed by Vladimir Kondić and Vladislav Popović, lasted from 27 September to 6 October 1976. The results have not been published.

[28] Documentation of the Institute of Archaeology, Belgrade.

Fig. 3. St Elias, 1976 trench: northern rampart in the front plan, corner of the building in the background (Documentation of the Institute of Archaeology, Belgrade)

Сл. 3. Утврђење на Св. Илији, сонда из 1976: северни бедем утврђења у првом плану и угао објекта у другом (документација Археолошког института)

Caričin Grad, the pottery was processed by Ljiljana Bjelajac.[29] Together with fragments of bases and body sherds, pot rims and lids of the I/2 and VIII/1 types were found.[30] In the layers of the rampart and building collapse (C–A), a mediaeval grave from a churchyard cemetery was dug; 15th–16th century pottery was recovered from the upper layers of the trench as well.

The 1976 excavations, although limited in scope, established two main phases of occupation. The first can be dated to the Early Byzantine period, i.e. to the 6th and probably the beginning of the 7th century, while the second horizon dates from the 15th–16th centuries, when the church was built and the cemetery laid out.[31] A precise description of the rampart reveals not only that it was built in the same technique as those at Caričin Grad – opus mixtum – but with the same width as well.

The DTM visualisation and analysis provided new information on the ground-plan, the dimensions and the vicinity of the fortification (Fig. 4.1–4). The line of the northern and eastern ramparts can be traced following the trenches left by the locals dismantling the walls, while the routes of the southern and eastern ones are presented as raised lines on the surface. The 0.21 ha large fortlet is trapezoidal in plan, with unequal rampart lengths: the northern rampart is some 42 m long, the eastern and southern about 52 m and 55 m respectively, while the length of the western rampart approximates 46 m. This irregular plan was dictated by the topography. Semicircular protrusions, depicted in the processed DTM, point to the existence of corner towers. The south-eastern is barely visible, as this part of the fortification has been damaged by a modern cemetery; however, from the description by Aleksandar Deroko and Svetozar Radojčić, we can assume that it had been constructed.[32] As the authors had suggested, the entrance might have been located in the north-western part of the fort where, in the northern rampart, one can observe a small recess (Fig. 4.A).

As can be discerned from the topography, a fence ran parallel to the eastern rampart, continuing towards the north-east. It was some 78 m long (Fig. 4.B). Perhaps this was a palisade protecting the most accessible, eastern approach. It apparently turns towards the west and runs parallel to the northern rampart, enclosing some 25 m wide area. Furthermore, there is a spacious platform to the west of the fort, framed on the north-west by two retaining walls (?), 20 m and 28 m long (Fig. 4.C).

In the course of a 2015 ground-penetrating radar survey, a large three-nave basilica – most certainly Early Byzantine – was recorded in the middle part of the fortification's interior.[33] This finding reopens the

[29] Documentation of the Institute of Archaeology, Belgrade.

[30] Bjelajac 1990, 165–181.

[31] One of the present-day hamlets of the Štulac village, to which both the active church and graveyard at St Elias belong, is called Caričina (*empress's*). It was mentioned (twice) in the 1434 merchant's book of Mihailo Lukarević (Динић 1962, 36).

[32] Дероко, Радојчић 1950b, 175–176, сл. 2.

[33] The GPR survey of spring 2015 was organised in cooperation of the Institute of Archaeology, Belgrade, with the Roman-Germanic Central Museum, Mainz, and the Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology (LBI ArchPro) from Vienna. The results remain unpublished (*cf.* Иванишевић *et al.* 2016, 147, н. 10).

[34] Кондић, Поповић 1977, 148–149.

[35] Ivanišević 2016, 120; Ivanišević 2017, 103.

question of the origin of the architectural sculpture built into the modern church: it may have belonged to the 6th century basilica at St Elias, rather than being brought from Caričin Grad as had been suggested.[34] Moreover, the existence of the church and of other buildings, documented either during the excavations or due to the application of different prospection methods, is of wider importance, as these may indicate that within the fortification circuit there used to be a monastery complex.[35] Taking into account the described structures north and west of the fortlet, its immediate vicinity might have been settled as well.

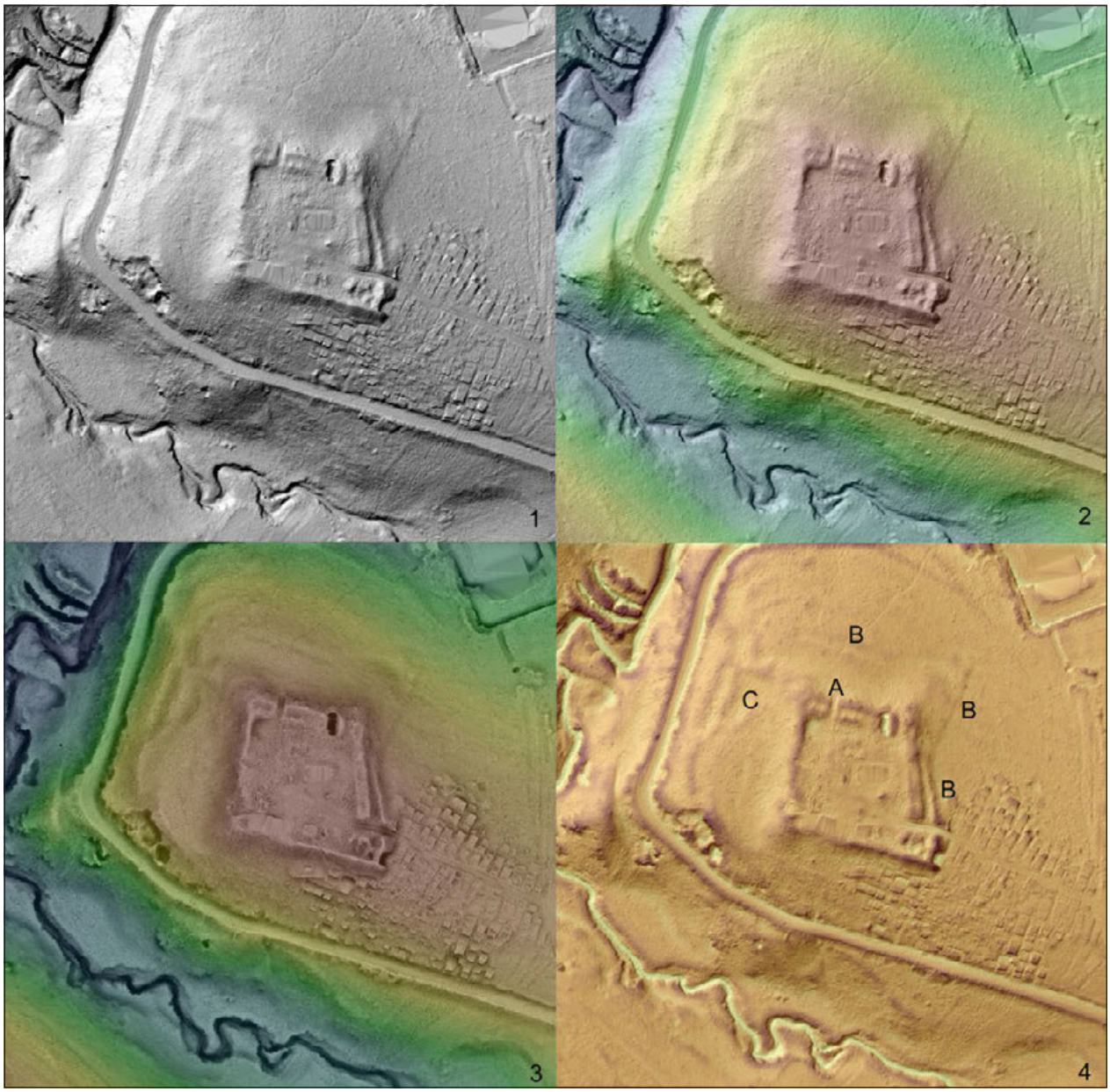

Fig. 4. St Elias: 1) Hillshade; 2) Hillshade and Digital Terrain Model; 3) Local Dominance, Sky View Factor and Hillshade; 4) Local Dominance and Hillshade; A – Entrance (?); B – Palisade (?); C – Platform and retaining walls (?) (Documentation of the Institute of Archaeology, Belgrade)

Сл. 4. Утврђење на Св. Илији: 1) Hillshade; 2) Hillshade и Digital Terrain Model; 3) Local Dominance, Sky View Factor и Hillshade; 4) Local Dominance и Hillshade; А – улаз (?); В – одбрамбени зид (?); С – платформа и подзиди? (документација Археолошког института)

Gornje Gradište in Svinjarica

Gornje Gradište is situated one kilometre south-west of Caričin Grad, on the northern slope of the hill above the Svinjarička rivulet. The fort dominated the valley and had visual communication with the city. The Caričin Grad aqueduct ran just south of it, between the rampart and the trench. This fortification stands out for its hexagonal plan with ramparts of unequal

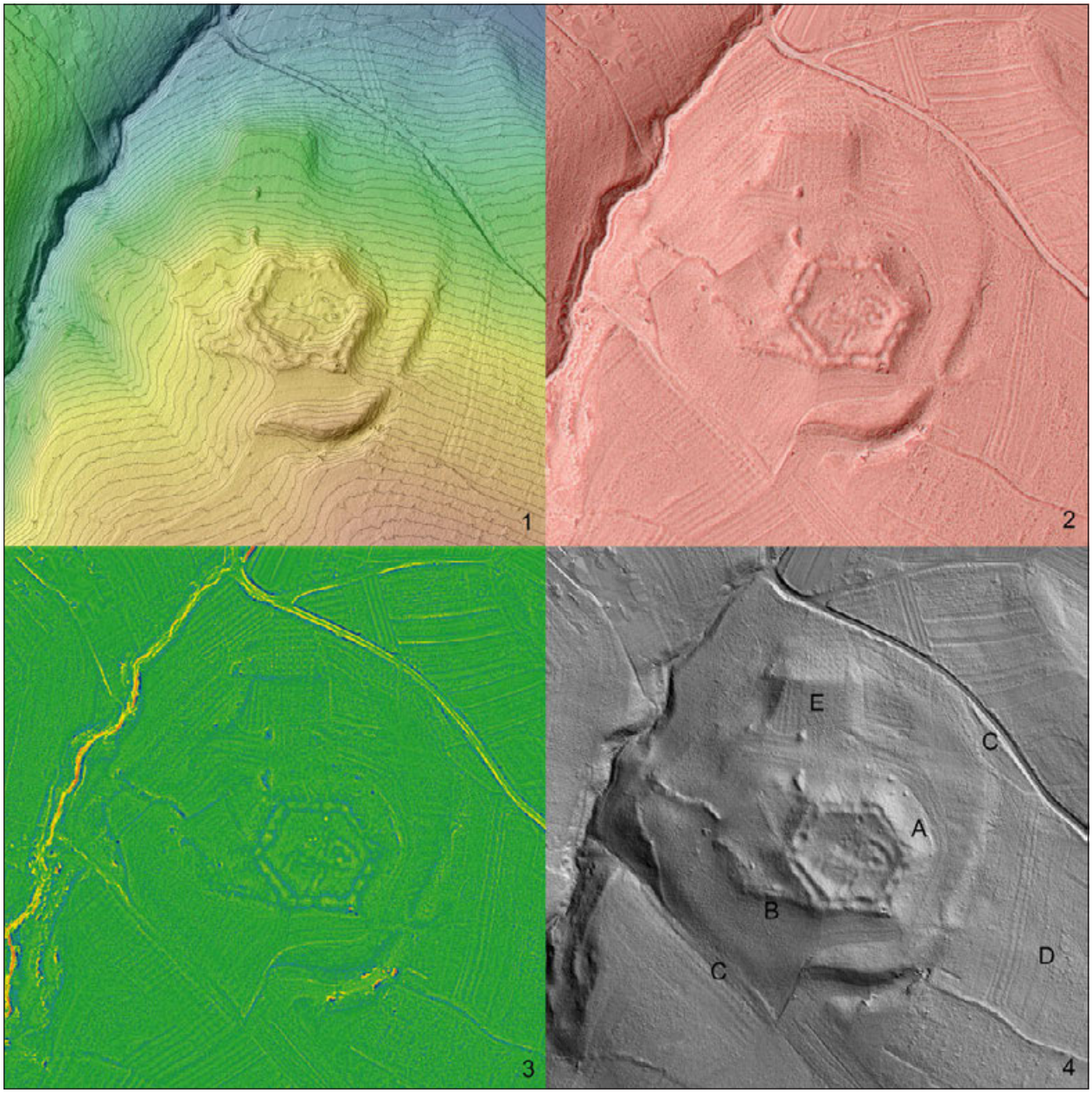

Fig. 5. Gornje Gradište in Svinjarica: 1) Hillshade, Digital Terrain Model and contour lines at 1 m intervals; 2) Focal Statistics and Hillshade; 3) Local Dominance; 4) Reflectance Transformation Imaging; A – Entrance (?); B – Stone agglomeration; C – Vallum and trench; D – Aqueduct route; E – "Bastion" (Documentation of the Institute of Archaeology, Belgrade)

Сл. 5. Горње градиште у Свињарици: 1) Hillshade, Digital Terrain Model и изохипсе на 1 m; 2) Focal Statistics и Hillshade; 3) Local Dominance; 4) Reflectance Transformation Imaging; A – улаз (?); B – агломерација камена; C – остаци рова и земљаног бедема; D – траса акведукта; E – „бастион" (документација Археолошког института)

Fig. 6. Gornje Gradište in Svinjarica: Trench (Documentation of the Institute of Archaeology, Belgrade)

Сл. 6. Горње градиште у Свињарици: ров (документација Археолошког института)

length: the northern, southern and south-western are ca 32 m long, and the north-eastern, south-eastern and north-western some 30 m (Fig. 5.1–4). The rampart perimeter measures about 190 m and encloses some 0.21 ha, the same area as that of the St Elias fortlet; no towers can be seen in the DTM. A small recess can be observed in the middle of the north-eastern rampart, presumably the entrance to the fort (Fig. 5.A).

Both on site and in the DTM, a ca 35 m long stone agglomeration (wall?) is visible, leaning on the fort's south-western corner and extending westward. Those stones were probably piled up when cleaning the fields around the fortlet. It could be that beneath this agglomeration lie the remains of a rampart, as was the case with that of the north-eastern outer town at Caričin Grad,[36] or perhaps of a palisade (Fig. 5.B), but this can only be resolved by archaeological excavation.

Inside the fortification, traces of two large buildings can be discerned. Abutting on the inner face of the south-western rampart, the first is rectangular in shape and some 21 m by 16 m in size; judging by its dimensions, it may have served as a storage building. The second construction, located in the eastern section of the fortification, is somewhat smaller – 20 m by 12 m. Oriented west-east and inclining to the south-east, it ends in a semi-circular apse (?) facing east. The layout of this building, probably a church, was dictated by the location of the first one and the available space. In the fortification's interior and on the rampart routes, large blocks of collapsed walls have been observed in the course of our field surveys, some of them in the very centre of the enclosure. The size and thickness of these opus mixtum blocks indicate that the ramparts were tall.[37]

[36] Иванишевић, Бугарски 2013, 82–83.

[37] Documentation of the Institute of Archaeology, Belgrade. Unpublished.

As the fort was built on a slope descending to the Svinjarička rivulet to the north, it was encircled by a vallum and trench. Preserved on the eastern and southern sides, in the south-eastern section the vallum was intersected to support the road to the fortlet. The north-western section of the vallum can be observed in the DTM, all the way to a gully leading to the rivulet. Although largely ruined by agriculture, part of the vallum can be traced to the north-east as well, in the direction of a modern road (Fig. 5.C). The southern part of the fossa is well preserved as it was cut through the rock (Fig. 6), while broken stones were used for the rampart construction.

A digital visualisation clearly shows the base of the aqueduct running beneath a passage through the vallum's south-eastern section (Fig. 5.D). From there, the canal can easily be traced in the micro-topography, all the way to an earthwork with a palisade enclosing the southern outer town of Caričin Grad and the south-western corner tower of the city's Lower Town (Fig. 9). In the opposite direction, towards the village of Bačevina and the remains of a large aqueduct bridge there, parts of the brick and stone construction of the canal can only be seen in gullies.[38]

A peculiarity of Gornje Gradište are large earthworks, easily visible in the terrain. To the north of the fort there is a massive rectangular protrusion, ca 40 m by 30 m and six metres high (Fig. 5.E). It appears to be artificial, but its function remains unclear; perhaps it was an earthen "bastion" controlling the approach from the Svinjarička rivulet valley. To the west there are two terraces which were possibly an integral part of the fortification.

Kulište–Jezero

Located one kilometre north-east of Caričin Grad, at the top of a rise gently sloping towards St Elias and the city in the west, and the Mrveška and Pusta River valleys in the east, is another, very small fortlet of Kulište–Jezero – undoubtedly a watchtower. In the DTM a ground-plan of a round tower is revealed, some 18 m in diameter and 150 m² in surface area (Fig. 7.1–2.A), also preserved in the toponym itself (*kula* = *tower*). Its perimeter is underlined with 2.5–3 m wide trenches, left after dismantling the rampart. The rampart width approximated those at Caričin Grad and the neighbouring fortlets. On the surface we have observed numerous fragments of bricks and stones; therefore it

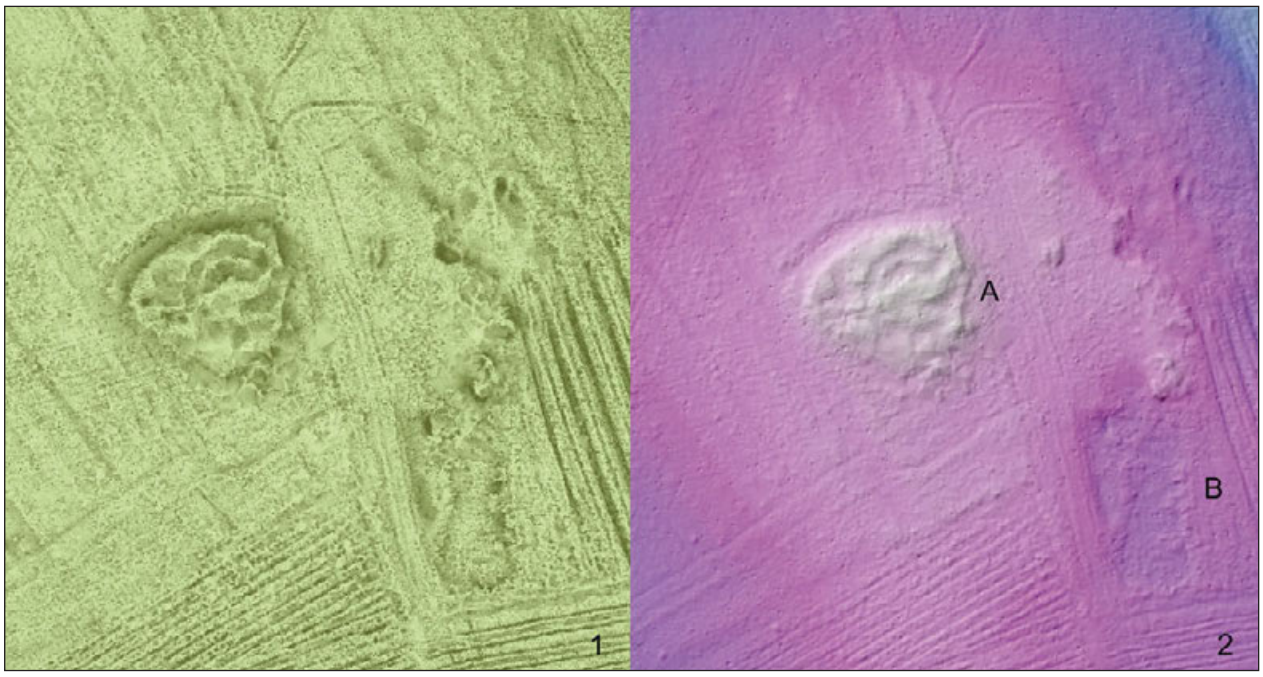

Fig. 7. Kulište–Jezero: 1) Digital Terrain Model and Sky View Factor; 2) Digital Terrain Model and Hillshade; A – Tower; B – "Quarry" remains (Documentation of the Institute of Archaeology, Belgrade)

Сл. 7. Кулиште – Језеро: 1) Digital Terrain Model и Sky View Factor; 2) Digital Terrain Model и Hillshade; А – кула; В – остаци каменолома (документација Археолошког института)

may be suggested that Kulište was built in opus mixtum as well.[39]

As at Caričin Grad, its roof construction comprised large lead plates, found within the tower some decades ago by the villagers of nearby Prekopčelica. Other finds have not been recorded.

There are no traces of other constructions in the immediate vicinity of Kulište, but shallow depressions in the rock east of it, left from a small "quarry", deserve mention. The best preserved is a rectangular depression in the south-east, some 32 m by 16 m across and only half a metre deep (Fig. 7.B). Much as at Svinjarica, it could well be that this rock was chiselled out for the construction of the watchtower itself. These depressions also hold water; hence the place-name (*Jezero = lake*).

Gradište in Sekicol

Approached via a saddle from the east, the Sekicol fortlet occupies a summit plateau and the upper parts of the steep southern and western slopes of a hill above the Caričinska rivulet, some 3 km to the north of Caričin Grad. This fortification differs greatly from those described above; it could be assigned to the most common group of Early Byzantine localities in the region, namely to that of fortified settlements – refugia.[40] We suggest that Gradište in Sekicol had originally been built in Late Antiquity and enlarged with an outer fortification line in the 6th century, at the time of the construction of Justiniana Prima, when it may have served to overlook the approach to the metropolis from the north. It was apparently used in later centuries as well: from the area of Sekicol comes a nomisma histamenon of Emperor Constantine VIII (1025–1028),[41] and the church at Gradište was reconstructed in the Middle Ages.

The fortification consists of three units – the Upper, Middle and Lower Forts (Fig. 8.1–4). The Upper Fort, triangular in plan and nearly 0.64 ha in surface area, occupies the top of the hill and its western slopes. At the highest point in its eastern section, there are the remains of a pentagonal watchtower observing the eastern approach. The north-eastern rampart was ca 90 m long, the south-eastern some 96 m, and the western about 130 m. Judging by its ground-plan, and the lack of confirmation that it had been built in opus mixtum, the Upper Fort may date from the 4th century. The Middle Fort was a separate fortification, approximately 1.23 ha in size, whose northern and eastern ramparts can easily be traced – some 153 m and 35 m long respectively – and the southern to some extent too, for ca 66 m, while the western rampart can only be discerned in the DTM; it might have been 161 m long (Fig. 8.A). The Lower Fort's ramparts defended the northern and, partly, the eastern sides of the hill. The northern, eastern, and southern ramparts were some 134 m, 29 m and 43 m in length, while one can only suggest that the western one was 41 m long (Fig. 8.B). This unit was around 0.63 ha in size.

The entire surface area of Gradište in Sekicol measured 2.5 ha. There was a trench in front of the Lower Fort, protecting access from the north-east, east, and south (Fig. 8.C). For the most part it is visible in the terrain, and the digital model depicts its otherwise almost unrecognisable sections; however, we have not observed the two towers mentioned by Slobodan Nenadović.[42]

As already mentioned, the early researchers had recorded the remains of several buildings in the Upper Fort – the church in its eastern part (particularly visible in the DTM), the large building next to the south-eastern rampart, and vague outlines of other constructions.[43] Our analysis reveals two rows of buildings spreading along the north-eastern and south-eastern ramparts. These buildings are 6 to 12 m long, and between them one can discern numerous other constructions; this layout resembles that of the settlement at the Upper Town's northern plateau in Caričin Grad.[44] In the Middle and Lower Forts only the platforms can be observed, apparently left from the levelling of the terrain prior to the construction, excluding the remains of a ca 24 m by 20 m large building in the south-eastern corner of the Lower Fort. Its walls are well preserved and were most likely massive; perhaps this building was a cistern (Fig. 8.D).

Conclusion

With its outer defence line, Caričin Grad differs from other fortifications in Illyricum. The erection of a new polis was part of a larger engineering project in a rural, hilly setting of the western areas of Dacia

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[38] Иванишевић 2012, 24–25.

[39] Documentation of the Institute of Archaeology, Belgrade. Unpublished.

[40] *cf.* Ivanišević, Stamenković 2014, 223.

[41] The find is housed in the National Museum, Leskovac, bearing inv. no. A–12.

[42] Ненадовић 1950, 152–153.

[43] Дероко, Радојчић 1950b, 175–176, сл. 4.

[44] Иванишевић *et al.* 2016.

Mediterranea, which also included construction of the aqueduct and the dam. The St Elias, Gornje Gradište in Svinjarica and Kulište–Jezero fortlets were parts of the original construction programme for Justiniana Prima. Just like those protecting the metropolis, their ramparts were built in opus mixtum.

Together with its nearby forts and the watchtower, Caričin Grad provides a unique example of an Early

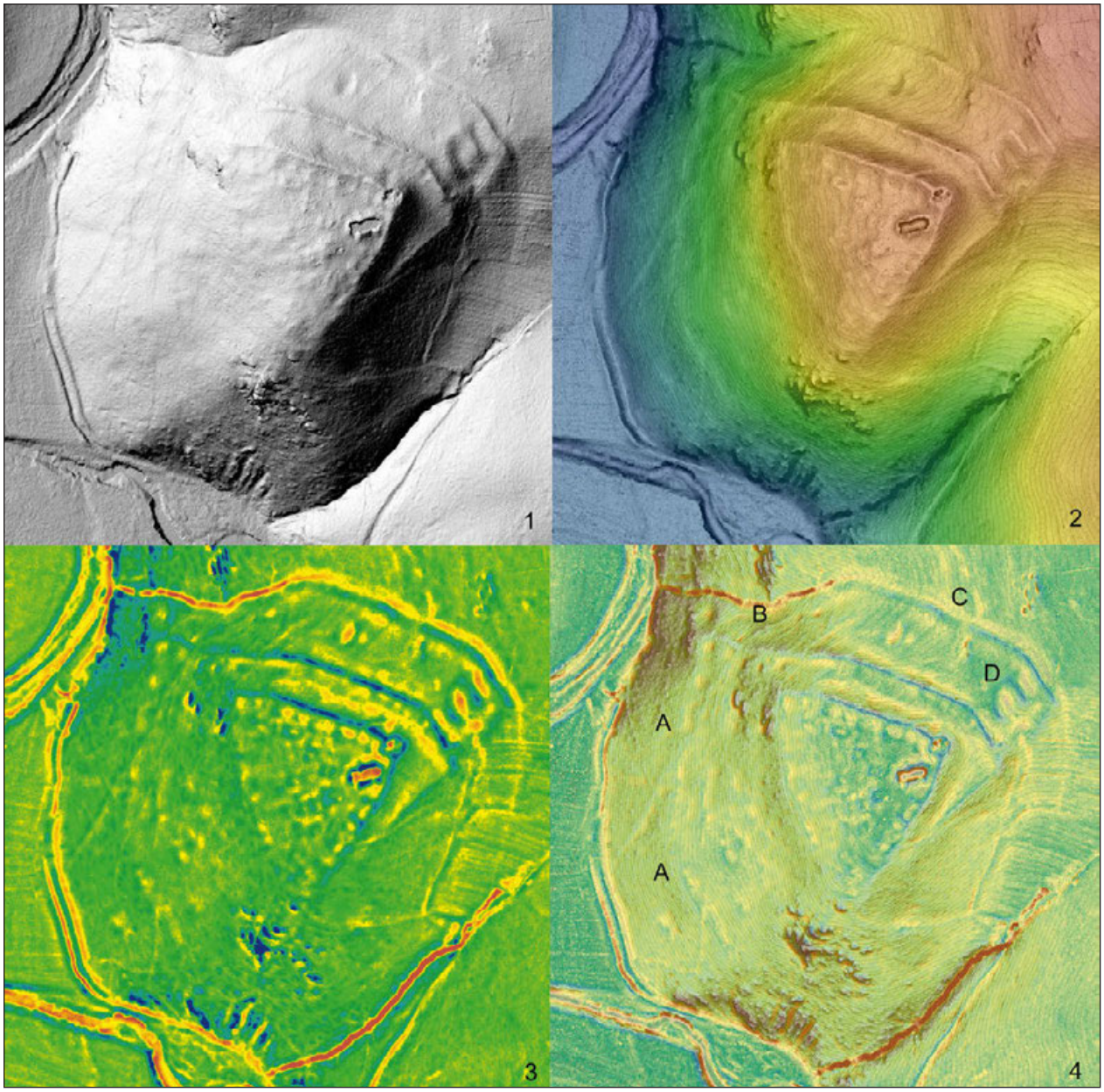

Fig. 8. Gradište in Sekicol: 1) Reflectance Transformation Imaging; 2) Sky View Factor, Digital Terrain Model and contour lines at 1 m intervals; 3) Local Dominance; 4) Sky View Factor, Local Dominance and contour lines at 1 m intervals; A – Western rampart of the Middle Fort (?); B – Western rampart of the Lower Fort (?); C – Rampart and trench; D – Cistern? (Documentation of the Institute of Archaeology, Belgrade)

Сл. 8. Градиште у Секицолу: 1) Reflectance Transformation Imaging; 2) Sky View Factor, Digital Elevation Model и изохипсе на 1 m; 3) Local Dominance; 4) Sky View Factor, Local Dominance и изохипсе на 1 m; А – западни бедем Средњег утврђења (?); B – западни бедем Доњег утврђења (?); C – бедем и ров; D – цистерна? (документација Археолошког института)

Byzantine city's complex defence system. One may understand why Procopius, in his *De aedificiis*, did not mention minor forts around cities. The chronicler described the establishment and the repair of many important fortifications from across the Empire, at the same time neglecting many others, and even large areas.[45] Leif Inge Ree Petersen, one of the few scholars devoted to the study of suburban fortifications, discusses the mid-5th century examples from the vicinity of Ratiaria and such 6th century fortlets on the outskirts of Neapolis, Thessalonica and Mediolanum.[46] In another seminal work, *De bellis*, Procopius mentioned the taking over of a suburban fort (φρούριον) of Neapolis in the year 536,[47] while *Miracula St. Demetrii* described how, in the course of the siege of Thessalonica of 586, the nearby forts (φρούρια), suburbs and fields were destroyed.[48] Furthermore, Gregory of Tours noted that the Franks captured suburban forts of Mediolanum as part of their 590 conquest of Italy.[49] These were apparently larger fortifications, erected in their cities' territories.

To this group could belong the 6th century fortifications at Sekicol and, especially, Rujkovac/Radinovac, which might have hosted troops in case of danger. Those units would leave them and attack the enemy's rear and their siege engines if the city was threatened. Many operations of this kind have been described by chroniclers.[50] From such fortlets, garrisons could be sent to endangered cities; such was the case of Salona in 537.[51] Other fortifications in the wider area of Caričin Grad, i.e. in the middle and western parts of the Leskovac Valley, shared this task.[52] In that way, the absence of military barracks at Caričin Grad may be explained, at least to some extent;[53] soldiers might have lived in numerous houses in the city, and in Sekicol as well. In this period, they often resided with their families.[54] In 544, the troops from Illyricum withdrew from Bononia (Bologna) not only because of significant debts owed to them for their military service, but also in response to the news that the "Huns" had made an incursion into their lands and had captured women and children.[55] That Caričin Grad was home to military personnel is witnessed by numerous finds of arms and armour, including fragments of the prestigious Baldenheim type helmets;[56] moreover, a large building in the Upper Town has been interpreted as Principia, the headquarters of a military commander.[57]

The St Elias, Gornje Gradište and Kulište fortifications had manifold functions. On the one hand, they overlooked the approaches to the city and its infrastructure, and on the other, they also served as shelters for the local population – refugia. Judging by their size, according to the estimations by Florin Curta, the first two fortlets could accommodate ca 130 soldiers each.[58] Yet, we have already mentioned that the 2015 GPR survey revealed the outlines of a church in the middle of the St Elias fort. This three-nave basilica was 36 m by 16 m across, occupying almost a quarter of the fortlet's interior. With its atrium leaning on the western rampart, the church was oriented west-east. The same survey provided information on other buildings along the ramparts as well, which is in line with the results of the 1976 excavations; this may well have been a fortified monastery.

Here we should also mention that Procopius, while describing the construction of Justiniana Prima, made an interesting remark on nearby Taurisium, the birth village of the emperor (χωρίον Ταυρίσιον), which was ramparted and turned into a quadriburgium (Τετραπυργίαν) – a quadrangular fort with corner towers – apparently within the same construction programme.[59]

The same source informs us that, apart from numerous churches, Justinian built fortified monasteries as well. The one at Sinai is particularly well known, established on a cult site below steep hillsides.[60] Procopius further describes a fortified monastery at Carthago, near the Mandrakion Harbour inside the city walls, which was heavily ramparted and turned into an impregnable fortress.[61] Similar to St Elias is a 0.16 ha large fortlet in Pirdop, in the south-west of present-day Bulgaria, which accommodated a 5th or 6th century church measuring 30.5 m by 17 m in plan.[62] Yet, the

45 Procop. *Buildings*.
46 Petersen 2013, 300.
47 Procop. *Wars* V.viii.6–7.
48 *Miracula St. Demetrii* 1.13–14.
49 Gregory of Tours 10.3.
50 cf. Peteresen 2013, 290–293.
51 Procop. *Wars* V.xvi.12–15.
52 Ivanišević, Stamenković 2014.
53 Ivanišević 2016, 114–115, Fig. 4.
54 Petersen 2013, 151.
55 Procop. *Wars* VII.xi.12–16.
56 Bavant 2008.
57 Bavant 1990.
58 Curta 2001, 182–183.
59 Procop. *Buildings* IV.i.17–18.
60 Procop. *Buildings* V.viii.4–9.
61 Procop. *Buildings* VI.v.8–11.
62 Băjenaru 2010, 145–146, Pl. 86.321.

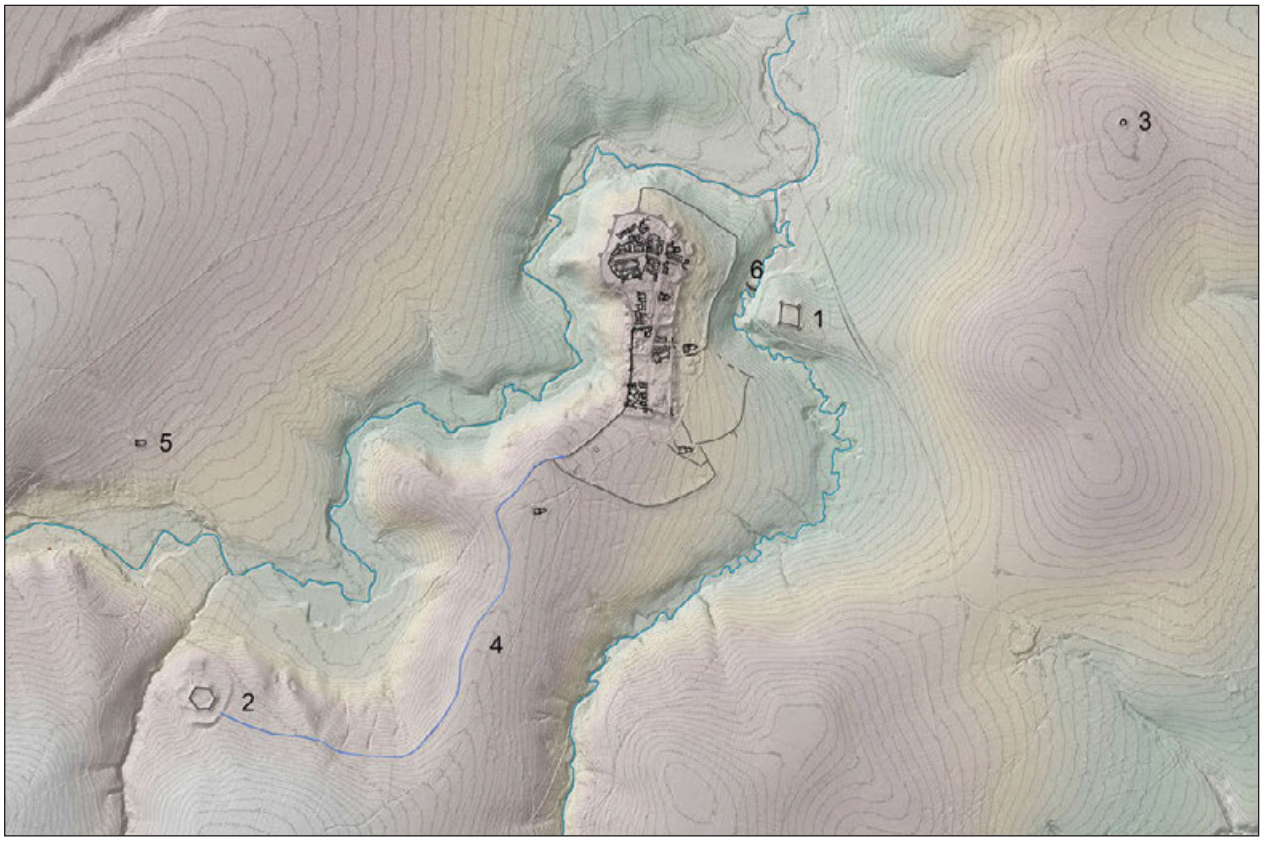

Fig. 9. Ground-plan of Caričin Grad and nearby fortlets: 1) St Elias; 2) Gornje Gradište in Svinjarica; 3) Kulište–Jezero; 4) Aqueduct; 5) Svinjarica basilica; 6) Dam (Documentation of the Institute of Archaeology, Belgrade)

Сл. 9. План Царичиног града са оближњим утврђењима: 1) Утврђење на Св. Илији; 2) Горње градиште у Свињарици; 3) Кулиште – Језеро; 4) Акведукт; 5) Базилика у Свињарици; 6) Брана (документација Археолошког института)

closest example comes from nearby Justiniana Secunda (Ulpiana). A martyrium-basilica was built in the 5th or 6th century within a former Roman temple's portico near the northern gate of Ulpiana. It was enclosed by 1.75 wide ramparts during Justinian's reconstruction of the city, which was then renamed to celebrate the emperor, and turned into a 0.28 ha large quadriburgium, somewhat larger than St Elias. The martyrium-basilica occupied a smaller area than the church in our fortlet, and it is interesting that the ramparts at St Elias were thicker (2.3 m) than those at Justiniana Secunda, the more so as the former had been built on a hill, and the latter on flatland.[63]

However, the hill is not high; the St Elias fortlet was therefore hidden in the terrain and could observe and protect, apart from the city, the structures in its immediate vicinity: the road, the dam, and the workshops at its foot (Fig. 9). Near the confluence of the Svinjarička and Caričinska rivulets, the remains of a melting furnace have been recorded.[64] Our visual contact analysis confirms that St Elias provided a very limited view, restricted to the closest surroundings and a small section of slopes north-west of the city (Fig. 11.1).[65]

Gornje Gradište in Svinjarica could observe somewhat wider surroundings, particularly the slopes around the Svinjarička rivulet. On the other hand, it is

[63] Teichner 2015, 294–322.

[64] Петковић 1937, 83.

[65] The extent of the DTM used in the visibility calculations was established by computing an average viewing distance of 6,600 m, as set by Wheatley, Gillings 2000, 17–18.

[66] Месеснел 1938, 197, сл. 18.

striking that this fort did not control the most vulnerable, southern approach to Caričin Grad (Fig. 11.2); we therefore assume that it was meant to overlook villages and workshops in the city's neighbourhood. A brick kiln was found on the rivulet's shore below the fortlet, as well as the remains of an Early Byzantine basilica to the north of it. France Mesesnel noted that other buildings' walls could be discerned in the terrain around the church.[66] Another role of Gornje Gradište might well have been to guard the aqueduct, particularly its

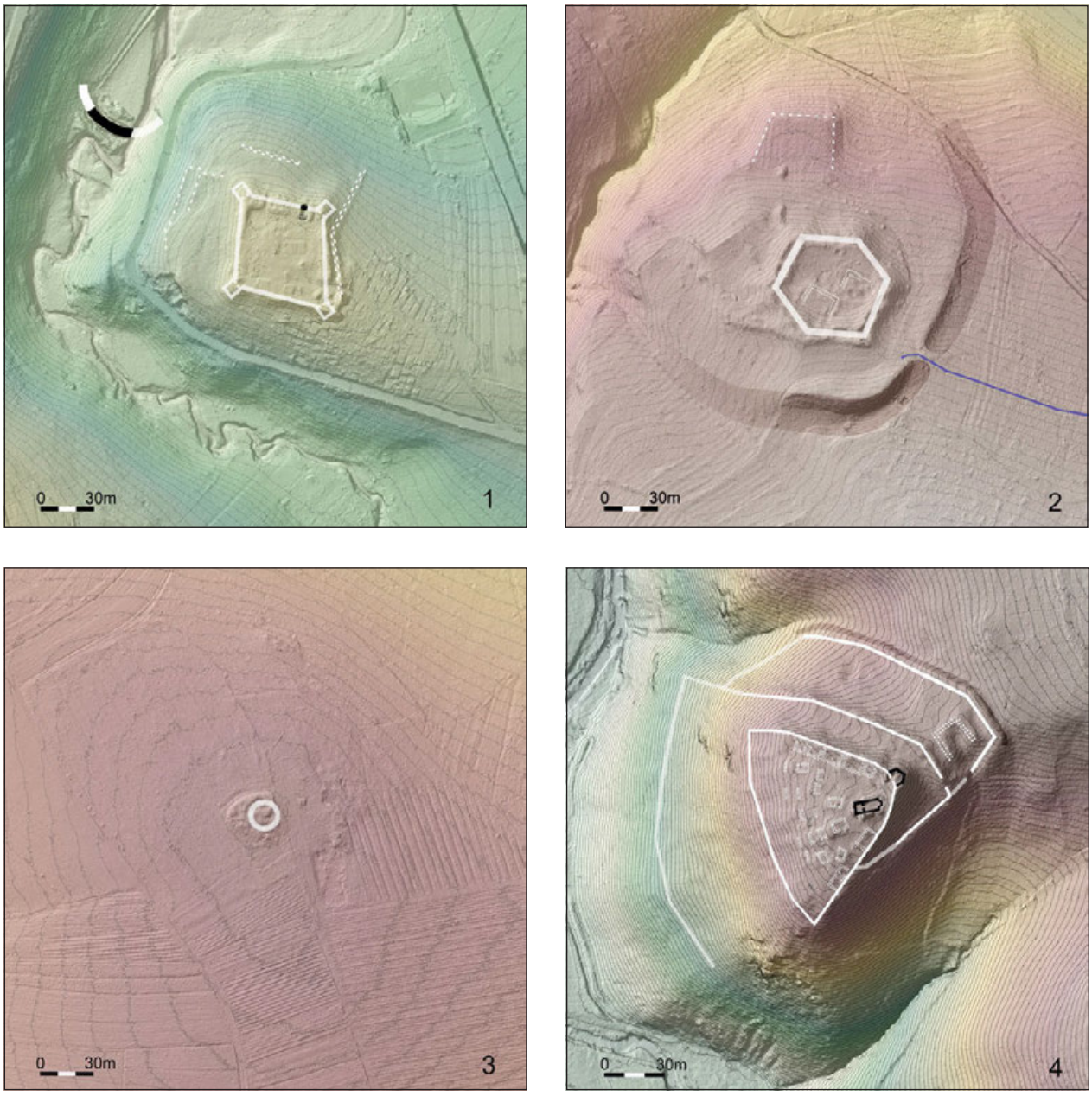

Fig. 10. Results of the DTM analyses – ground-plans of the fortlets:
1) St Elias; 2) Gornje Gradište in Svinjarica; 3) Kulište–Jezero; 4) Gradište in Sekicol
(Documentation of the Institute of Archaeology, Belgrade)

Сл. 10. Резултати анализа дигиталних модела терена – основе утврђења:
1) Св. Илија; 2) Горње градиште у Свињарици; 3) Кулиште – Језеро; 4) Градиште у Секицолу
(документација Археолошког института)

above-ground sections – bridges spread between this fortlet and the present-day village Bačevina.

In contrast to St Elias and Gornje Gradište, the Kulište–Jezero watchtower overlooked a wide area encompassed by heights on all sides, partly excepting the northern part of this tract. Its control over the road leading from Naissus, approaching the city from the north-east, through the Mrveška rivulet valley, was of the utmost importance, while the northern access was guarded by the larger fortification at Sekicol. Kulište–Jezero had visual communication with Caričin Grad, St Elias and Gornje Gradište in Svinjarica (Fig. 11.3), but not with the Sekicol and Rujkovac/Radinovac forts. The watchtowers were common Roman fortifications, particularly numerous along the limes. Many such fortlets are known from around the Empire – from Britain to the Danube border and all the way to Mesopotamia; for instance, numerous watchtowers were erected along the desert roads in Egypt to control these communication routes and especially water sources.[67]

The fortlets we are concerned with were built on rocky rises, chiselled out for rampart construction. Besides the above-mentioned shallow depressions in the rock left from these small "quarries", below St Elias and

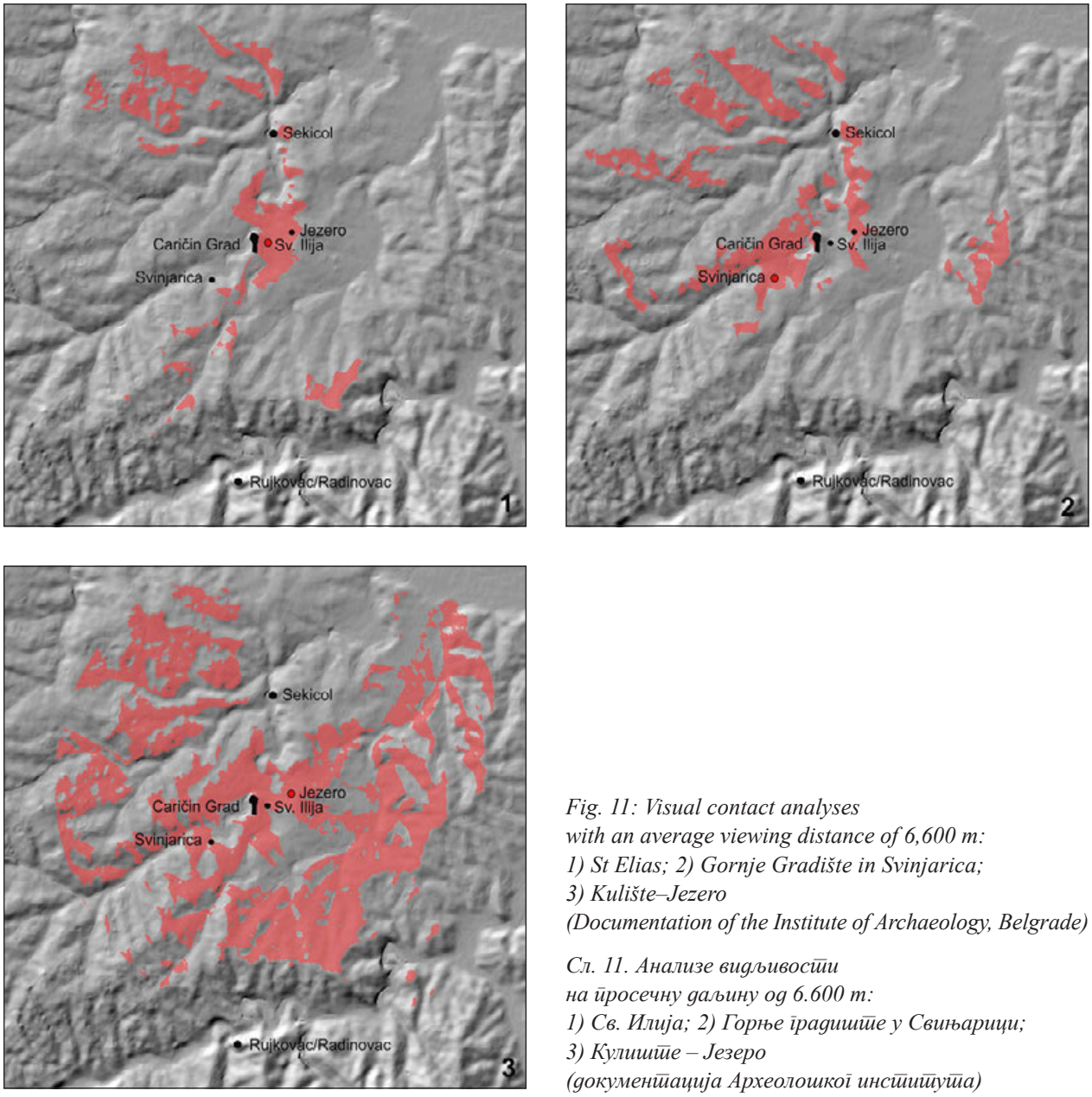

Fig. 11: Visual contact analyses with an average viewing distance of 6,600 m: 1) St Elias; 2) Gornje Gradište in Svinjarica; 3) Kulište–Jezero (Documentation of the Institute of Archaeology, Belgrade)

Сл. 11. Анализе видљивости на просечну даљину од 6.600 m: 1) Св. Илија; 2) Горње градиште у Свињарици; 3) Кулиште – Језеро (документација Археолошког института)

Gornje Gradište there are remains of modern quarries as well, which were in use until the 20th century. These resources had certainly been exploited in the Early Byzantine period too.

Caričin Grad, with its sophisticated defence system consisting of several rings of ramparts built in opus mixtum with at least 40 towers of different shapes, earthworks with palisades and a large trench in the immediate area of the city, and the outer fortlets described in this article, represents an exquisite example of Early Byzantine military architecture and the way it was adjusted to the topography. Future research of these forts should provide more detailed information on their chronology and function, complement the outstanding results of the LiDAR and geophysical surveys, and contribute to a better understanding of Justiniana Prima itself.

Translated by Ivan Bugarski

[67] Adams 2007, 223.

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Vujadin IVANIŠEVIĆ, Ivan BUGARSKI, Aleksandar STAMENKOVIĆ
The Outer Forts of Caričin Grad: Visualisation of Digital Terrain Models and Interpretation (297–317)

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СПОЉАШЊА УТВРЂЕЊА ЦАРИЧИНОГ ГРАДА: ВИЗУЕЛИЗАЦИЈА И ИНТЕРПРЕТАЦИЈА ДИГИТАЛНИХ МОДЕЛА РЕЉЕФА

Кључне речи – Јустинијана Прима, спољашња утврђења, рефугијуми, осматрачница, манастир, лидар, дигитални модели терена

Истраживања Царичиног града отпочета су пре више од једног столећа. Пажња стручњака је, из сасвим разумљивих разлога, пре свега била усмерена на истраживања града, док су околна утврђења изазивала знатно мање пажње (сл. 1, 2). Кад је реч о самим ископавањима, исто је и данас, али је примена савремених метода археолошке проспекције и детекције са земље и из ваздуха, нарочито заступљена у последњих десетак година и праћена теренском провером добијених података, довела и до важних сазнања о околини метрополе Северног Илирика. У чланку се коментаришу објављена запажања претходних истраживача – Дерока, Радојчића, Ненадовића, Кондића и Поповића – у светлу нових података.

Лидарска снимања ширих зона налазишта уведена су у српску археологију почетком ове деценије, у склопу учешћа Археолошког института у међународном пројекту *Archaeo-Landscapes Europe*. Међу првим скенираним локалитетима био је управо Царичин град, са одличним резултатима које су пратиле прелиминарне публикације. Зоном лидарског снимања од 12 km² из 2011. године, осим самог Царичиног града, био је обухваћен и део трасе акведукта, али и оближње утврде Св. Илија, Горње градиште у Свињарици и Кулиште – Језеро. Године 2015. извршено је снимање простора површине 4 km² око утврђења у Секицолу. Иако су и претходно добијени ласерски модели рељефа без вегетације били више него довољни за плодотворну анализу, у међувремену је омогућено побољшање параметара снимања, па су она из 2015. године бележила чак 40 тачака по квадратном метру – двоструко више него скенирање терена из 2011. године, уз више контролних трајекторија и смањену брзину и висину лета (табела 1).

Рад на визуелизацији добијених тродимензионалних модела терена одвијао се уз коришћење различитих техника – од стандардних, попут прављења дводимензионалних топлотних мапа помоћу алатке *Heatmap* у програму *QGIS*, интерполације изохипси (*Contour Extraction*) и сенчења (*hill-shading*), до рада у напредним слободно доступним софтверима као што су *Relief Visualisation Toolbox (RVT)* и *RTIViewer*. Функција *Focal Statistics* из *ArcGIS* пакета препознаје делове терена са изразитим висинским разликама и показује контрасте у боји, због чега се показала као једна од најуспешнијих у анализи конфигурације терена, структуре и урбанизма Царичиног града. Апликација *ArcScene* приказује тродимензионалне дигиталне моделе из различитих углова, а њена алатка *Vertical exaggeration of terrain* такође је веома корисна за наглашавање благих промена у терену. Процес дигиталне визуелизације је само корак у рашчитавању и интерпретацији добијених података, чему је посвећен преостали део текста у којем је показано како је примена савремене технологије снимања терена из ваздуха допунила досадашња сазнања о фортификацијама из најближег окружења Царичиног града (сл. 4, 5, 7, 8).

Утврда на брду Св. Илија је смештена непосредно уз Царичин град, надзирући источни прилаз граду и брану његовог акумулационог језера. Локалитет је сондажно ископаван 1976. године у организацији Археолошког института, када су установљена два главна хоризонта (сл. 3). На основу градитељске технике (*opus mixtum*) и покретних налаза, старији хоризонт је поуздано датован у 6. век и, вероватно, почетак 7. века, док познији припада средњем и новом веку. Визуелизација дигиталног модела рељефа, рачунарским путем ослобођеног постојеће вегетације, донела је нове податке о утврђењу. Основа ове трапезоидне фортификације сада може лако да се сагледа и премери. Утврђење је заузимало 0,21 ha и имало је угаоне куле, а у дигиталном моделу се уочава и ограда паралелна са источним бедемом, можда палисада, која је штитила најлакши источни прилаз. Скретала је ка западу, паралелно са северним бедемом, док се западно од утврде уочава пространа платформа коју оивичавају два подзида. Током георадарских снимања, која је у пролеће 2015. године извела екипа *Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology* из Беча, у централном делу утврђења је откривена велика рановизантијска базилика (сл. 4).

Утврђење Горње градиште налази се у селу Свињарици, на километар југозападно од Царичиног града. Било је, а и остало је веома урасло у вегетацију, тако да се запажања претходних истраживача углавном заустављају на опису четвороугаоног рова испред утврде и на њеном положају на траси акведукта. Лидарским снимком је пак откривена шестоугаона основа фортификације, састављена од зидова дужине око 30 m и 32 m, која заузима исту површину као и Св. Илија. Уз то, у дигиталном моделу, и у мањој мери на самом терену, уочавају се обриси двеју великих грађевина. Док је једна могла да служи као складиште, друга је била црква. Током обиласка локалитета уочили смо велику количину шута од камена, опеке и малтера. Утврђење је било опасано ровом и шанчевима, што се нарочито добро види са јужне стране, где је ров укопан у стену чији су блокови након вађења били уграђивани у бедеме и, вероватно, друге објекте. Делови северне трасе бедема су, пак, тешко оштећени

земљорадњом. Југоисточна секција валума је пресечена прилазним путем, а са истог одсечка траса акведукта може лако да се прати у микротопографији, све до угаоне куле кроз коју је вода улазила у Царичин град. Посебна одлика Горњег градишта јесу масивни земљани „бастиони" северно и, чини се, западно од утврде (сл. 5).

Кулиште – Језеро заузима врх благог успона на километар североисточно од Царичиног града. Судећи по површинским налазима опеке и камена, то веома мало утврђење, пречника око 18 m, које је у дигиталном моделу рељефа назначено рововима од вађења грађе, било је сазидано у техници *opus mixtum*. Имало је функцију осматрачнице, која је остала сачувана и у једном топониму, док други назив упућује на воду која се задржавала у плитким депресијама насталим вађењем стене за изградњу бедема, од којих је највећа четвороугаоног облика, површине 32 m x 16 m и дубине око пола метра (сл. 7).

Градиште у Секицолу је подигнуто на врху и стрмим падинама брда над Царичинском реком, око 3 km северно од Царичиног града. Утврђење се доста разликује од претходно описаних. Можда потиче из 4. века, да би у 6. столећу, у доба изградње Јустинијане Приме било увећано доградњом двају спољних бедема. Највиша утврда је троугаоне основе, а на терену није потврђено да је била сазидана уз коришћење опеке и малтера. Њена површина износи 0,64 ha. Претходни истраживачи су у источном делу те целине забележили цркву, која се нарочито јасно оцртава у дигиталном моделу, већу грађевину уз њен југоисточни бедем, као и слабе обрисе других зграда. Наша анализа је довела до открића два низа зграда уз бедеме и бројних грађевина између њих. По лепезастом распореду зграда, поседање ове утврде подсећа на насеље на северном платоу Царичиног града. Средњи прстен је скоро двоструко већи, док је доња утврда, придодата на североисточној страни, исте површине као и највиша. У њеном југоисточном крају налази се правоугаона грађевина димензија 32 m x 16 m – можда цистерна. Укупна површина Градишта у Секицолу је 2,5 ha. Испред доњег утврђења налази се ров, који се у појединим партијама види само у дигиталном моделу, док је на терену непрепознатљив (сл. 8).

Са својим спољним прстеном утврда, Царичин град се разликује од других утврђења у Илирику. Велика грађевинска активност у руралном залеђу Средоземне Дакије није била ограничена на подизање нове метрополе, већ је подразумевала и изградњу инфраструктурних постројења као што су акведукт и брана. Четири испитана утврђења представљала су део јединственог градитељског програма Јустинијане Приме, о чему сведочи и примењена техника зидања са опекама и малтером. У историјским изворима нема пуно података о мањим утврдама покрај градова. Већа утврђења, фруриони попут Градишта у Секицолу и Рујковца/Радиновца, могли су да у случају опасности прихвате трупе које би из њих нападале непријатељску позадину и опсадне справе. У то време, војници су често становали са својим породицама. Остала три утврђења имала су различите функције. Кулиште – Језеро била је добро постављена осматрачница, какве су уобичајене у римском војном градитељству, која је имала визуелну комуникацију са Царичиним градом, Св. Илијом и свињаричким Градиштем, али не и с већим утврдама у Секицолу и Рујковцу/Радиновцу.

Утврђења на Св. Илији и у Свињарици су, попут рефугијума, могла да збрину живаљ у тешким временима. Ипак, Св. Илија је изворно имао другу намену. Велика базилика откривена приликом георадарских снимања заузимала је чак четвртину утврде, а постојање зграда уз бедеме снажи претпоставку да је реч о утврђеном манастиру. Поред тога, у свом опису Јустинијане Приме Прокопије наводи да је цар овај град подигао поред свог родног села које је обзидао и од њега начинио квадрибургијум, очигледно као део јединственог градитељског програма. Познати су још неки утврђени манастири који су подигнути за владе цара Јустинијана, од којих је Св. Илији најсличнији онај у Јустинијани Секунди, дотадашњој Улпијани. На то да Св. Илија није представљао класично војно утврђење упућује и наша анализа видљивости, која показује да је поглед са те тачке веома ограничен. Према истој анализи, Горње градиште у Свињарици је надзирало села и радионице у околини града, као и акведукт (сл. 11).

Детаљно разрађен одбрамбени систем Јустинијане Приме састојао се од неколико прстенова градских утврда са најмање 40 кула, ровова, палисада и спољашњег прстена фортификација, који је обухватао, пре свега, овде коментарисана утврђења. Одбрамбена постројења новоустановљене метрополе и начин на који су се она прилагодила топографији представљају изузетан пример рановизантијског војног градитељства. Будућа истраживања би сигурно обезбедила поузданије податке о њиховој хронологији и функцији и тако надоградила изузетне резултате лидарских и геофизичких снимања, што би допринело и јаснијем сагледавању самог Царичиног града.

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САШКА ЦРКВА У НОВОМ БРДУ – *SANTA MARIA IN NOVOMONTE*

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Апстракт – У раду су саопштени резултати археолошких истраживања вршених током педесетих и шездесетих година 20. века који до сада нису били целовито објављени. На истраженим остацима саме цркве издвојене су три грађевинске фазе, које одсликавају настанак, обнове и доградње овог храма у ширем раздобљу – од првих деценија 14. до краја 17. века. У прву и најзначајнију етапу издвојено је грађење саме цркве, укључујући сукцесивну доградњу зиданих гробница и гробне укопе у унутрашњости првобитног храма. Следећа етапа обухвата обимну обнову цркве и њено проширење у шестој деценији 15. века, док је као трећа и последња етапа издвојена доградња трема испред западне фасаде. Сашка црква, односно *Santa Maria in Novomonte*, подигнута је трудом заједнице новодосељених саских рудара, на шта указује просторно решење храма засновано на традицијама из постојбине, које је та рударска популација раширила на свим подручјима своје дијаспоре. Сам начин грађења и нека конструктивна решења, која нису утицала на основну концепцију, били су препуштени локалним неимарима.

Кључне речи – Ново Брдо, Саси, Католици, црквена архитектура

Истраживања пространог комплекса са остацима средњовековног града Новог Брда започета су 1952. године у организацији Археолошког института Српске академије наука. Било је замишљено да се у оквиру вишегодишњег програма приступи систематским археолошким ископавањима у оквиру остатака утврђења, односно „Горњег и Доњег града", као и на локалитетима где су се очекивали остаци порушених сакралних здања. Планирани истраживачки радови, у које су били укључени Народни музеј и Војни музеј ЈНА, с већим или мањим интензитетом обављани су првих десетак година, а потом су настављени 1969. и тада коначно прекинути.[1] Током првих година ископавања главна пажња је била усмерена на остатке фортификација и комплекса некадашњег новобрдског катедралног храма – цркве Светог Николе са некрополом.[2] Уз истраживања на та два главна локалитета, археолошким ископавањима је, осим остатака два мања храма – цркве Јовче и „Саборнице",[3] био обухваћен и комплекс на локалитету познатом под називом Сашка црква[4], који је овом приликом предмет нашег посебног интересовања.

Још пре започињања теренских археолошких ископавања изнете су претпоставке, које су касније истраживања и потврдила, да се на овом локалитету налазе остаци главне новобрдске католичке цркве, која се од 14. па све до 17. века више пута помиње у изворној историјској грађи, најчешће у дубровачким архивским документима, као што су: *S. Maria in Novomonte di Dogni targ in Schiauonia; S. Maria sotto Nouamonte; S. Maria chiesa canonicale;*

[1] Истраживања Новог Брда обустављена су вољом албанских партијских кадрова у Приштини, в: Поповић 1989, 143.

[2] Здравковић, Јовановић 1954–1955, 275–282; Кораћ 1954–1955, 265–274; Zdravković 1956, 331–345; Поповић, Бјелић 2018, 37–48.

[3] Здравковић, Јовановић 1954–1955, 259; Здравковић 1958, 348, сл. 19.

[4] Здравковић 1958, 341–348; Чершков, 1958, 338–340; Зечевић 2006, 21–25.

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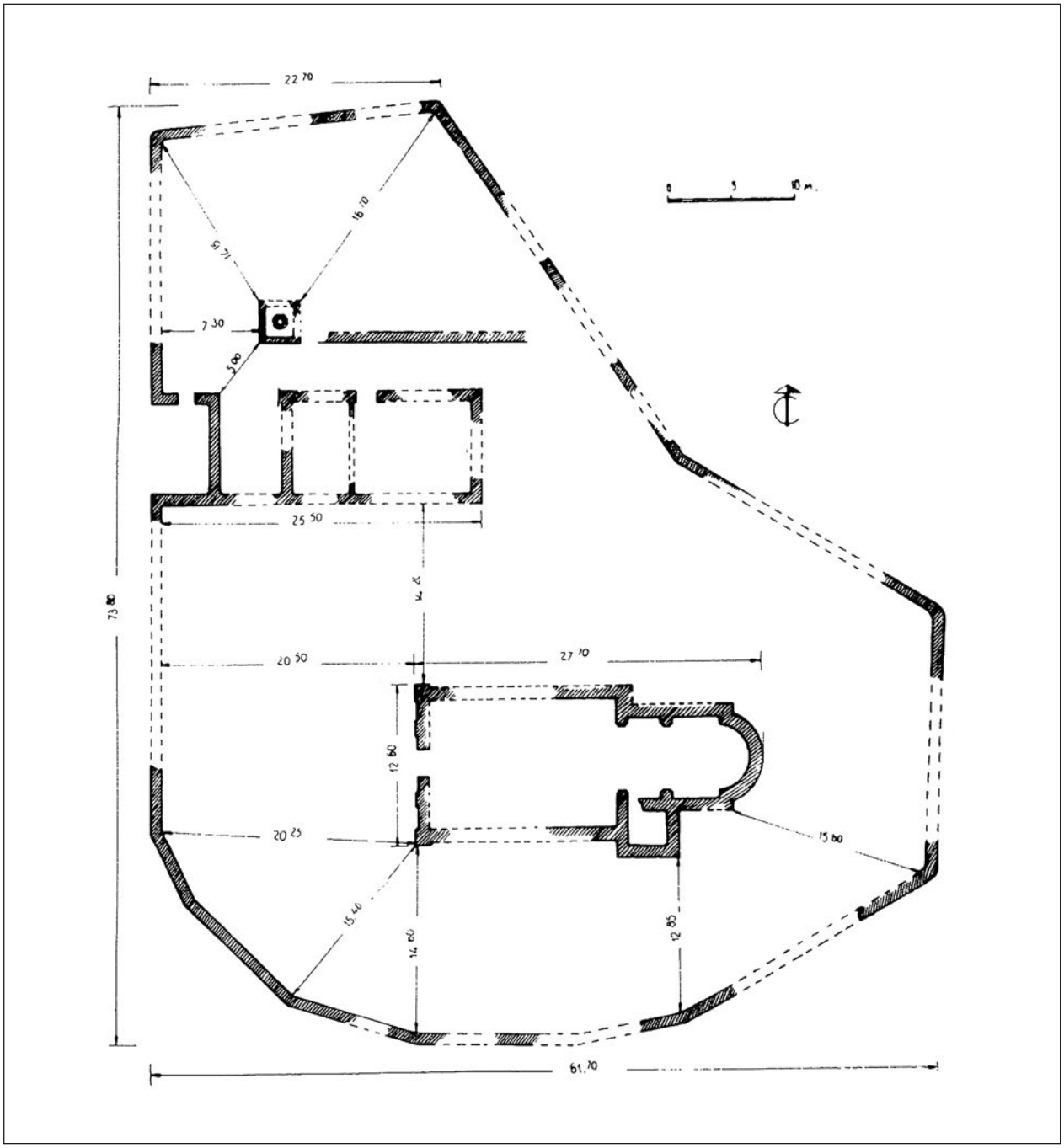

Сл. 1. Комплекс Сашке цркве, ситуациони план (према: Здравковић, Јовановић 1954–1955)

chiesa S. Maria che e in Seruia sotto Nouamonte chiamata in Dogni Targ.[5]

Локалитет лежи на благој падини која се спушта од утврђења према југоистоку, односно селу Бостане. Удаљен око 1.200 м од новобрдског подграђа, налазио се изван те некадашње урбане целине. Рушевине на локалитету, које су пре више од једног столећа сигурно биле у много бољем стању од оног које су затекли први савремени истраживачи, уочене су још средином 19. века. У то време, на свом путу ка Солуну, у Новом Брду кратко се задржао

[5] Динић 1962, 29–30; Gogić 2016, 5.

Сл. 2. Сашка црква, унутрашњост у равни пода у току ископавања 1955. (Документација Археолошког института)

аустријанац Георг фон Хан, који је о томе оставио своје белешке. Поред осталих запажања забележио је и то да се изнад села Бостана налазе остаци цркве и рушевине „палате", које, међутим, није детаљније описао.[6] Пола столећа касније, на самом почетку прошлог века, подручје Новог Брда обилазио је Јован Цвијић, припремајући своје опсежно дело *Основе за географију и геологију Македоније и Старе Србије*. Том приликом, како је забележено, посетио је и „католичку Саску цркву", од које је видео „развалине изнад села Бостана, изван подграђа."[7]

У раздобљу између два светска рата, односно током целе прве половине 20. столећа, остаци комплекса средњовековног града ретко су привлачили пажњу истраживача. Судећи према сачуваној фото-документацији, могло би се закључити да је током треће деценије прошлог века Ново Брдо обишао Владимир Петковић, тада управник Народног музеја у Београду.[8] Нешто касније, у јулу и августу 1933. године боравио је у Новом Брду Ђурђе Бошковић и након тога објавио је и своја запажања која се готово искључиво односе на утврђени део града.[9]

Програм обимних археолошких истраживања Новог Брда, као што је већ речено, започет је 1952. године. У оквиру тог програма започета су и истраживања комплекса Сашке цркве. Прелиминарна ископавања обављена су у лето 1954. године са циљем да се одреди ареал локалитета и утврди стање археолошких остатака. Том приликом су местимичним сондирањем дефинисани остаци обимног зида целог комплекса и уочени обриси основе саме цркве. Такође, у оквиру комплекса препознати су трагови зидова једне правоугаоне зграде испред које се налазио бунар.[10] Ови радови су омогућили да се сачини први ситуациони план локалитета (сл. 1).

На основу ових прелиминарних истраживања наредне године је рађено на откривању остатака зидова цркве. У целом унутрашњем простору уклоњени су слојеви земље и шута до приближне равни некадашњег пода, а истражен је и простор са спољне стране зидова цркве у ширини од око три метра. У току тих радова откривено је у шуту, који је нарочито био интензиван у источном делу грађевине, више уломака камене пластике од кречњака, пешчара, брече, као и венаца од сиге. Посебно је значајно то што су међу каменом пластиком нађени сви делови једног прозора готичког облика, као и један лучно профилисан натпрозорник. Из шута потичу и бројни уломци фресака, од којих су неки остали очувани и на тесаницима сиге. [11]

Након уклањања слојева шута у целини су откривени надземни остаци зидова цркве која је имала наос правоугаоне основе и ужи презбитериј, одвојен масивним пиластрима, који се на истоку завршавао полукружном апсидом. У средишту тог

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[6] Georg von Hahn 1868, 147. Овај податак нетачно је цитиран код: Јовановић и други 2004,114, где је наведено да Фон Хан помиње остатке замка (Schloss), као и то да је на зидовима олтара цркве „уочио истрвене словенске натписе и слике". Погрешно су наведене и цитиране стране наведеног текста (168). Фон Хан саопштава податак о фрескама када описује једну цркву у Велесу на стр. 169.

[7] Цвијић 1911, 1127.

[8] У Документационом центру Народног музеја налази се 13 фото-негатива на стакленим плочама, углавном са приказом остатака утврђења. Ови, за сада најстарији снимци Новог Брда несумњиво су дело В. Петковића.

[9] Бошковић 1939, 161–167.

[10] Здравковић, Јовановић 1954–1955, 280–282, сл. 58.

[11] Здравковић 1958, 344–345.

Сл. 3. Сашка црква, део олтара и наос пре почетка ископавања 1958. (фото: Р. Љубинковић)

простора откривени су остаци зидане олтарске мензе. Са јужне стране налазила се сакристија што је вратима била повезана са презбитеријем. Остаци зидова очувани су местимично до висина између 0,50 и 1,00 м, а само местимично и до 2,00 м. Уочено је да сви зидови грађевине нису једнаке дебљине, као и да постоје разлике како у начину зидања, тако и у употребљеном градиву, што је указивало на више етапа грађења, о чему ће даље бити више речи. Испред западног дела храма, како се тада могло закључити, откривени су трагови темеља призидане припрате.[12]

У равни некадашњег претпостављеног пода у целом простору наоса као и у делу презбитерија налазиле су се надгробне плоче од црвене бреče, кречњака и шкриљца, већином померене са својих првобитних лежишта (сл. 2)[13] Запажено је да оне образују осам подужних редова, што се при каснијим истраживањима остатака гробова није могло поуздано потврдити. Међу једноставним грубо клесаним плочама тада су уочена и два плитка стећка слемењака[14] (сл. 19).

Истраживања гробних укопа испод плоча била су приликом радова 1955. године ограничена само на неколико гробова, о чему у расположивој теренској документацији као и објављеном извештају о ископавањима има веома мало података. У североисточном углу наоса откопана су два, вероватно зидана гроба, о којима нема забележених теренских података. Исти случај је и са гробницама 1 и 2 у презбитерију за које су изнета само узгредна запажања. Знатно детаљније био је истражен простор сакристије, где је констатован само један гробни укоп. У објављеном извештају са ископавања саопштени су и подаци да је у тој просторији откривена и једна остава.[15]

Откривени остаци зидова цркве били су већим делом у веома трошном стању, те су већ у лето исте, 1955. године обављени и неопходни конзерваторски радови, када су неки делови зидова президани у границама расположивих могућности.[16] И поред пажње конзерватора, приликом тог превентивног захвата изгубљени су и неки подаци о начину зидања појединих делова зидова, што је било од посебног значаја за издвајање првобитне градње од каснијих обнова.

После двогодишњег прекида археолошка ископавања у Сашкој цркви настављена су 1958. године, и то с циљем да се истраже сви гробни укопи у унутрашњости храма. Пре наставка ископавања могло се уочити да је у међувремену било неких дивљих прекопавања и померања надгробних плоча, као и да неке од њих недостају (сл. 3). Такође, са

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[12] Чершков 1958, 338.

[13] Положај плоча у унутрашњости цркве није технички снимљен приликом радова 1955. године. О затеченом стању сведочи само једна сачувана фотографија.

[14] Чершков 1958, 338–339.

[15] Како је наведено, „остава нађена у југоисточном углу сакристије, на нивоу пода, затрпана шутом. Састојала се од две сребрене зделе, турске провенијенције, у којима се налазио суд од керамике са 125 комада сребрених аспри Сулејмана I из 1510. године, два сребрена прстена, два пара наушница, једног аморфног комада сребра и остатака сребреног окова некакве кожне кесе”, Чершков 1958, 339–340.

[16] Здравковић 1958, 346–348.

локалитета су били ишчезли и сви раније ископани комади камене пластике. У оквиру припремних радова снимљена је основа цркве са затеченим положајем надгробних плоча и површинским траговима зиданих гробних конструкција.[17] Ископавања су тада углавном била усмерена на источни део наоса и презбитериј, где је констатовано више зиданих гробних конструкција, као и неколико гробних укопа у стеновито тло и здравицу. У исто време сондажно су истраживани и бочни зидови наоса. Том приликом откривени су трагови темеља старијег западног зида, што је указивало на то да је црква приликом једне позније обнове продужена према западу. Радови су после једногодишњег прекида настављени 1960. године, што је омогућило да се окончају истраживања у источном делу наоса.[18]

Ископавања у западном делу наоса настављена су 1962. године. Као и ранијих година, локалитет је поново затечен знатно оштећен рушењима и прекопавањима.[19] Откривени су у целини трагови старијег западног зида, а истражен је и темељ познијег зида на тој страни. Том приликом је констатовано да су приликом грађења овог млађег зида пресечени старији гробови што су се некада налазили испред цркве. Такође, под темељом новог западног зида уочени су и трагови два масивна ступца, који су одговарали старијој фази цркве. На том простору је у непосредној близини новог западног портала откривена остава сребрених турских акчи.[20]

Радови на истраживањима Сашке цркве, после петогодишњег прекида, настављени су 1969. године на простору припрате, односно отвореног дрвеног трема пред црквом, како је то закључено у току истраживања. На том простору је откривено око 20 надгробних обележја у виду грубих необрађених камених плоча или само слога камена. У теренској документацији остали су подаци о свега девет гробова који су већим делом били очувани, док је мноштво откривених костију потицало из раније раскопаних гробова. Налази накита из слојева као и примерци новца припадали су гробним прилозима из тих растурених гробова.[21] После радова 1969. године даља истраживања у комплексу Сашке цркве нису настављена, а нису вршена ни касније. У међувремену, током протеклих пола столећа локалитет је опустошен, тако да се трагови разрушених зидова, зарасли у шибље, сада тешко могу уочити.[22]

Сазнања до којих се дошло у току наведених археолошких ископавања саопштавана су доста сумарно у неколиким извештајима о теренским радовима[23], а нека запажања изнета су и у једном од радова истраживача.[24] Од гробних прилога публиковани су сви налази накита,[25] као и идентификовани примерци новца.[26] Теренска документација, сада у Археолошком институту у Београду, није у целини сачувана,[27] посебно она из првих година ископавања, што у знатној мери отежава потпунији увид у сазнања до којих су истраживачи могли доћи током вишегодишњих радова. За разлику од археолошких налаза, превасходно гробних прилога, којима је у теренским дневницима посвећивана главна пажња, веома је мало забележених података о зиданим гробним конструкцијама као и надгробним обележјима. Такође, готово да и нема антрополошких података, будући да анализе у том смислу, изгледа, нису ни вршене.

У немогућности да се сада, након шест деценија, у целини обраде и објаве налази до којих се дошло у току археолошких ископавања Сашке цркве, овом приликом ћемо се ограничити само на разматрања архитектонских остатака и зиданих гробних конструкција, као и – у оквирима расположиве грађе

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[17] Цео унутрашњи простор наоса подељен је на 15 квадрата, димензија 3 м х 3 м, обележених римским бројевима од I до XV (Дневник археолошких истраживања 1958. г., стр. 23–27).

[18] Ljubinković R i M. 1960, 162.

[19] У Дневнику археолошких истраживања је за 23. јули 1959. године забележено да су у односу на претходну годину уочена знатна оштећења: „У унутрашњости цркве непозната лица су испревртала гробне плоче, а у наосу на североисточној страни вршена су и нека копања. Порушени су довратници западног портала и уништен праг на том месту, повађени тесани квадери сиге из источног зида, повађени поједини квадери из јужне фасаде и поломљене 4 надгробне плоче.

[20] Ljubinković R. i M. 1962, 267–269.

[21] Ljubinković M. 1969, 229.

[22] Запажање приликом обиласка локалитета 2016. године.

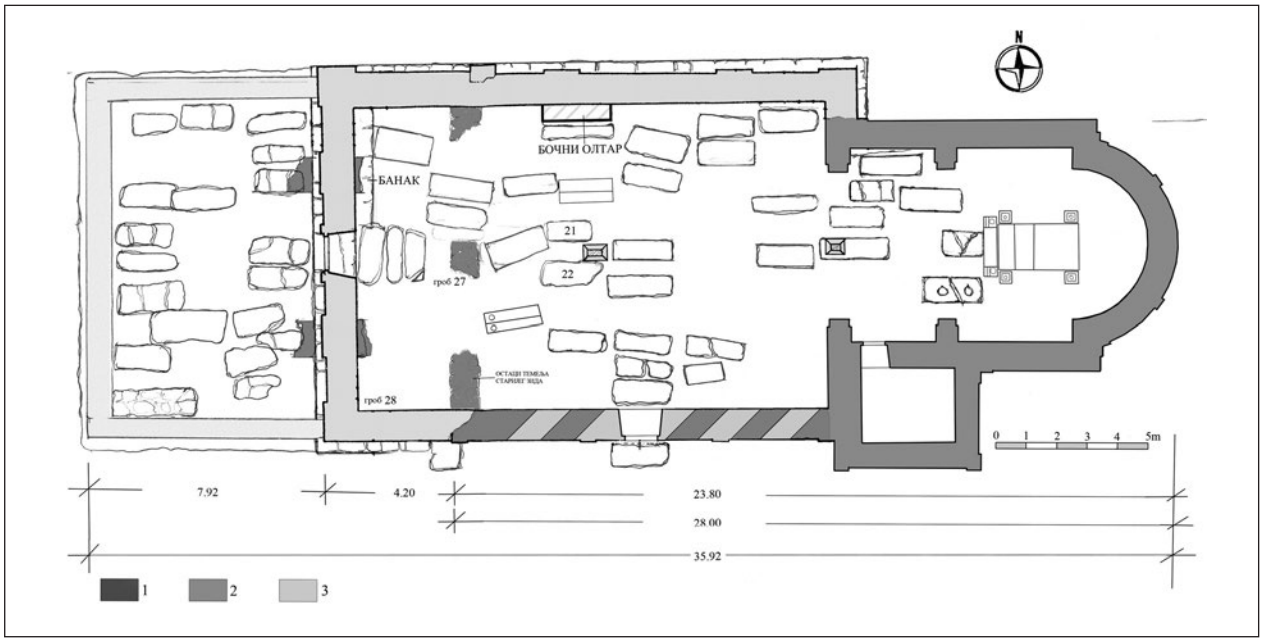
[23] Чершков 1958, 338–340; Ljubinković R. i M. 1960, 162; Ljubinković R. i M. 1962, 267–269; Ljubinković M 1969, 229.

[24] Ћоровић-Љубинковић 1967, 261–262.

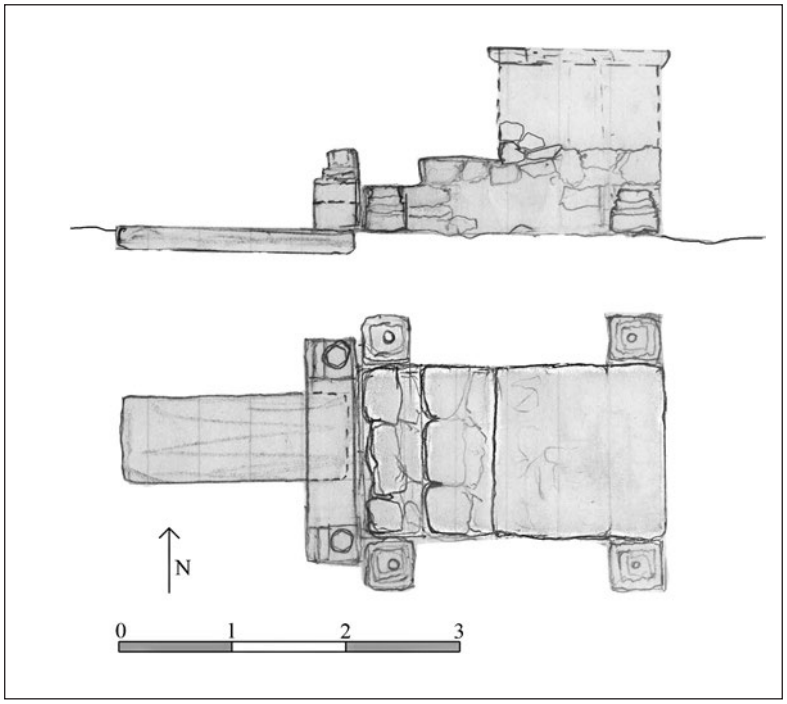
[25] Зечевић 2006, 21–25 и даље.

[26] Димитријевић 1967, 271–308, Иванишевић, Радић 2004, 222–242.

[27] У Археолошком институту чува се комплетна теренска документација само за радове обављане 1969. године. Од ранијих кампања постоје Теренски дневници ископавања из 1955, 1958, 1960. и 1962, затим два плана цркве, неколико теренских скица и око 40 фотографија. Недостају теренски инвентари и гробни записници. Од првих ископавања 1955. године постоје само инвентари камене пластике и фрагмената фресака. Покретни археолошки налази чувају се у Народном музеју у Београду, док су они из прве године ископавања предати Музеју у Приштини.



Сл. 4. Сашка црква, основа са означеним грађевинским фазама и затеченим положајем надгробних плоча 1958 г. (Документација Археолошког института)



Сл. 5. Сашка црква, остаци олтарске мензе (теренска скица Р. Љубинковића из 1958. г.)

– гробних укопа који су се налазили у унутрашњости овог новобрдског римокатоличког храма. Осим на подацима из наведених извештаја, наша разматрања биће заснована на сазнањима из теренске документације која, иако некомплетна, ипак пружа довољно података за нека детаљнија разматрања. Нажалост, изостала је могућност да се неки подаци провере на терену, будући да су остаци ове цркве, некада конзервирани и презентовани, сада у великој мери разорени.

У току теренских истраживања, ограничених превасходно на цркву, констатована је сложена стра-

Сл. 6. Сашка црква, степеник испред олтарске мензе са местима за свеће (фото из 1958. г.)

тиграфска ситуација, са археолошким остацима који одговарају различитим раздобљима коришћења те локације у близини некадашњег новобрдског подграђа (сл. 4). На основу запажања до којих су дошли ранији истраживачи, као и наших детаљних анализа расположиве документације, могуће је издвојити три етапе, тачније грађевинске фазе, које одсликавају настанак, обнове и доградње овог храма у ширем раздобљу – од првих деценија 14. до краја 17. века. У прву и најзначајнију етапу издвојено је грађење саме цркве, укључујући сукцесивну доградњу зиданих гробница и гробне укопе у унутрашњости првобитног храма. Следећа етапа обухвата обимну обнову цркве и њено проширење, док је као трећа и последња етапа издвојена доградња трема испред западне фасаде. Имајући то у виду, наше даље излагање усмерићемо ка томе да сваку од тих етапа детаљно размотримо, уз доношење одговарајућих закључака.

Грађење и старије раздобље

Комплекс Сашке цркве подигнут је на заравни која је у благом паду према југоистоку. Може се претпоставити да је у оквиру припрема за грађење затечени терен претходно био нивелисан, односно делом насут. На то би указивао слој земље са доста пирита која је, по свему судећи, како је то уочено приликом археолошких истраживања, избацивана као јаловина из рударских јама. Остало је отворено питање да ли су се те јаме налазиле у близини локалитета, или је земља за насипање доношена с неке удаљеније локације.[28]

Сашка црква, оријентисана по оси исток–запад, заснована је као једнобродни храм са пространим наосом правоугаоне основе, првобитних димензија унутрашњег простора 11,30 м x 10,20 м. Са источне стране су два масивна пиластра одвајала наос од знатно ужег олтарског простора, ширине 6,30 м, који се завршавао полукружном апсидом. Тај простор, односно презбитериј, паром сличних масивних пиластара био је подељен на два неједнака дела – краћи западни, који би се могао означити као кор и знатно пространији источни, у чијем средишту се налазила зидана олтарска менза, сачињена од масивног ступца, димензија 1,50 м x 1,50 м, и два истовремено зидана степеника (сл. 5). Испред њих је са исте, западне стране тој конструкцији припадао и први, монолитни степеник,[29] који је био клесан од пешчара и који је са бочних страна имао степенасто профилисане кубусе на чијој су се горњој површини налазила правилно уклесана кружна удубљења, пречника између 15 цм и 20 цм (сл. 6).

Уз сва четири угла зиданог постројења олтарске мензе откривене су *in situ* степенасто профилисане базе, клесане од бреče. На њиховој горњој површини налазе се мала кружна удубљења која су служила за углављивање „чепа", односно учвршћивање ослонца за постављање дрвеног дирека. Олтарској мензи, без сумње, припадали су и уломци масивне и од бреče исклесане плоче са профилисаним рубовима, који су нађени у непосредној близини.[30] Са јужне стране, у углу између олтарског

[28] Ljubinković R. i M. 1962, 269.
[29] Чершков 1958, 339.
[30] Чершков 1958, 339.

Сл. 7. Сашка црква, зидови олтарског дела после ископавања 1955. г. (Документација Археолошког института)

Сл. 8. Сашка црква, улаз из презбитерија у сакристију (фото из 1955. г., Документација Археолошког института)

простора и ширег наоса налазила се сакристија, унутрашњих димензија 3,00 м х 2,50 м, која је са презбитеријем, односно кором била повезана вратима, чији је праг био за 40 цм виши од пода у олтару.[31]

Зидови првобитне цркве, ширине око један метар, неједнако су очувани. У олтарском делу са сакристијом остали су откривени остаци нижих делова зидова очувани у изворном стању, без каснијих преправки. Првобитни зидови наоса, међутим, сачувани су само фрагментарно, и то искључиво са јужне стране, будући да су највећим делом президани приликом позније обнове цркве. Остаци првобитне конструкције јужног зида уочени су местимично испод каснијег презиђивања, а очувани су само у нижој зони над темељом, и то углавном у висини између два и пет редова камена. Зид са северне стране президан је приликом позније обнове у целини по старој траси. Од старог западног зида откривени су само трагови темеља, будући да је приликом обнове наос продужен за 2,70 м, а нови зид са те стране посебно утемељен. Испред трасе некадашњег западног зида откривени су трагови темеља два зидана ступца, чије некадашње димензије није било могуће поуздано утврдити. Преостали су само скромни остаци испод темеља млађег западног зида, док су остали делови порушени приликом укопа познијих гробова.[32] На основу онога што је сачувано јасно је утврђено да су ти ступци у

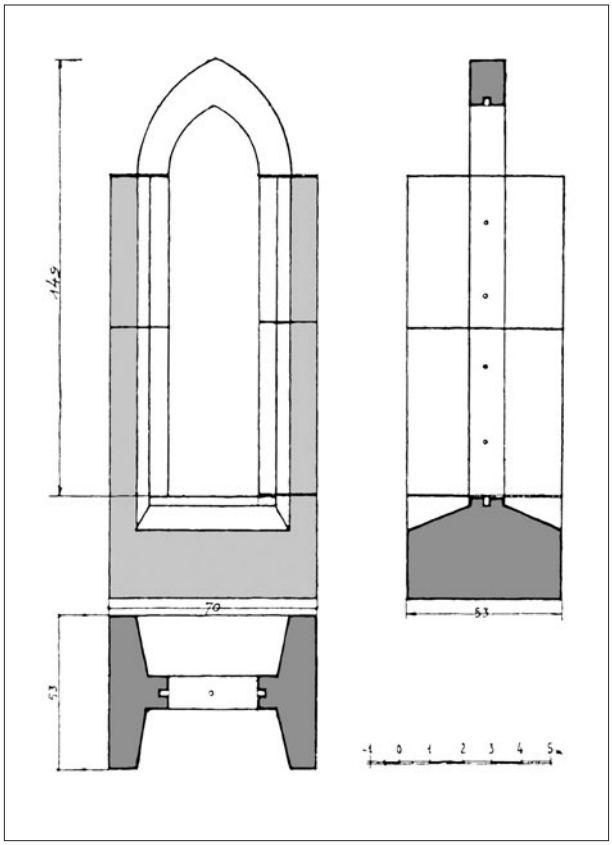
[31] Чершков 1958, 339–340.

[32] Ljubinković R. i M. 1962, 267.

темељу имали ширину око 1,20 м, док им дужина, како се могло претпоставити, највероватније није прелазила 2,5 м.

Зидови првобитне цркве били су засновани на стеновитом тлу, у паду од севера ка југу, или на веома чврстом слоју здравице, што је и условило њихову различиту дубину. Тако је северни зид био утемељен на дубинама од 0,50 м до 1,10 м, где је дно темеља било постављено на затечене, често косе, гребене стена и без претходног заравнавања, што се, као што ћемо даље видети, показало као слабост таквог начина грађења.[33] Са јужне стране темељ је био нешто дубље укопан, местимично и преко 1,50 м. За разлику од северног зида, јужни је лежао на слоју компактне здравице. Над тим темељима – од необрађеног камена у неправилном слогу – били су надземни делови зидова цркве знатно солидније грађени. Имали су уједначену ширину – од око 1,00 м, док је зид олтарске апсиде био нешто ужи – око 0,94 м. Првобитни зидови цркве били су, према унутрашњем простору храма, зидани ломљеним притесаним каменом, док им је спољна фасадна страна грађена тесаницима сиге сложеним у правилне редове, између којих се налазио по један ред танких опека. Местимично је било танких опека и у вертикалним спојницама између квадера (сл. 7). Фасаде су биле рашчлањене низом декоративних плитких лезена. На очуваним деловима првобитног јужног зида могло се уочити да су над темељом постојала два реда квадера сиге, изнад којих су били засновани уски пиластри, ширине око 40 цм и дубине не веће од 10 цм.

Од некадашњег улаза у цркву, на траси порушеног западног зида није било очуваних трагова. Једини остаци врата, ширине 60 цм, откривени су на улазу у сакристију из простора кора. Врата су над монолитним повишеним прагом имала фино клесане блокове кречњака са довратницима, ширине 30 цм (сл. 8). О некадашњим прозорима цркве може се судити само на основу налаза из шута. У слојевима рушевине, на простору јужно и југоисточно од зидова цркве нађени су, како је већ наведено, сви делови једног прозора готичког типа са преломљеним луком. Прецизно клесани блокови кречњака – потпрозорник, четири допрозорника и натпрозорник пружају могућност да се састави цео оквир једног прозора, ширине отвора 30 цм, а висине око 1,40 м (сл. 9).[34] Из шута са истог простора потиче и налаз два дела једног натпрозорника са полукружним луком.[35] Осим ове камене пластике што одговара прозорима цркве, у шуту је нађено и више комада с једном косо засеченом страном, углавном клесаних од пешчара и брече, мада је било и сличних уломака од сиге. У питању су, по свему судећи, делови поткровног венца.



Сл. 9. Сашка црква – клесани делови оквира прозора (према: Здравковић 1958)

Према налазима из шута, а посебно из високих наслага обрушене грађе у олтарском делу цркве, могло се још у време првих истраживања закључити да је овај простор храма имао сводне конструкције. За разлику од олтара, пространи наос цркве, где је било знатно мање грађевинског шута, није био засведен, већ је у свом горњем делу, без сумње, био наткривен дрвеном конструкцијом. Међу обрушеном грађом у том простору откривено је мноштво уломака жутозелених глеђосаних ћерамида, које би одговарале првобитном кровном покривачу. Значајно је запажање истраживача да налаза

[33] Дневник археолошких истраживања, 21. 8. 1958.
[34] Здравковић 1958, 345, сл. 12.
[35] Здравковић 1958, 345.

Сл. 10. Сашка црква, тесаници сиге са остацима живописа (фото из 1955. г., Документација Археолошког института)

глеђосаних кровних опека није било у шуту на простору позније дограђеног трема и западног дела цркве.[36]

Остаци некадашњег пода у наосу нису откривени, будући да је ту дуго вршено сахрањивање, а потом је цео тај простор и позније прекопаван. У олтару је уочена нешто боља ситуација. У апсиди су сачувани делови првобитног пода од плоча шкриљца и кречњака. Испред олтарске мензе у равни пода налазиле су се надгробне плоче, од којих су неке затечене у првобитним положајима. У олтару су, међутим, у делу где није било познијих прекопавања уочене деформације пода које делују као последица слегања, тако да је раније изнета и претпоставка да су оне, можда, проузроковане тектонским поремећајем.[37] У сакристији, и поред каснијих прекопавања, откривен је делимично очуван првобитни под. Био је поплочан мањим каменим плочама, док су се у његовом делимично улегнутом средишњем делу налазиле нешто веће плоче, клесане од бреče, које су обележавале један гробни укоп.

Зидови цркве били су прекривени фрескама, и то, како изгледа, само у олтарском простору. Ту су на нижим деловима зидова очуване површине са

[36] Чершков 1958, 339.
[37] Чершков 1958, 339.

Сл. 11. Сашка црква, фрагменти сигнатура на фреско-малтеру (према цртежима из теренског инвентара 1955. г.)

орнаментима сокла.[38] Доста већих фрагмената фресака било је на бројним квадерима сиге из шута, а на некима од њих уочени су трагови два слоја живописа. На једном већем блоку приказана је глава бика са ореолом, симболом јеванђелисте Луке (сл. 10). Међу фрагментима је препознат и део главе Богородице, као и једног анђела. На неким фрагментима сачувани су и делови сигнатура, претежно ћирилских, али је у нешто мањем броју било и латинских (сл. 11). Занимљив је налаз једног блока сиге на коме је сачуван део подлоге фреске са сигнатуром (С)теф(ан). У питању је, по свему судећи, ознака мајстора који је обележио место за осликавање, највероватније, првомученика Стефана.[39] Осим тих нешто већих трагова живописа, у шуту је било и мањих уломака фреско-малтера, посебно у олтарском делу, али и у насипу којим су биле засуте девастиране гробнице. Мноштво фрагмената фресака откривено је и у једној јами што је била укопана са спољне стране јужног зида цркве,[40] где је без сумње реч о намерном укопу остатака уништеног живописа како би се спречило његово даље скрнављење.[41]

Уз Сашку цркву је још у време њеног заснивања започето сахрањивање. Први гробни укопи били су, како изгледа, истовремени са грађењем новог храма. На то би указивали најстарији налази новца – два сребрена динара емисије краља Стефана Уроша II (1282–1321), откривени у слоју са костима из неког раније прекопаног гроба што се налазио испред западне фасаде првобитне цркве. У наредним деценијама формирана је око новоподигнутог храма главна некропола католичког становништва Новог Брда. О сахранама које су ту вршене више од три столећа не зна се довољно. Гробни укопи ове, по свему судећи простране, некрополе остали су неистражени на просторима изван зидова храма, а у унутрашњости цркве су од бројних сахрана које су ту вршене остали очувани само ретки гробови. На то је утицало више чинилаца. Као прво, у исте гробнице или укопане гробне раке вршена су сукцесивна сахрањивања, и то по више пута, при чему су земни остаци старијих покојника померани и уклањани да би се обезбедило место за нову сахрану. С друге стране, гробови у цркви, а посебно зидане гробнице као и укопи обележени надгробним плочама били су и предмет пљачке током турских похода и опсада у смутним временима друге четвртине 15. века. Чак су и касније, када је црква већ била у рушевинама, прекопавани гробови и померане надгробне плоче, што се наставило све до нашег доба.

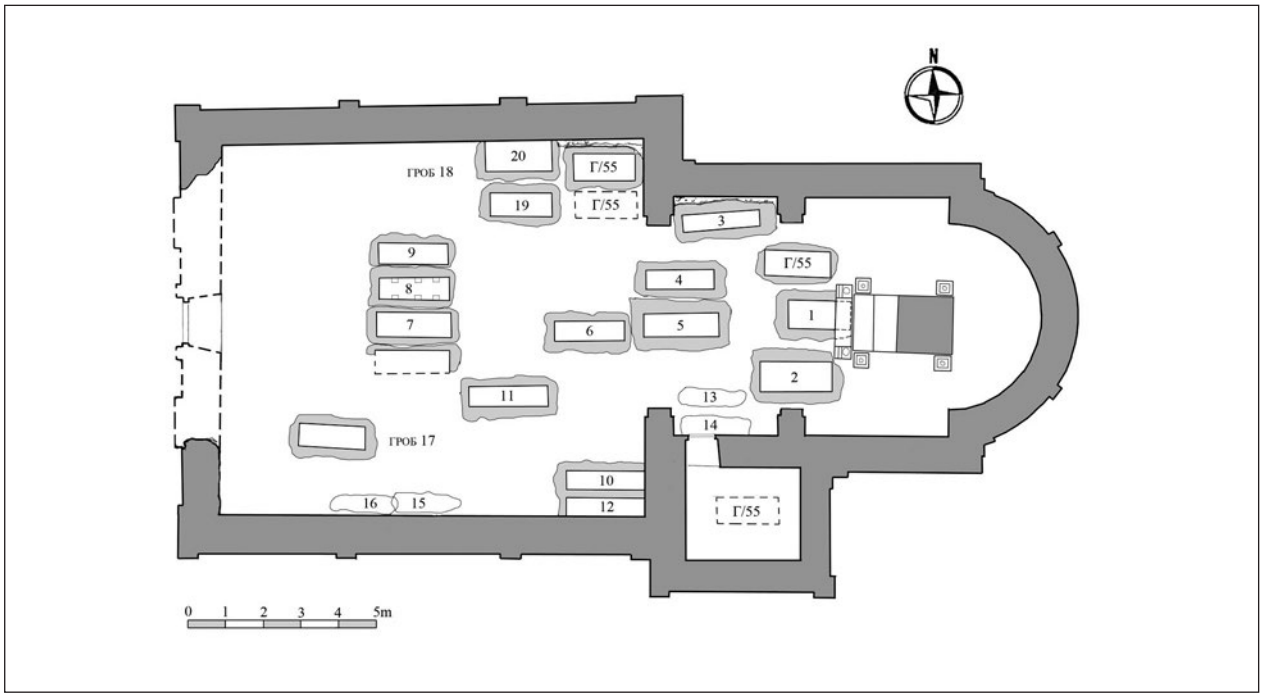
У унутрашњости Сашке цркве, која је у целини истражена, могло се уочити да је постојало неколико хоризоната сахрањивања, који се у основним цртама могу и хронолошки одредити. Најстарије

[38] Очувани фрагменти живописа су у току ископавања скинути, конзервирани и пренети у Музеј у Приштини, в. Здравковић 1958, 345–348.

[39] Чершков 1958, 339; Здравковић 1958, 345.

[40] Дневник археолошких ископавања, 14. август 1969. г.

[41] За сличан пример из новобрдске катедрале Светог Николе в. Поповић, Бјелић 2018,139–143..



Сл. 12. Сашка црква, првобитна основа са зиданим гробницама и гробовима (Р = 1 : 200)

сахране, које су вршене у оквиру првобитне цркве, унеколико се разликују од оних познијих из времена после обнове храма, као и доградње трема. За старије раздобље карактеристичне су зидане гробне конструкције, или боље рећи гробнице, предвиђене за више сахрана (сл. 12). У олтарском простору било их је шест, док су у наосу откривени остаци око дванаест зиданих гробница. У теренској документацији има веома мало података о тим конструкцијама, а неке што су чак приказане на плану остатака цркве нису ни поменуте у Дневнику археолошких ископавања. Према ономе што се сада може закључити на основу расположиве грађе,[42] у питању су биле етажне гробнице подударне са сличним гробним конструкцијама у оближњој цркви Светог Николе, православном катедралном храму Новог Брда.[43] Грађене су ломљеним каменом са грубо обрађеном, односно дерсованом површином зидова. Биле су укопане у тло и дубина им је зависила од нивоа на коме се појављивала чврста стена. Гробница 7, на пример, имала је под на дубини од свега 0,75 м, док је суседна, солидније грађена гробница 8 била знатно дубља – са подом на дубини од готово два метра. Дубина других гробница о којима су забележени подаци кретала се између 1,40 м и 1,60 м. Под у гробницама, који је готово по правилу лежао на заравњеној стени, чинио је слој добро заглачаног малтера. Будући да су у питању биле етажне конструкције, може се претпоставити да су на бочним зидовима постојале конзоле за ослањање хоризонталних преграда, као што је то био случај и у новобрдској катедрали. У сачуваној документацији ове конзоле, по три са обе бочне стране документоване су само у гробници 8. Други случај забележен је у конструкцији гробнице 2 у презбитерију, где је откривена хоризонтална преграда у виду гвоздене решетке, на коју је полаган дрвени ковчег новосахрањеног покојника.[44]

Све гробнице су са горње стране биле затворене масивним надгробним плочама, које су лежале у равни пода. Те плоче, померане или разбијане приликом првог већег пустошења цркве, сачуване су само изнад неких гробница или поред њих. Биле су углавном правоугаоне, клесане од бреče, а ређе од пешчара. Својим изгледом посебно се издвајала поклопна конструкција изнад гробнице 2 коју су

[42] Дневник археолошких ископавања, август 1958, из документације Археолошког института у Београду.

[43] Поповић, Бјелић 2018, 161–165, сл. 58–60.

[44] Чершков 1958, 339.

Сл. 13. Сашка црква, гробница 2 у олтарском простору (фото из 1955. г.)

чиниле две једнаке плоче с масивним гвозденим алкама (сл. 13).

Распоред гробница у простору првобитне цркве указује на извесну правилност, која ипак није у целини доследно спроведена. Сигурно је на почасном месту била гробница 1 у презбитерију, укопана испред саме олтарске мензе. Над гробницом се налазила плоча са натписом, уклесаним у два реда, од кога се могло прочитати само: *IN HOC SEPULC*...[45] Над овом плочом, која је остала делимично очувана, стајао је монолитни, раније поменути први степеник пред олтарском мензом. У односу на ову гробницу биле су готово симетрично постављене још две зидане гробне конструкције са северне и јужне стране. Гробница 5, на западном рубу презбитерија и непосредно уз њу, већ у простору наоса гробница 6 биле су укопане тако што је праћена подужна оса цркве. У самом средишту наоса налазиле су се једна уз другу четири зидане гробне конструкције, од којих су три обележене приликом ископавања – гробнице 7–9, док четврта, полуразрушена, није посебно евидентирана. У шуту којим је била засута гробница 8 откривени су и мањи уломци надгробне плоче са остацима готичког натписа.[46] Зидане гробнице, у релативно правилном распореду, постојале су и у источним угловима наоса, а један гробни укоп налазио се и у средишту сакристије.

У гробницама, које су готово све биле девастиране, обично су налажене растурене кости више покојника. У теренској документацији, нажалост, подаци о приближном броју сахрањених наведени су само у појединим случајевима. У гробници 2, како је забележено, на металној решетки нађени су остаци једног покојника са траговима дрвеног сандука, а на дну гробнице кости „неколико костура".[47] За наша разматрања су посебно значајни налази из гробница 10 и 12 у југоисточном углу наоса. Обе гробнице, раније девастиране, биле су до дубине 0,45–0,60 м засуте шутом са доста уломака бледозелено до жуто глеђосаних кровних опека, а слично је уочено и у неким другим гробницама у наосу. При томе је важно запажање истраживача да у нижим слојевима насипа у гробницама, где су се налазиле расуте кости више покојника, уломака глеђосаних ћерамида није било.[48] Како је закључено према броју откривених лобања, у гробници 10 било је расутих костију од 11 покојника, а у суседној гробници 12 најмање од седам сахрањених. Међутим, испод тог слоја са остацима девастираних укопа у обе гробнице откривени су у равни пода непоремећени скелети првобитних сахрана. У гробници 10, над малтерним подом, лежали су земни остаци два покојника. Уз скелет што је лежао на самом поду нису евидентирани гробни прилози. На десној руци другог скелета нађен је сребрени прстен,[49] а крај леве ноге део траке, везене од срме, са петљама за дугмад и девет позлаћених пуцета.[50] Уз те скелете откривени су примерци новца угарског краља Лудвика I (1342–1382) и деспота Стефана (1402–1427), а у насипу над тим скелетима нађен је денар краља Ладислава V (1453–1457).[51] У суседној гробници 12 откривена су непосредно над подом (кота –1,62) два скелета што су лежала један изнад другог. Уз старији скелет нађени су једна наушница,

[45] Чершков 1958, 339.

[46] Дневник археолошких ископавања за 26. август 1958. године.

[47] Чершков 1958, 339.

[48] Извештај о археолошким ископавањима у Сашкој цркви 1958, необјављено (из архиве Завода за заштиту споменика културе у Приштини).

[49] Зечевић 2006, 193–194, кат. бр. 68.

[50] Зечевић 2006, 217–218, кат. бр. 104.

[51] Димитријевић 1967, 289; Ђоровић-Љубинковић 1967, 262.

затим део текстилне траке, украшене златовезом, са четири нашивена позлаћена дугмета, као и неколико једноставних пуцета.[52] Како је констатовано приликом истраживања, након првих сахрана покојници су на дну обе гробнице били засути танким слојем земље. Над тим слојем (кота –1,42) извршена је у гробници 12 наредна сахрана, којој одговара скелет без гробних прилога, који је такође остао очуван.

Поремећени остаци покојника откривени су и над подом у гробници 8. Уз остатке покојника откривени су фрагменти текстила са звездастим мотивима и чипканим апликацијама извезеним срмом, као и траке оковратника с неколико пуцета.[53] И у гробници 6, чини се у више наврата прекопаваној, било је, како се према расутим костима могло закључити, више сукцесивних сахрана. У насипу гробнице је од некадашњих гробних прилога откривен само један сребрени денар угарске краљице Марије (1382–1395).[54]

Очуваних остатака првобитних сахрана, судећи према фрагментарно сачуваној документацији, било је и у неким гробницама које су ископане 1955. године. Ту свакако на првом месту треба поменути гробни укоп у сакристији, чији је горњи део био раније прекопан. У теренској документацији, међутим, није забележено да ли је ту сахрана била обављена у зиданој гробној конструкцији или у обичној гробној раци. Мада је гроб откривен у просторији која није била намењена сахрањивању, не би се могла искључити евентуална познија уградња зидане гробнице. На дну укопа, дубине 1,30 м у односу на праг, откривена су два очувана скелета са гробним прилозима.[55] Уз доњи скелет налазила су се 22 пара малих копчи од бронзане жице са траговима конца, а било је и фрагмената златотканог текстила. Од накита су нађени сребрена позлаћена игла са кружном филигранском главом,[56] затим три привеска и златан прстен,[57] као и два српска сребрена динара из 8–9. деценије 14. века.[58] У гробној раци откривени су и фрагменти две стаклене посуде.[59] На горњем скелету откривени су очувани делови огрлице са перлама од зелене стаклене пасте спојене карикама, уз које су била и два привеска.[60] Из земље над тим скелетом потиче и налаз једног оштећеног сребреног динара.[61] У наосу на дну гробнице, истражене 1955. године, а уграђене у североисточни угао, откривени су остаци првобитне сахране.[62] Уз очувани скелет са остацима тканине украшене златовезом, уз које је било и дугме од уплетене срме, откривене су и две игле – једна позлаћена са филиграном, а друга бронзана са полиедарском главом.[63]

Осим зиданих гробница, које су у старијем раздобљу пре обнове и доградње цркве представљале основни вид сахрањивања у њеном унутрашњем простору, у току археолошких ископавања откривени су и неки гробни укопи који би такође могли припадати том старијем хоризонту сахрањивања. У питању су гробне раке што су директно укопане у земљу, без посебних подземних конструкција. Тим старијим сахранама вероватно одговарају гробови 13 и 14, укопани у простору презбитерија, који су затечени девастирани, тако да се једино могло закључити да су покојници били сахрањени у дрвеним ковчезима. Међу испретураним костима на дну гробних рака, на дубини –1,40 м откривени су фрагменти текстила са златовезом и неколико пуцета, а у гробу 13 и четири бронзане игле са лоптастом главом.[64]

Према расположивој документацији и налазима, том старијем хоризонту могла би се сасвим поуздано приписати још само три гроба у јужној половини наоса. Гроб 15 налазио се уз унутрашњу страну јужног зида. У гробној раци, укопаној у здравицу уз темељ зида, откривен је на коти –1,45 делимично очуван скелет на чијим су грудима били трагови одеће са везом од сребрене и златне жице као и с расутим низом сребрених, позлаћених пуце-

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[52] Зечевић 2006, 161, кат. бр. 11; 216, кат. бр. 101.

[53] Дневник археолошких истраживања за 21. август 1958. године.

[54] Теренски инвентар, 535/1958.

[55] Теренски инвентар, 161–173/1955.

[56] Зечевић 2006, 244, кат. бр. 148 (погрешно означена да је из оставе).

[57] Зечевић 2006, 247, кат. бр. 151.

[58] Теренски инвентар, 171/1955. Примерци нису детаљно идентификовани, један на AV има челенку, а на RV текст - према опису могао би припадати ковању Вука Бранковића или Ђурђа I Балшића (8–9. деценија 14. века), а други одговара емисији кнеза Лазара, в. Иванишевић 2001, 161, врста 24.8.

[59] Теренски инвентар, 167–168/1955.

[60] Теренски инвентар, 145/1955.

[61] Теренски инвентар, 146/1955. Оштећен примерак на AV Христ на престолу, а на RV део текста: *В ХА БА БЛАГОВЕР* ....., који одговара ковањима локалних династа (од краја 7. до 9. деценије 14. века).

[62] Теренски инвентар, 153–155 и 160/1955.

[63] Зечевић 2006, 171–173.

[64] Дневник археолошких ископавања, 21. август 1958.

та.[65] На десној руци покојника нађен је сребрени прстен са срцоликом главом.[66] У насипу изнад гроба откривен је још један масиван сребрени прстен,[67] као и динар краља Стефана Душана, кован пре 1347. године.[68] У питању су, највероватније, прилози који би одговарали старијој сахрани у истом гробном укопу. У непосредној близини, такође уз јужни зид, откривен је нешто плиће укопан гроб 16 (на коти –1,27), са остацима покојника уз које се налазио динар цара Уроша, кован после 1355. године.[69] Приликом укопа овог гроба делимично је оштећена лобања покојника из суседног гроба 15.[70] Изнад те примарне сахране откривене су растурене кости више покојника, уз које је било трагова текстила са златовезом, неколико пуцета[71] и један прстен од позлаћене бронзе.[72] Гроб 17, који се налазио у непосредној близини претходна два, био је делимично укопан у стену. Затечен је већим делом прекопан и девастиран. На његовом дну нађен је делимично поремећен скелет, који је, како изгледа, представљао најмлађи укоп. Уз скелет су откривени прстен[73] и четири бронзане игле.[74] Међу испретураним костима раније сахрањиваних покојника у том гробном укопу нађен је у насипу сребрени динар царева Стефана Душана и Уроша, кован средином 14. века.[75]

Отворено је питање да ли је у простору првобитног наоса Сашке цркве, осим наведена три, било још старијих укопа без зиданих конструкција. Таква могућност се не би могла искључити, али поузданих сазнања у том смислу нема. Није искључена претпоставка да се покрај тих укопа, „код јужног зида" налазио и један гроб што је ископан 1955. године. У гробу су откривена два скелета. На грудима горњег, млађег скелета откривен је мањи део ланчића са два привеска, од којих је један вероватно представљао амајлију, као и примерак ситног угарског новца из 15 века.[76] Уз доњи скелет откривене су три лоптасте апликације од „филигранске жице".[77]

Сведочанства о првобитним сахранама у Сашкој цркви, иако фрагментарна и само делимично документована, ипак пружају могућност за доношење неких закључака. Већина старијих гробних укопа, као што се могло видети, уништена је приликом познијих сахрана, пљачки и честих прекопавања рушевина цркве. Као сведочанства о сахранама богатијег слоја новобрдског грађанства, из редова Саса или приморских трговаца, остале су зидане породичне гробнице са расутим гробним прилозима што су измакли похлепи пљачкаша. Бројни налази трагова луксузног текстила са златовезом указују на то да су покојници сахрањивани у скупоценом оделу и с личним накитом, најчешће прстењем. Према древном обичају у гроб је стављан и по који примерак новца, што је за наша разматрања од изузетног значаја. Остало је непознато колико је укупно у току археолошких ископавања нађено примерака новца. Може се само претпоставити да их је сигурно било више десетина, не рачунајући примерке новца из остава млађег хоризонта. Према ономе што је сачувано или јасно дефинисано у документацији, располажемо подацима о 19 примерака новца који сасвим поуздано потичу из гробова старијег хоризонта. Најбројнији су примерци српског новца који одговарају ковањима: краља Стефана Уроша II, пре 1321. – два; краља Стефана Душана, пре 1347. – један; цара Уроша, после 1355. – два; кнеза Лазара, после 1371. – два; српских династа, 8–9. деценија 14. века – два; деспота Стефана, после 1402. – четири; и деспота Ђурђа, после 1427. – један. У знатно мањем броју (три примерка) заступљен је и угарски новац: Лудвига I (1342–1382), краљице Марије (1382–1395) и Ладислава V (1453–1457). Уз поменуте, откривен је и један старији млетачки примерак дужда Ђованија Дандола (1280–1289), који је, будући пробушен, касније ношен као привесак, као што је то био случај и са сребреним динаром који би одговарао једном од последњих ковања краља Стефана Томашевића (1461–1463).

Откривени остаци Сашке цркве у Новом Брду представљају редак, готово јединствен пример римокатоличког градског храма у континенталном делу средњовековних српских земаља. То је чињеница од посебног значаја за проучавање живота и деловања верника латинске цркве, који су у српској средини

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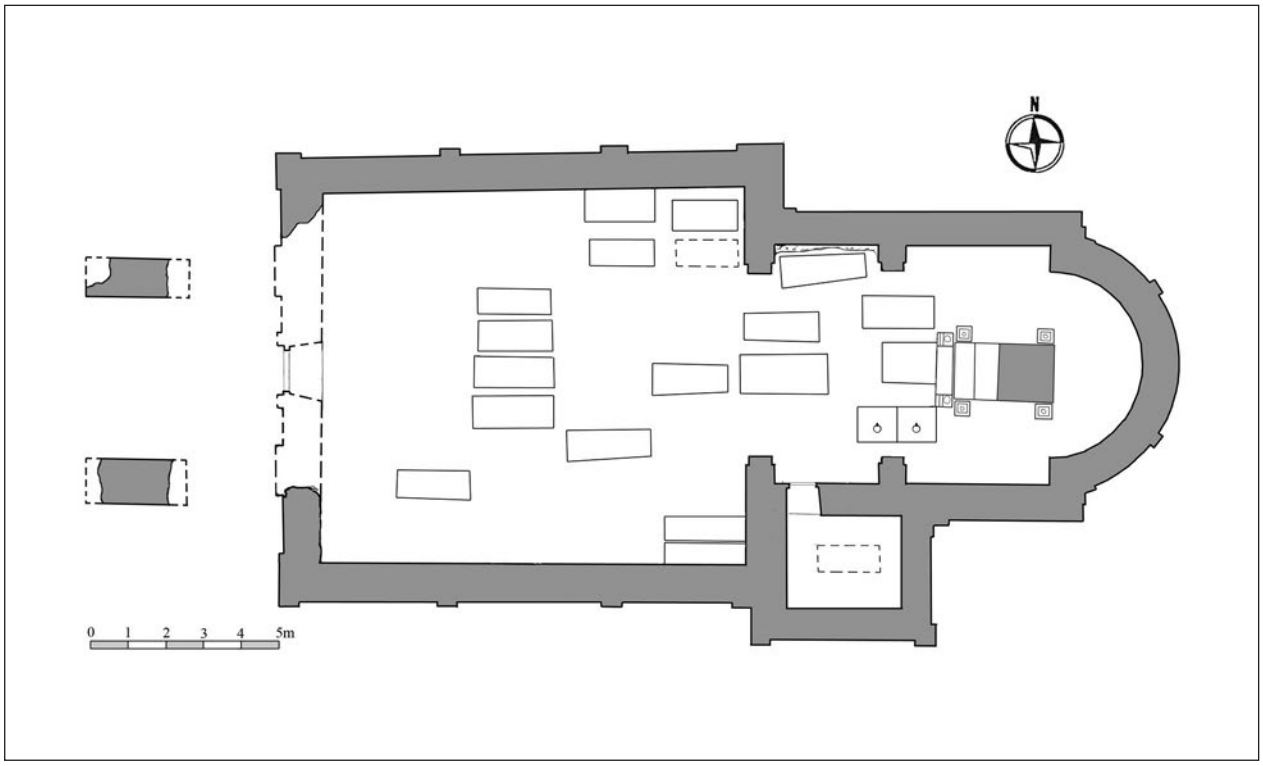
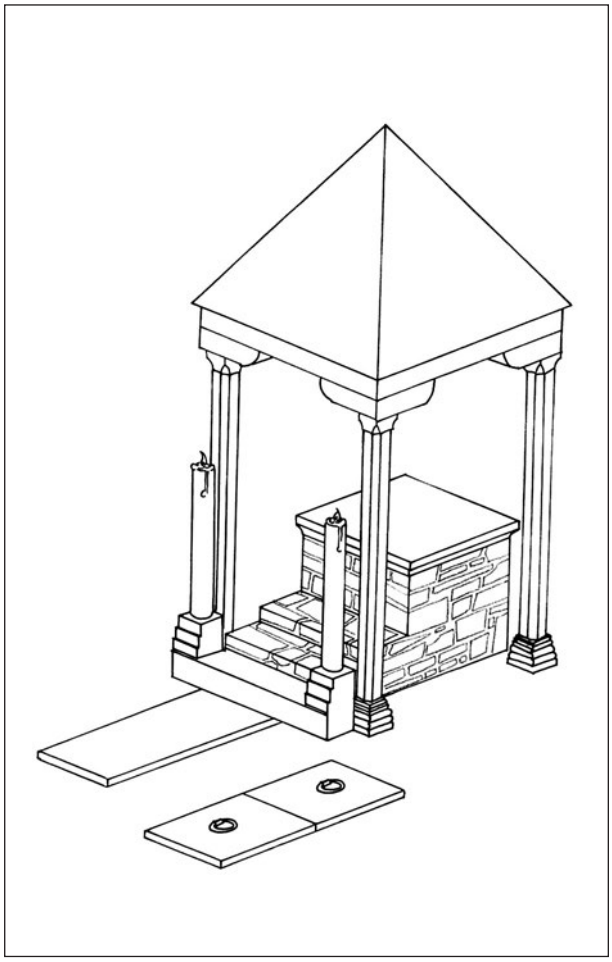
[65] Дневник археолошких ископавања, 8. август 1960.
[66] Зечевић 2006, 192, кат. бр. 66.
[67] Зечевић 2006, 195, кат. бр. 70.
[68] Димитријевић 1967, 272–273.
[69] Димитријевић 1967, 273–274.
[70] Дневник археолошких ископавања, 8. август 1960.
[71] Зечевић 2006, 215, кат. бр. 99.
[72] Зечевић 2006, 197–198, кат. бр. 74.
[73] Зечевић 2006, 208, кат. бр. 87.
[74] Зечевић 2006, 171, кат. бр. 29.
[75] Димитријевић 1967, 273.
[76] Теренски инвентар, 156–158/1955.
[77] Теренски инвентар, 159/1955.



Сл. 14. Сашка црква, реституција првобитне основе (P = 1 : 200)

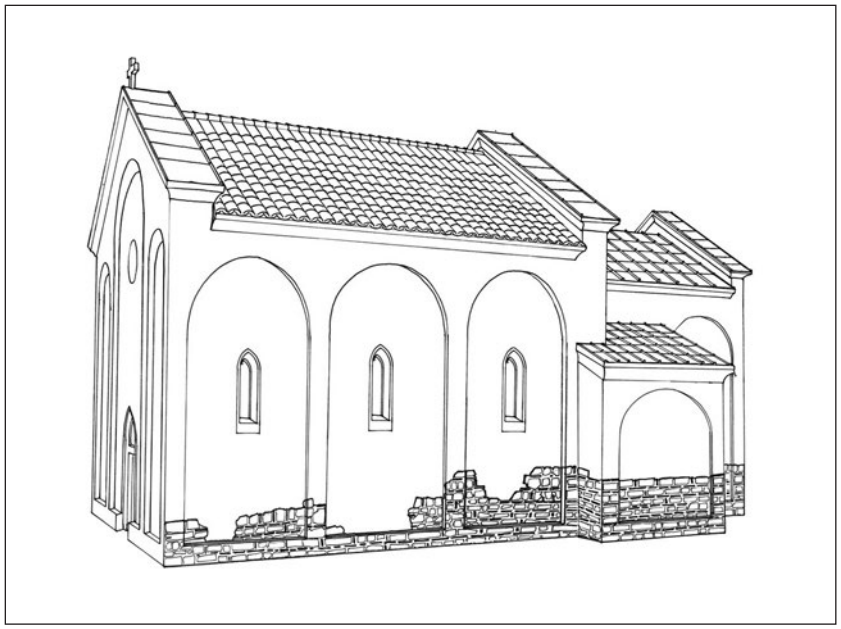


Сл. 15. Сашка црква, олтарска мензa са циборијумом – реконструкција некадашњег изгледа (према замисли аутора, арх. И. Бјелић)

доживљавани као странци. Новобрдска Сашка црква, о којој је овде реч, сигурно није била једини пример те врсте у средњовековним српским градовима, али је то још увек једна од недовољно истражених тема. Није познато како су изгледале католичке цркве у рударским градовима Брскову, Сребреници или Руднику. Усамљено сведочанство у том смислу представљају остаци тробродне базилике у Старом тргу, односно средњовековној Трепчи,[78] која се према одликама своје архитектуре битно разликовала од новобрдског католичког храма.

Подаци до којих се дошло у току археолошких истраживања рушевина Сашке цркве пружају довољно елемената да се у основним цртама сагледа њен првобитни изглед, проучи порекло архитектонског решења и утврди време њеног настанка (сл. 14). У питању је, као што је то већ напред истак-

[78] Корać 1965, 39– 42.



Сл. 16. Сашка црква, реституција првобитног изгледа (према замисли аутора, арх. И. Бјелић)

нуто, једнобродни храм са пространим наосом, који није био засведен. Овај простор је масивним пиластрима на које се ослањао тријумфални лук био издвојен од солидније грађеног олтарског дела – презбитерија, са сакристијом на јужној страни. И сам презбитериј је другим паром сличних пиластара био подељен на кор, из кога се улазило у сакристију и олтарски простор, завршен полукружном апсидом. У средишту олтара налазила се зидана часна трпеза са два приступна степеника. Судећи према пирамидалним, степенасто профилисаним базама, које су откривене *in situ* уз углове зидане конструкције, над олтарском мензом налазио се дрвени циборијум (сл. 15). Над тим базама, како се сасвим поуздано могло утврдити, стајали су дрвени direци који су носили горњу пирамидалну конструкцију, чији се некадашњи изглед сада може само замислити. Испред олтарске мензе налазио се још један монолитни степеник што је са бочних страна имао повишене кубусе, који су, по свему судећи, служили за постављање масивних високих свећа. Отворено је питање поузданог датовања елемената поменутих сегмената олтарске мензе. Њен зидани део је без сумње истовремен са грађењем цркве, док би дрвени циборијум могао представљати каснији додатак. То се сигурно односи и на монолитни степеник са лежиштима за свеће. Овде се такође поставља питање када је гробница 1 укопана и у каквом је хронолошком односу према монолитном степенику који делом лежи преко надгробне плоче. На основу расположиве документације могуће је износити неке претпоставке, али за поузданији закључак нема елемената.

Откривени остаци у источном делу цркве, о којима је већ раније било речи, омогућавају да се са доста сигурности закључи да су кор и олтарски простор били засведени полуобличастим или преломљеним сводом, а апсида полукалотом.[79] Над сакристијом је постојао полуобличасти, а можда и крстасти свод. Овај засведени и солидније грађен источни део цркве, како је то било и уобичајено, био је без сумње покривен оловом. Над наосом је постојала дрвена структура, али о њеном је изгледу сада тешко говорити будући да су била могућа различита решења. Над њом се, сасвим сигурно, налазила кровна конструкција која је била ослоњена на бочне зидове. Првобитни кровни покривач наоса чиниле су глеђосане ћерамиде, што за сада представља јединствен случај у српском средњовековном градитељству (сл. 16).

За разлику од основног корпуса грађевине, чији се некадашњи изглед може доста поуздано замислити, остаје отворено питање како је било решено њено прочеље. Откривени остаци темеља стубаца указивали би да је са западне стране постојао и звоник. Међутим, ти слабо очувани трагови не пружају могућност да се претпостави како је он могао

[79] Кораћ 1965, 98.

изгледати. Сигурно је да је према првобитној замисли подизање звоника било предвиђено, али је тешко закључити да ли је оно и остварено. Склони смо претпоставци да се од те намере одустало већ у току грађења цркве, а на то би указивали укопи гробних рака у део темеља поменутих стубаца. Приликом археолошких ископавања није се дошло до сасвим поузданих података о датовању тих гробова, али би се посредно могло закључити да су припадали старијем хоризонту сахрањивања.

Посматрана у целини, Сашка црква у Новом Брду представља особену појаву на подручју српских земаља. Просторно решење цркве, што је већ на први поглед уочљиво, прилагођено је потребама римокатоличког богослужења. Међутим, обликом своје основе она се издваја од уобичајених типова католичких храмова у приморским областима средњовековне Србије, одакле су струјали западни културни утицаји. Јасно се могло уочити да основа новобрдске цркве нема ближих паралела међу црквама Јадранског приморја, што је наметало потребу да се њено просторно решење детаљније размотри. Први се тог проблема подухватио В. Гвоздановић, који је, проучавајући цркву Мајке Божије у Моровићу (Срем), дошао до закључка да је њено решење основе – са правоугаоним наосом, ужим засведеним презбитеријем и бочно постављеном сакристијом – карактеристично за сакрално градитељство на ширем подручју од Низоземске, јужне Немачке и Саксоније, па све до Седмоградске – Ердеља. Распростирање овог типа основе са матичних подручја током 12. и 13. века он је с правом повезао са дијаспором Саксонаца, односно саских рудара према истоку. На то је посебно указивао знатан број таквих храмова у рударским областима Ердеља, одакле су кретале даље сеобе Саса према југу, односно централним областима Балкана.[80] Посматрана у том контексту, основа новобрдске цркве, која у целини следи просторно решење саских храмова, представља најјужнији пример сакралног здања тога типа на југоистоку Европе.

Проблемом новобрдске Сашке цркве бавио се и М. Такач покушавајући да је директније повеже са градитељским решењима саских храмова у Ердељу. На основу публиковане документације, која је била недовољна за доношење поузданијих закључака, он је изнео претпоставку да се над засведеним презбитеријем могао налазити звоник, као што је то био случај код неких цркава саског градитељства. Међутим, детаљнијим увидом у стање на терену, како се показало, таква претпоставка није имала поузданије утемељење.[81]

За разлику од плана цркве, чије је порекло сасвим поуздано утврђено, њен начин грађења и изглед разликовали су се од остварења саског градитељства. Фасадна платна рашчлањена лезенама и грађена тесаницима сиге, између којих се налазио ред танких опека, дело су без сумње локалних неимара ослоњених на византијске градитељске технике. Ромејски утицај на српско градитељство у виду мешаног декоративног слога камених квадера и редова опека, који је дошао до пуног изражаја на задужбинама краља Стефана Уроша II, остао је битна одлика градитељског наслеђа у српским земљама и у потоњим временима како током 14. века тако и касније.[82]

Уз неимаре који су Сашку цркву градили, на њеном живописању су очигледно радили и сликари који су осликавали српске храмове тога времена. Како су показали резултати истраживања, изгледа да је фрескама био украшен само презбитериј. О садржају и стилским одликама тог сликарства тешко је говорити на основу сачуваних фрагмената. Међу већим фрагментима, као што је већ речено, препознати су остаци лика Богородице, делови тела анђела, а на једном блоку сиге сачуван је и део фреске са представом бика – симбола Светог Луке. Битну карактеристику овог живописа представљале су ћирилске сигнатуре које се уочавају на више уломака фреско-малтера. Међутим, у знатно мањем броју посведочено је и постојање латинских сигнатура. Будући да је на неким фрагментима из презбитерија уочено постојање два слоја живописа, не би се могла искључити ни могућност да латинске сигнатуре одговарају млађем слоју – слоју поновног осликавања или обнове живописа.

Посматрана у целини, Сашка црква је, и поред уочљиве технике грађења карактеристичне за локалну средину, у стилском погледу деловала као готичко здање. На то су посебно утицали стилски и јасно препознатљиви уски високи прозори са преломљеним луком. На такво стилско опредељење, по свему судећи, утицало је и могуће решење поткровне конструкције изнад незасведеног наоса, за коју

[80] Gvozdanović 1969–1970, 18, с наведеним примерима и литературом.

[81] Takacz 1991, 44–51.

[82] Ненадовић 2003, 156–171.

можемо само претпоставити да је била обликована као и код других готичких храмова истог типа. Као илустрацију могућег изгледа поткровног дела наоса новобрдске цркве могао би се навести пример цркве Свете Кларе у Нирнбергу (око 1270),[83] где се на вертикалне зидове наоса ослањала структура са дрвеним луковима испод кровне конструкције.

Време грађења Сашке цркве у Новом Брду, и поред фрагментарно очуване документације, може се доста поуздано одредити. Заснивање ове насеобине крајем 13. века, као што је познато, било је условљено отварањем нових рудника сребра и насељавањем знатног броја саских рудара. Није познато када се ова римокатоличка популација верски организовала, али нећемо погрешити ако претпоставимо да се на то није дуго чекало. За крај 13. века нема познатих података, а на самом почетку 14. века Ново Брдо се још не спомиње међу жупама латинске цркве у рударским центрима Србије. Међутим, нагли развој града пратило је сасвим сигурно и верско организовање, и то најпре саских рудара, а касније и бројних трговаца из јадранских градова, на првом месту оних из „краљевог града" Котора, па потом и из Дубровника. На основу свих до сада прикупљених података, о којима је напред било речи, може се доста поуздано закључити да је прва новоподигнута црква у Новом Брду била управо Сашка црква, односно *Santa Maria in Novomonte*, која је без сумње подигнута трудом заједнице новодосељених саских рудара. На такав закључак поуздано указује просторно решење новог храма заснованог на традицијама из постојбине што их је ова рударска популација ширила на сва подручја своје дијаспоре. Сам начин грађења и нека конструктивна решења, која нису утицала на основну концепцију, били су препуштени локалним неимарима. На даљу судбину новобрдског храма латинске цркве утицало је све веће досељавање трговаца из српских приморских области који су током времена знатно увећали римокатоличку популацију, те су полако преузимали и примат од саског становништва које је цркву подигло. Сећање на прве градитеље, и поред промена које су се с временом дешавале, није било заборављено и остало је сачувано готово до наших дана.

На основу напред изложених података до којих се дошло у току археолошких истраживања, као и проучавања ретке сачуване изворне историјске грађе може се поуздано закључити да је црква *Santa Maria in Nuvomonte* подигнута тек коју деценију после отварања новобрдских рудника и заснивања тамошње урбане насеобине. Нећемо погрешити ако закључимо да се то догодило после 1300. године, највероватније током последње деценије владавине краља Стефана Уроша II.

Црква саских рудара није подигнута на подручју које ће обухватити подграђе новозаснованог града, већ нешто даље на месту које је било означено као Доњи трг. То је, по свему судећи, могла бити једна издвојена урбана инсула саских рудара са тргом, која се налазила недалеко од рудничких јама. На такву могућност указивало би и једно знатно позније изворно сведочанство. У турском дефтеру из 1498/99. године помиње се, између осталог, и „махала сашке цркве",[84] што би значило да је и тај, некада издвојени, простор био укључен у урбану целину османског Новог Брда. Међутим, за разлику од ових изворних података, приликом површинске теренске проспекције простора око Сашке цркве и могућег подручја некадашњег Доњег трга нису уочени трагови старије насеобине нити појединачних објеката. Ако се све то има у виду, поузданији закључак о овом питању морао би сачекати резултате евентуалних новијих истраживања.

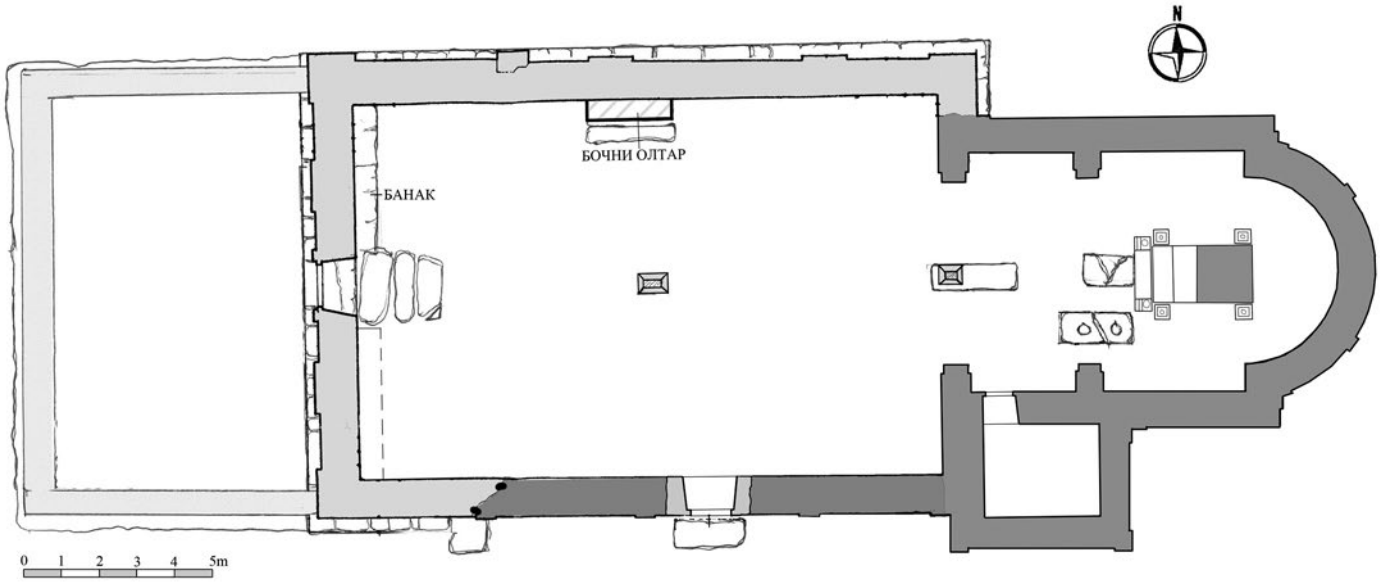
Уз новоподигнуту цркву започето је одмах, како изгледа, сахрањивање новобрдских римокатоличких грађана, у почетку превасходно Саса, а касније и досељених приморaца. Угледни богати грађани, који су имали привилегију укопа у самом храму, поседовали су зидане породичне гробнице намењене за више сахрана, као што је то био обичај не само у црквама приморских градова већ и у православној новобрдској катедрали Светог Николе.[85] О томе како је текао процес грађења тих гробница тешко се може закључити на основу расположивих података. Једино што је поуздано утврђено јесте то да старијој фази Сашке цркве одговарају свих 19 зиданих гробница, као и неки укопи без зиданих конструкција. Такође, истовремено је вршено и сахрањивање на простору око цркве, где је с временом образована главна некропола новобрдског католичког становништва.[86] Ако је судити према раније изложеној анализи налаза новца, сахрањивање у

[83] Eckstein 1981, 130–163.

[84] Филиповић 1954, 74.

[85] Петровић 1972, 69–86; Ковачевић-Којић 2010, 146–150; Поповић, Бјелић 2018, 155–178.

[86] Јачов 1986, 589.



Сл. 17. Сашка црква, основа после млађе обнове (P = 1 : 200)

самој цркви, у породичним гробницама имућнијих грађана обављано је током целог 14. века, а делом и у првим деценијама 15. века.

Отворено је питање да ли је уз Сашку цркву, као главни новобрдски римокатолички храм, било и неких других објеката или се у том старијем раздобљу око ње налазила само некропола. Није познато ни то да ли је и у којој мери црква тада била обнављана. Могло би се доста поуздано претпоставити да су неки радови извођени у самом олтарском простору, што би се на првом месту односило на постављање дрвеног циборијума над олтарском мензом. Та појава, која није била уобичајена у саским храмовима, овде би се можда могла довести у везу са све већим присуством верника што су пристизали из приморских градова, где је циборијум над олтарском мензом имао дугу традицију. Могуће је и то да је истом приликом додат и монолитни први степеник са бочним лежиштима за свеће, мада је до такве интервенције могло доћи и знатно касније.

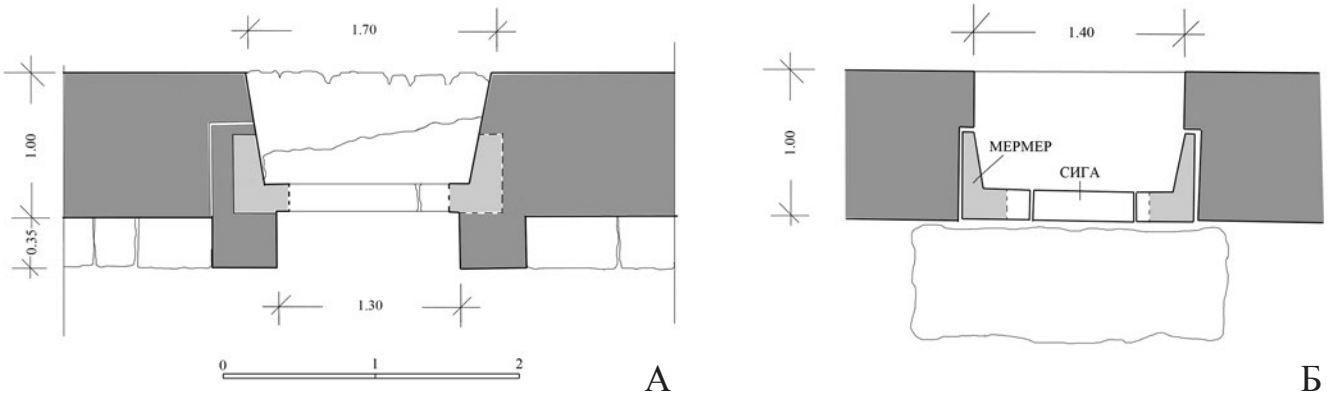
Као грађевина изван утврђеног подграђа Сашка црква је делила судбину Новог Брда. Будући да се налазила на прилазу граду који није био посебно брањен, може се претпоставити да је већ током последњих деценија 14. века могла бити изложена повременим турским похарама. Међутим, како су показали резултати археолошких ископавања, старије раздобље живота Сашке цркве окончано је великим пустошењима и рушењима, у којима су отворене и девастиране скоро све зидане гробнице у цркви, а разрушени су и зидови наоса. Нећемо погрешити ако претпоставимо да се то догодило у време готово двогодишње турске опсаде Новог Брда 1439–1441. године. Ранији истраживачи су оставили отворену могућност да је до урушавања зидова наоса можда дошло приликом неког тектонског поремећаја.[87] Ово размишљање, које сигурно не треба одбацити, за сада се тешко може утемељити на нашим сазнањима о земљотресима у централним областима Балкана током 15. века.[88]

Обнова цркве и млађе раздобље

После турског запоседања Новог Брда 1455. године и стабилизације прилика у освојеном граду стекли су се услови да се пострадале цркве обнове. Турска власт, заинтересована за наставак рада рудника и даљу производњу сребра, заузела је у прво време доста толерантан став према новобрдским хришћанима. То је раздобље када су, без сумње, започети радови и на обнови Сашке цркве. На овај закључак наводи и једно писмо, упућено из Рима 1458. године барском надбискупу, у ком папа Пије II тражи да се додели опрост грехова свим верници-

[87] Чершков 1958, 339.

[88] N. Ambraseys 2009.



Сл. 18. Сашка црква, западни и јужни портал после млађе обнове

ма који посете новобрдске цркве – Светог Николе у подграђу и Свете Марије на Доњем тргу, те приложе нешто за њихову обнову.[89] Та папина заповест била је, како изгледа, успешна, будући да је Сашка црква – *Santa Maria in Novomonte* управо у том раздобљу радикално обновљена. У току археолошких ископавања, као што је напред истакнуто, дошло се до читавог низа података који су омогућили да се сасвим поуздано не само уочи обим ове обнове већ и сагледа даља судбина тог некада главног храма Римске цркве у Новом Брду (сл. 17).

Главни радови, како се то јасно могло уочити, обављени су у простору наоса који је био готово у целости урушен. Отворено је питање у каквом стању се налазио солидније грађен олтарски део са сакристијом. Будући да на њиховим очуваним остацима није било трагова познијих градњи, може се само претпоставити да ту није било обимнијих интервенција. Предузета обнова је била и прилика да се црква просторно увећа, односно продужи према западу за 2,70 м. Током тих радова изграђени су из темеља нови зидови са северне и западне стране. Остаци старијег северног зида су уклоњени и на истој траси утемељен је нов зид. Према западу је подигнут зид на новој траси, чији је темељ пресекао неколико гробова старијег хоризонта, без зиданих гробних конструкција, односно слободно укопаних испред некадашње западне фасаде.[90] Нови темељ, као што је већ истакнуто, прешао је и преко остатака темеља раније поменутих стубаца претпостављеног звоника. Са јужне стране задржан је преостали приземни део првобитног зида и над њим је озидано ново цело зидно платно.

Нови зидови били су нешто солидније засновани, али без интервенција на затеченим гребенима стена. Над темељом, ширине 1,40 м, изнад равни тла налазили су се сокл, ширине око 0,40 м и зид, чија дебљина није прелазила 1 м. Дубина темеља, зиданих доста немарно и са слабим малтерним везивом, била је прилагођена равнима стена и нивоу компактне здравице, као што је то био случај и приликом грађења првобитне цркве. Сокл над темељом северног и западног зида грађен је већим тесаницима црвене бреће, а делом и блоковима сиге. За разлику од старијег зидања, обновљени односно нови зидови грађени су притесаним каменом у неправилном слогу. Такође се уочава и то да су при грађењу коришћене различите врсте камена, односно употребљена је, по свему судећи, грађа од ранијих рушења која се налазила око цркве. Обновљена зидна платна била су, као и раније, рашчлањена плитким лезенама, чији се правилан распоред могао уочити само на новој западној фасади.

Главни улаз у обновљену цркву налазио се на западној страни. Од конструкције портала откривен је мермерни праг са отисцима довратника, што је недовољно да би се сагледао његов некадашњи изглед. Може се само претпоставити да су у оквир новог западног зида пренети делови старијег портала. Други, мањи бочни улаз уграђен је у обновљен и президан јужни зид (сл. 18). Није познато ни како су изгледали прозори цркве после те обнове. Може се само претпостављати да су неки стари прозори или пак њихови клесани оквири нашли место и у оквиру зидова обновљене цркве.

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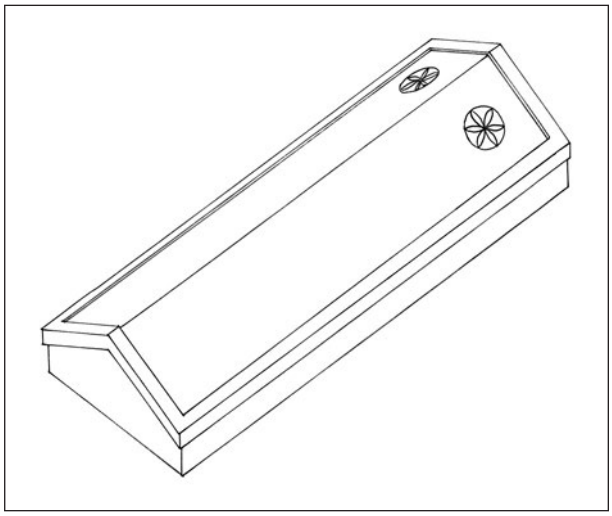
89 Gogić 2016, 22.

90 Ljubinković R. i M. 1962, 267–269 (према Дневнику ископавања из 1962. године; у питању су гробови 23–26 и 29–32).



Сл. 19. Сашка црква, цртеж стећка из наоса

У наосу, уз унутрашње лице поново изграђеног северног зида, откривени су остаци једног призиданог бочног олтара, који нису детаљније евидентирани у теренској документацији. Посредно се може закључити да је у питању била уска зидана конструкција завршена плочом, пред којом је био камени степеник. Уз нови западни зид, такође у наосу, налазио се прислоњен банак, односно зидана клупа, ширине око 0,50 м. Њени остаци откривени су на делу од портала према северном зиду, док је са супротне стране, према јужном зиду, ова призидана конструкција готово у целини порушена укопом познијих гробова.

Старији ниво пода остао је, изгледа, сачуван само у презбитерију. У наосу је над слојем насипа којим су засуте старије гробнице образован нови под, о коме, услед познијих прекопавања, нема поузданих података. У средишту наоса, у равни која сигурно одговара нивоу новог пода, откривена је пирамидално засечена база за дрвени дирек. Иста таква камена база налазила се и испод некадашњег тријумфалног лука пред презбитеријем. Била је постављена на масивну камену надгробну плочу што је затварала старију гробницу 5. Распоред тих камених база указује на положај дрвених дирека, односно носача за греду-подвлаку на коју је била ослоњена равна дрвена таваница. Над обновљеним наосом је највероватније постојала двоводна кровна конструкција која је била покривена црвеним кровним опекама – ћерамидама. Уломци тог познијег кровног покривача уочени су у знатном броју у слојевима шута, посебно у западном делу храма.[91]

У унутрашњости обновљене цркве, као и раније, вршено је сахрањивање. Међутим, за разлику од старије праксе, укопи су вршени непосредно у земљу, без посебних гробних конструкција. Услед познијих прекопавања уништени су готово сви гробови који одговарају том млађем хоризонту сахрањивања. На основу општих запажања и стратиграфске анализе података из теренске документације могло се ипак доћи до неких закључака. Као прво, јасно је уочено да за сахране нису коришћене старије зидане гробнице. Изузетак би, како се чини, представљао само гроб 2 у презбитеријум, где су над гвозденом хоризонталном решетком откривени непоремећени остаци покојника сахрањеног у дрвеном ковчегу, што би указивало на млађи укоп. Затечена ситуација са мноштвом, углавном дислоцираних, масивних плоча која је уочена у наосу приликом ископавања 1954–1955. године указивала би на то да су се над млађим укопима налазиле надгробне плоче, од којих су неке сигурно првобитно затварале зидане гробнице. Међу тим млађим надгробним обележјима, као сасвим особена појава уочавају се два ниска стећка слемењака. Један од њих, боље клесан, имао је рељефно обрађене рубове и две мање розете, на којима се могло запазити да су првобитно биле црвено обојене (сл. 19). О овим стећцима из наоса обновљене Сашке цркве, који изискују посебну обраду, могу се за сада изнети основна запажања. Као облик надгробника ниски стећак слемењак је изузетно редак на централнобалканском подручју, док се као чест вид надгробног споменика јавља на некрополама у западним областима Балкана, ближе Јадранском приморју, где се оквирно датује у 15. век.[92] Једину аналогију овим новобрдским надгробницима из области југозападне Србије за сада представља један сличан стећак са некрополе у селу Балетиће код Новог Пазара.[93] Знатно сложеније јесте питање како објаснити појаву стећка као надгробног обележја у наосу храма, што такође изискује посебну расправу.

Међу бројним укопима који одговарају млађем хоризонту сахрањивања у обновљеној Сашкој цркви, само за четири гроба располаже се нешто поузданијим подацима. У средишњем делу наоса откривена су два гроба обележена надгробним плочама,

[91] Ljubinković R. i M. 1962, 267–269.
[92] Bešlagić 1982, 93–102.
[93] Ердељан 1996, 151, сл. 14/2.

које су остале у свом првобитном положају. Испод једне од њих, у гробу 21, откривени су остаци покојника без прилога. У суседном гробу 22, такође обележеном надгробном плочом, на дубини од 0,97 м откривен је добро очуван женски скелет са остацима златоткане траке на којој су била нашивена пуцета. Од осталих прилога у гробу су нађени једна лунуласта наушница, прстен и бронзана игла. Сви ови налази датовани су у другу половину 15. и у 16. век.[94]

У гробу 27, делимично укопаном у остатке темеља старијег западног зида, биле су обављене три сукцесивне сахране. Скелет последњег укопа, уз који није било гробних прилога, био је добро очуван. Лобање два раније сахрањена дислоцирана покојника биле су секундарно постављене са бочних страна главе млађег покојника и предњом страном окренуте ка западу. У очним дупљама обе старије лобање били су забијени гвоздени клинови,[95] што представља појаву коју би тек требало детаљније проучити. У југозападном углу обновљеног наоса откривен је још један непоремећени укоп млађег хоризонта сахрањивања. У гробу 28, уз добро очуване остатке покојника који су лежали на дубини од –1,82 м, откривена су само два мања гвоздена запона.[96]

У простору обновљене цркве, осим трагова млађих сахрана, откривене су и две укопане оставе. Једна, већ поменута остава откривена је у југоисточном углу сакристије 1955. године. Забележени стратиграфски подаци о том налазу доста су непрецизни и тешко се могу сматрати поузданим.[97] Како је наведено, остава је откривена у нивоу пода и засута шутом. Уколико је тачно уочена раван пода, то би могао бити нижи старији ниво пода засут нивелационим слојем шута над којим је вероватно стајао млађи под. Остава је стога, сасвим сигурно, била укопана у тај нивелациони слој испод млађег пода из времена обнове цркве. Према подацима из теренског инвентара у остави су откривени: две сребрене чаше, сребрени оков једне мање зделе, затим мала сребрена полуга, као и керамички лончић у коме су била два прстена, два пара наушница и 125 аспри султана Сулејмана из 1510. године.[98] На основу налаза новца може се закључити да је остава укопана највероватније у другој деценији 16. века.[99]

Друга и нешто млађа остава била је укопана испод равни пода уз унутрашњу страну западног портала.[100] У остави је откривено 510 турских аспри, међу којима су се налазила и два новчића руског владара Ивана IV Грозног (1533–1584) – један кован пре 1547. године, а други после његовог проглашења за цара.[101] Судећи према овим датованим примерцима, остава је укопана највероватније у другој половини 16. века.

Обнова Сашке цркве, као што смо већ навели, могла је да уследи убрзо након османског освајања Новог Брда и стабилизације прилика у том освојеном граду. Није познато колико су трајали радови, али се може претпоставити да је црква можда већ у седмој деценији 15. века била оспособљена за богослужења. Обновљено је, или тада управо подигнуто, стамбено здање са бунаром у северозападном делу комплекса, по свему судећи намењено за боравак жупника цркве. Током последњих деценија 15. века обновљен је, или изнова изграђен, камени зид око целог комплекса некрополе са црквом. За завршне радове на том зиду један Дубровчанин је 1498. године у свом тестаменту оставио суму од 5.000 аспри.[102]

Доградња трема

Испред западне фасаде обновљене цркве дограђен је у неком познијем раздобљу отворени трем правоугаоне основе. Са бочних страна пратио је ширину цркве, док је према западу био истурен за око 7,5 м. Грубо грађеним темељима, укопаним до дубина између 0,50 м и 0,80 м, како изгледа, нису били оштећени дубље укопани старији гробни укопи.[103] Зидови трема као и темељи цркве, на које се зидови само прислањају, имали су ширину 1,10–1,20 м. Над овим темељом откривени су само делимично очувани остаци сокла, ширине 0,60–0,70 м,

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[94] Зечевић 2006, 166–207 (наушница, кат. бр. 20; игла, кат. бр. 30; прстен, кат. бр. 86).

[95] Дневник археолошких ископавања, 3. септембар 1962.

[96] Исто, 4. септембар 1962.

[97] Чершков 1958, 338–340.

[98] Теренски инвентар, 130–136, 138–142.

[99] Детаљно о садржају оставе в. Бикић 2018, у припреми за штампу.

[100] Остава је откривена на дубини од –1,23 м, мерено у односу на праг портала (Дневник археолошких ископавања, 30. август – 3. септембар 1962. г.).

[101] Ljubinković R. i M. 1962, 269. Према подацима из Теренског дневника за 30. август 1962, на дубини од –1,27 м у односу на раван прага откривено је 483 новчића, а наредних дана још 27, што је укупно 510 комада.

[102] Динић 1962, 29, нап. 23.

[103] Ljubinković 1969, 229; Зечевић 2006, 23, нап. 43.

чија некадашња висина изгледа није прелазила 3–4 реда камена. У тај зидани постамент били су уграђени дрвени direци који су носили горњу конструкцију са кровом. У североисточном углу, уз фасадни зид цркве, у остацима сокла откривено је лежиште једног кружног дирека, пречника 20–22 цм.[104] У унутрашњости трема, у равни некадашњег пода откривено је 17 грубо обрађених надгробних плоча, од којих су неке биле састављене од два или три дела. Те су плоче обележавале гробове најмлађег хоризонта сахрањивања вршеног у самом трему. Приликом археолошких ископавања откривено је мноштво дислоцираних костију, али ниједан од тих млађих и, по свему судећи, плиће укопаних гробова није откривен интактан. Такође, услед каснијих прекопавања уништени су и неки старији гробови на које указују дислоцирани налази накита и новца из 14–15. века. У целом простору трема откривено је само девет дубље укопаних, нешто боље очуваних гробова, а сви припадају старијем хоризонту сахрањивања на некрополи испред цркве.

Откривени остаци трема не омогућавају да се ова доградња поузданије датује. Трем је могао бити дограђен само после обнове цркве, што би значило најраније крајем 15. века, мада остаје отворена могућност да је то урађено и у првим деценијама наредног столећа. Судећи према налазима примерака накита из растурених гробова, изгледа да се у трему интензивно сахрањивало током 16. века.

Резултати до којих се дошло детаљним истраживањима остатака Сашке цркве, односно цркве Свете Марије на Доњем Тргу у великој мери допуњавају сазнања о граду Новом Брду и његовим житељима латинске вере. Први стални становници новооснованог града и будућег рударског средишта, као што је то у више наврата истакнуто, били су у највећем броју римокатолици – Саси, народ немачког порекла. Обдарени привилегијама српског владара, ови важни покретачи рударске производње имали су и право на слободно исповедање своје вере. Стога би се сасвим поуздано могло закључити да су они били и прва организована верска заједница у граду који је настајао. О томе када је заснована прва католичка жупа нема поузданих података. Посредно би се могло закључити да се то догодило убрзо после 1303. године, када се међу жупама латинске цркве у Србији Ново Брдо још не помиње.[105] Значајно сведочанство у том смислу представља грађење цркве Свете Марије изван подграђа, а ближе новоотвореним рударским јамама, које смо датовали у последњу деценију владавине краља Стефана Уроша II. Оснивање жупе и подизање првог римокатоличког храма било је, без сумње, дело првих новобрдских житеља – Саса, на шта указује и анализа остатака цркве, који су до наших дана задржали име које подсећа на њене некадашње утемељитеље. Посматрана у целини, новобрдска црква Свете Марије, као што је већ истакнуто, представљала је симбиозу просторног решења, односно плана карактеристичног за подручја саске дијаспоре и примењене градитељске технике, која је дело локалних неимара.

Уз новоподигнуту цркву Свете Марије веома брзо је започето сахрањивање новобрдских римокатоличких грађана, у почетку превасходно Саса, а касније и досељених приморaца из Котора и Дубровника. Угледни богати грађани, који су имали привилегију укопа у самом храму, поседовали су зидане породичне гробнице намењене за више сахрана, као што је то био обичај у црквама приморских градова. Такође, истовремено је вршено и сахрањивање на простору око цркве, где је с временом образована главна некропола новобрдског католичког становништва.[106]

Немирна времена која су наступила после великог хришћанског пораза у бици на Марици 1371. године утицала су и на даљу судбину цркве Свете Марије. Турски продори што су већ током осме деценије 14. века стизали и до подручја Новог Брда угрозили су опстанак овог новобрдског римокатоличког храма. Великим пустошењем и знатним рушењима, како су показали резултати археолошких ископавања, окончано је старије раздобље живота Сашке цркве. Можемо претпоставити да се то догодило у време готово двогодишње турске опсаде Новог Брда – током 1439–1441. године. После турског запоседања Новог Брда 1455. године и стабилизације прилика у освојеном граду стекли су се услови да се пострадале цркве обнове, а међу њима и Сашка црква. Археолошка истраживања су омогућила да се сасвим поуздано уочи обим изведене обнове, као што је већ изложено, а и сагледа даља судбина овог некада главног храма Римске цркве у Новом Брду. Током наредна два столећа Сашка цр-

[104] Дневник археолошких ископавања, 27. август 1969.

[105] Ћирковић 1997, 244–245; Gogić 2016, 2, с наведеним изворима.

[106] Јачов 1986, 589.

ква је остала у богослужбеној функцији. Барски надбискуп Марино Бици помиње је приликом канонске визитације 1610. године као „*велику и лепу цркву посвећену Богородици*", која је у то време у ризници имала 12 путира, крстове и све друго што је потребно за богослужење.[107] Три деценије касније, године 1642. његов наследник надбискуп Ђорђо Бјанки посетио је „*каноникалну цркву посвећену Светој Марији*", за коју каже: „*...и данас је у рукама хришћана, и у реченој цркви налазе се гробови у којима се сахрањују католици...*"[108] Ово су уједно и последњи познати подаци о овом знаменитом новобрдском храму који је, без сумње, коначно пострадао у време аустро-турског рата, крајем 17. века.

[107] F. Rački 1888, 122.

[108] М. Јачов 1986, 589.

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THE SAXON CHURCH IN NOVO BRDO – *SANTA MARIA IN NOVOMONTE*

Key words – Novo Brdo, Sasi, Catholics, church architecture

The site with the remains of the Saxon church, that is, the former Catholic church of St Mary, lies on a mild slope that descends from the fort to the southeast, or the village of Bostane. Located at a distance of about 1,200 m from Novo Brdo's Lower Town, it was outside this former urban area. It was intermittently investigated in the 1950s and ,60s, but the complete results of these works have not been published. With this in mind, after almost six decades, an attempt was made, based on the remaining fieldwork documentation, to examine in more detail the complex of this important Novo Brdo edifice.

The investigated remains of the church itself reveal three stages, or more precisely, construction phases, which reflect the emergence, renovation and extension of this temple over an extended period of time, from the first decades of the 14th to the end of the 17th century. The first and most important stage comprises the construction of the church itself, as well as the successive adding of masonry tombs and graves in the interior of the original temple. The following stage includes an extensive renovation and expansion of the church, while the third and final stage is distinguished by the construction of a porch in front of the western façade (Fig. 2).

The Saxon church is a single-nave temple of a spacious rectangular base. On the eastern side, two massive pilasters separated the nave from a much narrower alter area that terminated in a semicircular apse. This space, that is, the presbytery, was divided by a pair of similar massive pilasters into two unequal parts – a shorter western one, which could be labelled as the choir, and a much larger eastern one, in the centre of which was a masonry altar mensa in the form of a massive column and two simultaneously built steps. In front of them, on the same western side, this construction also included the first, monolithic step, which on the sides had step-like profiled cubes, the upper surface of which contained regularly carved circular indentations for the placement of massive candles. Alongside all four corners of the masonry construction of the alter mensa, step-like profiled bases carved from breccia were discovered *in situ*, which most likely carried the construction of a wooden ciborium. On the southern side, in the corner between the altar area and the wider nave, a sacristy was located, which was connected by a door to the presbytery, that is, the choir.

The interior of the Saxon church, which was completely explored, revealed the existence of several burial horizons, which can, chronologically and in terms of their general characteristics, be determined. The oldest burials, which were performed within the original church, somewhat differ from the later ones, from the time after the renovation of the temple, as well as the construction of the porch. Characteristic of the older period are masonry tombs, intended for a number of burials (Fig. 3).

Generally observed, despite the noticeable construction technique typical of the local area, the Saxon church stylistically resembled a Gothic edifice. What particularly contributed to this are stylistically clearly recognisable tall and narrow windows with a broken arch. Such a stylistic preference, in all likelihood, was also influenced by a possible solution for the under-roof construction above the unvaulted nave.

The Saxon church in Novo Brdo represents a peculiar phenomenon in the territory of Serbia. It is immediately apparent that the church's spatial solution corresponded to the needs of Roman Catholic worship. However, by the form of its base it is distinguished from the usual types of Catholic temples in the coastal areas of medieval Serbia, from where the western cultural influences flowed. It was clearly noted that the base of the Novo Brdo church has no close parallels among churches of the Adriatic, which imposed the need for a more detailed consideration of its spatial solution. It's base, with a rectangular nave, a narrower vaulted presbytery and a laterally positioned sacristy, is characteristic of sacral architecture in a wider area, from the Netherlands, Southern Germany and Saxony, all the way to Transylvania – Ardeal. The spread of this type of base from the areas of its origin, during the 12th and 13th centuries, can be associated with the Saxon diaspora, specifically the Sassi miners, progressing towards the east. This was particularly indicated by a considerable number of these temples in the mining areas of Ardeal, from where the Sassi migrations advanced further down to the south, namely, to the central regions of the Balkans. The thus perceived base of the Novo Brdo church, which, on the whole, follows the spatial solution of Saxon temples, represents the southernmost example of a sacral edifice of this type in Southeast Europe.

The time of the construction of the Saxon church in Novo Brdo can be quite reliably determined despite the fragmentarily preserved documentation. The rapid development of the city was undoubtedly accompanied by religious organising, first of the Sassi miners, followed by numerous merchants from Adriatic towns, primarily those from the "King's City" of Kotor, and subsequently also from Dubrovnik. Based on all these findings it can be quite safely concluded that the first newly erected church in Novo Brdo was precisely the Saxon church, that is, *Santa Maria in Novomonte*. It was built, without any doubt, due to the efforts of the newly settled Sassi mining community. Such a conclusion can reliably be drawn on the basis of the spatial solution of the new temple rooted in traditions from the homeland, which were disseminated by this mining population in all areas of their diaspora. The very method of building and some construction solutions, which did not affect the basic concept, were left to local builders. This dating is further supported by coin finds, the oldest specimens of which originate from the last decade of the reign of King Stefan Uroš II (1282–1321).

The Saxon church, outside the fortified Lower Town, shared the fate of Novo Brdo. Since it was located on the access

route to the city, which was not especially defended, it could have been exposed to occasional Turkish attacks during the last decades of the 14th century. With significant destruction, as evidenced by the results of archaeological excavations, the earlier period of life of the Saxon church came to an end. It can be assumed that this took place at the time of the almost two-year long Turkish siege of Novo Brdo between 1439 and 1441.

After the Turkish occupation of Novo Brdo in 1455, and upon restoring stability in the conquered city, conditions were created for the renovation of the Saxon church – *Santa Maria in Novomonte*. One letter from Rome, sent to the archbishop of the city of Bar in 1458, indicates that this was also advocated by Pope Pius II personally.

Major works on that occasion, as shown by archaeological investigations, were conducted within the area of the nave, which was almost entirely in ruins. The undertaken renovation provided the opportunity to increase the size of the church, specifically to extend it westward by 2.70 m. New walls were built from the ground up on the northern and western side of the nave, while within the altar area, which was certainly much better preserved, no traces of any subsequent alterations were noted. Somewhat later, in front of the renovated church, a wooden porch was added.

The Saxon church was also used for worship during the 16th and the first half of the 17th century. The archbishop of Bar, Marino Bizzi, during a canonical visitation in 1610, noted that the church at that time fulfilled all the requirements for worship. Three decades later, his successor, Archbishop Giorgio Bianchi, visited the Novo Brdo "canonical church dedicated to St Mary", which he says was in the hands of Christians and that inside "are graves in which Catholics are buried…". This is also the last known data regarding this prominent Novo Brdo temple, which was, without a doubt, finally destroyed during the Austro-Turkish war at the end of the 17th century.

КРИТИКЕ И ПРИКАЗИ – COMPTES RENDUS

Gold & Bronze: metals, technologies and interregional contacts in the Eastern Balkans during Bronze Age = Злато & бронз: метали, технологии и междурегионални контакти на територията на Източните Балкани през бронзовата епоха,
editors Stefan Alexandrov, Yana Dimitrova, Hristo Popov, Barbara Horejs, Krastyu Chukalev, National Archaeological Institute with Museum, Bulgarian Academy of Sciences, Sofia 2018.
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Почетком 2017. године у Бечу је уприличена изузетно интересантна изложба под називом *Das erste Gold. Ada Tepe: Das älteste Goldbergwerk Europas*, у организацији Уметничко-историјског музеја (Kunsthistorische Museum) у Бечу, Археолошког института са музејом Бугарске академије наука (НАИМ-БАН) и Института за оријенталну и европску археологију (OREA) Аустријске академије наука. Изложба је била посвећена истраживањима рудника злата из бронзаног и гвозденог доба Ада Тепе у Тракији, која су годинама пратили с великим интересовањем стручњаци широм Европе. Изузетна посећеност изложбе у Бечу подстакла је сараднике из НАИМ-БАН да изложбу прошире на металне налазе из бронзаног доба са целе територије Бугарске. Нова изложба под називом *Злато и бронз – Gold & Bronze* отворена је у октобру 2017. године у Археолошком музеју у Софији. У њеној реализацији учествовао је импресиван број од 85 сарадника из 28 музеја из целе Бугарске.

Тематски је књига подељена на два дела. Први део представља зборник радова са текстовима посвећеним технолошким достигнућима бронзаног доба и њиховом утицају на друштвене заједнице тог доба, и то како у Бугарској тако и у ширем европском контексту. Други део је посвећен самим налазиштима и налазима из бронзаног доба са територије Бугарске. Физички, књига има четири поглавља: *Introduction, Metals, technologies and contacts, Sites and finds* и *Catalogue*.

У уводном делу (*Introduction*) представљен је ток настајања изложбе као и овог пратећег зборника, који почиње историјатом истраживања рудника Ада Тепе. С обзиром на то да су и изложба и пратећа књига *Gold & Bronze* инициране тим истраживањима, у књизи им је дато доста простора. Заштитна истраживања тог рудника злата код Крумовграда у јужној Тракији, предузета због савремене рудне експлоатације што је уништила цео локалитет, представљају највећа археолошка истраживања приватног сектора која су икада предузета у Бугарској. Започета још 2001. године мањим радовима, од 2005. проширила су се уз укључивање, поред археолога из Бугарске, стручњака из Немачке и Аустрије. Вишегодишња интензивна истраживања на великом простору дала су веома значајне резултате о рударству, металургији и функционисању рударских заједница током бронзаног и гвозденог доба. О свему томе говори текст Христа Попова на крају уводног дела (*About Ada Tepe and its Role for the Creation of this Book*), а знатно више конкретних резултата изнето је у другом поглављу књиге у тексту који потписују руководиоци истраживања на Ада Тепе – Христо Попов и Албрехт Јокенхевел (*The Late Bronze Age Gold Mine at Ada Tepe*).

Свакако најзанимљивије јесте поглавље *Metals, technologies and contacts*. У овом својеврсном зборнику радова о металургији бронзаног доба сакупљено је 24 рада водећих аутора из света у овој области. Радови су тематски поређени тако да су покривене све теме – од оних које говоре о природним условима у бронзаном добу, преко оних који се баве материјалним налазима, до текстова о културним контактима са суседним областима.

На почетку поглавља, осим чланка који даје резултате новијих истраживања о еколошким одликама средине и прилагођавању тим условима од стране носилаца бронзанодобних култура источног Балкана (*Natural Environment and its Use by Man During the Bronze Age in the Territory of Bulgaria*), налазе се текстови у којима је више пажње посвећено геолошком потенцијалу Бугарске.

Текст К. Димитрова и Р. Стојчева (*The East Balkan Region as a Source of Precious and Non-ferrous Metals from Prehistory to the Roman Period*) даје пресек археолошки потврђених, као и потенцијалних праисторијских рудника и рудишта бакра и племенитих метала на источном Балкану. Поред Аи Бунара, халколитског рудника бакра, једног од најстаријих у Европи, приказани су и неки каснији рудници што су експлоатисани током римског периода и средњег века, за које се претпоставља да су коришћени и у праисторији. Нарочито је методолошки занимљиво истраживање рудног поља Розен на обали Црног Мора, код Созопоља, где су остаци старог рударства детектовани путем *LiDAR* технологије.

Чланак З. Цинцова (*The Long Guarded "Precious" Secrets from the Alluvial Sediments. The Placer Gold in Present-Day Bulgaria*) један је од ретких такве врсте у археолошкој литератури. Геолог по струци, научно усмерен ка истраживању алувијалних лежишта племенитих метала (био је такође и члан истраживачког тима рудника Ада Тепе), Цинцов је у свом тексту приказао геолошко богатство водених токова и њихов економски значај у праисторији. Испирањем алувиона на златоносним рекама, на начин како се то радило у прошлости, па вероватно и у праисторији, аутор је, осим руде, сакупио и бројне ситне златне праисторијске предмете који су дали хронолошку потврду о времену експлоатације злата из речних наноса.

Откривање металургије почетком 5. миленијума пре н. е. доноси са собом нове професије које су директно повезане са прерадом метала. Једна од њих је и рударење, а о њему говори рад Т. Штолнера (*Mining as a Profession in Prehistoric Europe*). Овај аутор, који дуги низ година води истраживања неких од најзначајнијих рудника у Европи и Азији, као што су Митерберг у Аустрији и Сакдриси у Грузији, приредио је један веома интересантан рад о рударству и другим активностима које су у праисторији биле везане за њега – од саме експлоатације руде до промена у друштвеној структури металодобних заједница.

Следе радови који се баве периодизацијом и културним контактима током бронзаног доба у Бугарској и Доњем Подунављу, с посебним освртом на развој металургије у том периоду, а које потписују аутори из Бугарске и Румуније (*The Early and Middle Bronze Age in Bulgaria: Chronology, Periodization, Cultural Contacts and Precious Metal Finds; Cultural Influences and Long-Distance Contacts during the 3rd Millennium BC; Gold Finds from Southern Romania during the 3rd and 2nd Millennia BC; Early and Middle Bronze Age Copper Metallurgy in the Northern Part of the Lower Danube Region*). Треба имати у виду то да по хронологији бугарских праисторичара бронзано доба траје безмало три миленијума (3500–1000/900 пре н. е.), па зато приликом читања радова објављених у овој књизи не треба сметнути с ума разлику између бугарске и српске хронологије, будући да се српска везује за хронологију Средње Европе по којој је рано бронзано доба Бугарске паралелно са средњим и касним енеолитом у Србији и Средњој Европи.

Два рада су посвећена настанку калајне бронзе, као и изворима руде калаја у југоисточној Европи. У овим радовима дата су два супротстављена мишљења. У тексту Б. Несел и Е. Перницке (*The Rise of Tin Bronze in Southeastern Europe in the 3rd and 2nd Millennia BC*) искључује се могућност коришћења алувијалних лежишта каситерита у северозападној Србији, а појава бронзаних предмета у југоисточној Европи везује се не само за утицај већ и за сировине из Средње Европе и уњетичке културе. Насупрот њему, рад групе аутора коју предводи В. Пауел (*Tin Sources and Regional Trade in the Bronze Age of Southeast Europe: Evidence from Tin Isotopes*) даје резултате нових истраживања која су утврдила да је бронза јужно од Дунава рађена од калаја управо из српских лежишта, а она северно од њега из Ерцгебиргеа, лежишта калајне руде на граници Немачке и Чешке.

У неколико радова (*The Middle Bronze Age on the Lower Danube; Hoards and Metal Assemblages on the Lower Danube during the Late Bronze Age; The Bronze Age in the Eastern Rhodopes*) изнети су резултати истраживања бронзаног доба у Доњем Подунављу у ширем смислу, тако да се знатно боље могу сагледати културни контакти током овог периода на територијама данашње Бугарске и Румуније. У поменутим текстовима посвећено је доста пажње утицају са удаљених територија, од Мале Азије до Средње Европе.

Посебно је занимљив текст А. Јокенхевела (*Casting and Forging in Bronze Age Bulgaria*), који се више бави технолошким проблемима у бронзаном добу. Без обзира на то колико је металних предмета прикупљено у самој Бугарској, мало је налаза који директно сведоче о технологији њихове производње. У овом раду сабрани су и представљени малобројни калупи, инготи и ливачке посуде са целе територије Бугарске, уз разматрање њихове примене у производњи металних предмета.

Остави из Влчитрна, по речима М. Стефанове „најегзотичније и најинтересантније од свих трачких остава", посвећена су три рада. У поменутој остави нађено је 13 предмета врхунске занатске производње и укупне тежине невероватних 12,4 килограма. Откада је откривена 1924. године, остава је често била тема научних студија, али о њој још није све речено. Чланци у овом зборнику доносе нове резултате проучавања технологије украшавања, с посебним освртом на технику дамаскаж (*The Treasure of Valchitran: Production Technique*), као и на анализе хемијског састава злата, које указују на то да предмети нису били израђени од исте руде, нити од руде која потиче из самог рудника Ада Тепе, већ из области око њега (*The Chemical Composition of the Gold Finds from Valchitran Treasure*). Рад М. Стефанове (*Valchitran Type Disks: Reviewing Some Aspects of their Interpretation and the Cultural Interconnections in the 2nd Millenium BC Thrace*) бави се културним утицајима из Грчке и са Блиског истока на Тракију кроз анализу предмета из влчитрнске оставе.

Културним контактима источног Балкана са околним областима посвећена су три чланка. Онима са егејским светом бави се рад Б. Хорејш и Р. Јунга (*Networks and Cultural Contacts with the Aegean*), додирима источног Балкана са Тројом и Анадолијом током бронзаног доба посвећен је текст П. Павука (*Thrace, Troy and Anatolia. Troy and its Contacts to*

the Balkans), а са средњом Европом и северном обалом Црног мора чланак Љ. Лештакова (*The Metallurgy of the Eastern Balkans and the Contacts with Central Europe and the Northern Black Sea Region in the Second Half of the Late Bronze Age*).

Посебно су интересантни текстови Р. Јунга (*Warriors and Weapons in the Central and Eastern Balkans*) и М. Василеве (*Late Bronze Age Scepter-Maces*) који се баве бронзанодобним оружјем. Први текст говори о релативно малобројним мачевима који су као оружје у правом смислу те речи коришћени у борби, а други је студија о посебној врсти налаза – каменим секирама и скиптрима, за које се сматра да су били статусни симболи ратничке елите.

Поглавље се завршава радом који се бави моделом транзиције из бронзаног у гвоздено доба на територији Тракије (*The Model of Transition to the Culture of Iron in Thrace*). Усвајање нове технологије – црне металургије, односно производње гвоздених предмета – представља значајан преломни моменат у праисторији. Аутори се у тексту посебно баве разлозима који су довели до производње гвожђа у Тракији. Као један од њих наводе модел А. Снодграса (*Snodgrass*), који је предложен за Грчку и по коме је исцрпљеност резерви бакарне и калајне руде на крају бронзаног доба био један од главних узрока увођења металургије гвожђа, што представља смелу претпоставку која ће сигурно бити тема неких будућих истраживања. Такође, доста пажње посвећено је и утицајима из Анадолије и Грчке који су довели до усвајања нове технологије у Тракији крајем 10. века пре н. е.

Након споменуте 24 студије, у којима се даје пресек бронзаног доба Бугарске на најбољи начин и износе нови резултати и нови погледи на тај дуг и буран период праисторије, следе поглавља која приказују локалитете и налазе што су представљени на изложби. Поглавље *Sites and finds* садржи 37 кратких текстова посвећених најзначајнијим бронзанодобним насељима, некрополама и групним налазима металних предмета. Управо се у том поглављу види обим археолошких истраживања у Бугарској, која се на неким налазиштима воде, с прекидима, још од прве половине 20. века. Поглавље прати каталог изложених предмета са одличним илустрацијама. Мора се нагласити и то да фотографије високог квалитета дају посебну вредност овој књизи.

Није познато зашто су праисторијска налазишта са приметно већом количином метала, посебно злата, баш у Бугарској остала сачувана у већем броју него у осталим деловима Балкана. Поставља се питање да ли је разлог за то боља археолошка заштита која се спроводи у Бугарској или мање уништавање током ранијих периода (антика, средњи век, отомански период, ратови у 19. и 20. веку), а можда и близина Егеје и Мале Азије и отвореност утицајима из тих области која је довела до већег узлета металургије током бронзаног доба. У бројним текстовима у овој књизи покушано је, између осталог, да се одговори и на та питања изношењем резултата нових археолошких открића и интердисциплинарних истраживања, у којима је приметна знатно ближа сарадња са тимовима стручњака из иностранства него што је то било раније. Сви текстови у књизи *Злато и бронза*, као и изложба истог назива, на најбољи су начин представили снагу бугарске археологије и њен очигледан напредак током последњих деценија. Мени је лично било право задовољство прочитати је од корице до корице, а не сумњам у то да су је на исти начин доживеле и бројне колеге широм Европе.

Драгана АНТОНОВИЋ

Марко Поповић, Игор Бјелић, Црква Светог Николе: катедрала града Новог Брда – St Nicholas Church: the Orthodox Cathedral of the Town of Novo Brdo, Републички завод за заштиту споменика културе, Београд 2018.
244 стране, 82 слике

Двојезични текст књиге Марка Поповића и Игора Бјелића о цркви Светог Николе у Новом Брду представља свеобухватну студију о овом средњовековном споменику, а састоји се од више поглавља: Уводна разматрања, Настанак и развој Новог Брда у 14. и 15. веку, Досадашња истраживања, Гробљанска црква са некрополом, Црква Светог Николе – старији, западни део катедрале, Црква Светог Николе – дограђени, источни део катедрале, Сахрањивање у катедрали, Доградња катедрале – значење, функција и датовање, Џамија – некадашња катедрала Новог Брда и Завршна реч. На крају књиге је прилог о натписима из саборне цркве Светог Николе који је написала Гордана Томовић.

Већ се из наслова књиге и навођења њених поглавља види да су аутори главну пажњу усмерили на највећу новобрдску цркву и сакрални простор око ње, разматрајући их у историјском контексту и кроз промене које су с временом доживљавали. Увод у тему, неопходан и веома важан у студијама овакве врсте, представља сажет и прегледан осврт на настанак Новог Брда, његов развој и његово гашење пред крај 17. века. Осим најважнијих података о граду, о његовом тргу, урбаној структури, градској управи и ковници новца, у књизи је прегледно приказана историја града, најпре у његовом српском, а потом и турском раздобљу. У првим поглављима књиге исцрпно су изложени и сви расположиви подаци о житељима Новог Брда током 14. и 15. века – Сасима, Дубровчанима, Которанима и локалном српском становништву – уз наглашавање да је сачувана изворна грађа махом једнострана, јер највећим делом потиче из приморских архива – Дубровника и Котора. Излагање о житељима града било је неопходно ради бољег разумевања изградње храмова у Новом Брду, о којима се највише зна по писаним изворима и по њиховим археолошким траговима.

У књизи је одговарајућа пажња посвећена сваком од њих, како римокатоличким храмовима (Santa Maria in Novomonte, данас позната као Сашка црква, и капела Светог Николе) тако и православним (Саборна црква, Богородичина црква, црква у замку, црква звана Јовча и још неколико у подграђу с непознатим посветама). Међу њима се изгледом и величином издвајала главна градска црква, посвећена светом Николи, која је припадала православним становницима града. Ову су цркву Турци претворили у џамију убрзо после освајања Новог Брда (1455), те је она тада престала да функционише као хришћанска богомоља.

Нимало није случајно то што су у амбициозно замишљеном пројекту истраживања Новог Брда, повереном Археолошком институту, Народном музеју и Војном музеју у Београду, а реализованом током 1952–1962. и 1969. године – и никад завршеном – у средишту пажње били Подграђе и црква Светог Николе, који су и најпотпуније истражени. Систематска археолошка истраживања започели су Радивоје Љубинковић и Мирјана Ђоровић-Љубинковић, којима је због те заслуге и посвећена ова књига. Премда је о археолошким ископавањима на Новом Брду публикован низ извештаја, резултати истраживања у комплексу Саборне цркве никад нису били у целини ни обрађени ни објављени у виду завршне студије – вероватно се у очекивању да ће се истраживања наставити и привести крају није приступало ни детаљној анализи откривених остатака архитектуре Саборне цркве и обради налаза са некрополе, нити изношењу коначних закључака до којих се дошло током истраживачког процеса. Дуг претходне генерације истраживача испунили су тек сада Марко Поповић и Игор Бјелић, мада су се они, због непотпуне теренске документације и налаза са ископавања на локалитету новобрдске Саборне цркве, морали ограничити углавном на разматрање њених архитектонских остатака, зиданих гробних конструкција и укопа у унутрашњости цркве.

На основу претходних извештаја, сачуваних налаза и података из старе документације, као и на основу сопствених истраживања, Поповић и Бјелић су установили да је изградњи цркве Светог Николе претходило образовање градске некрополе, ограђене солидно утемељеним зидом. У њој се, највероватније од прве половине 14. века, али ближе његовој средини, налазила мала гробљанска црква од које су углавном преостали делови темеља, а чији се изглед данас може замислити само у основним обрисима. Био је то једнобродни храм правоугаоне основе, с полукружном апсидом и са два пара пиластара, чији распоред дозвољава претпоставку о постојању куполе изнад њих; зидови цркве су били грађени ломљеним каменом и на унутрашњим странама живописани. Аутори су оправдано закључили да су нагли прилив становништва и економски успон града око средине 14. века условили не само проширивање некрополе него и подизање нове, веће и лепше црквене грађевине непосредно до постојеће мале богомоље. Она тада није била порушена, већ тек касније, кад је црква Светог Николе била проширивана на источној страни. Редослед и хронологија црквених грађевина одређени су првенствено на основу стратиграфије гробова у некрополи, будући да ретки налази накита и новца не пружају могућност њиховог прецизнијег временског одређења.

Од те нове цркве, која је одмах постала и градска катедрала, има веома много остатака: њени су темељи скоро у целини сачувани, као и зидови до одређене висине, док су у унутрашњости откривени постаменти свих шест доста добро сачуваних стубова и знатни остаци камене пластике, од којих су многи с рељефним украсом. Након прибирања свих расположивих података до којих се дошло приликом археолошких ископавања, као и пажљивог описа очуваних делова цркве, ауторима књиге је пошло за руком да веома уверљиво реконструишу њен конструктивни склоп и некадашњи изглед. Ширина цркве је износила 13 м, а дужина са апсидом (која није сачувана) око 21 м. Прецизним прорачунима су установили првобитну висину грађевине и чак, колико се могло, њену пету фасаду. Утврдили су да је новобрдска црква Светог Николе била грађевина уписаног крста с куполом, коју су носила четири стуба на масивним постаментима, и да је имала припрату, коју су од наоса одвајала два нижа стуба. Претпоставили су – што нам изгледа врло вероватно – да су се изнад припрате налазили катихумениј и над бочним травејима пар мањих купола, мада није искључено да тих купола није било, што аутори допуштају као могуће решење. Зидови су били грађени ломљеним притесаним каменом и изнутра осликани фрескама. Остаци сокла, зидова, портала, прозора и камене пластике омогућили су Поповићу и Бјелићу да начине убедљиву студијску реконструкцију спољњег изгледа цркве: фасаде су биле изведене редовима одлично обрађених тесаника брече и андезита у две боје, хоризонтално и вертикално су биле рашчлањене кордонским венцем и тростепеним пиластрима, а украшене плиткорељефном преплетном пластиком моравског типа, што је цркви давало изузетну живописност.

Анализа облика и некадашњег изгледа цркве дозволила је писцима књиге да изведу врло важне закључке. Новобрдска црква Светог Николе је својом основом, конструктивним склопом, слободним носачима лукова и сводова, као и стубовима који су одвајали простор припрате од наоса била најсличнија црквама Марковог манастира код Скопља и Нове Павлице на Ибру, с којима су је спајали и пропорцијски односи: висине њихових купола се према укупној висини грађевина налазе у односу 1:3, а исти такав однос, показали су аутори, има и студијска реконструкција цркве Светог Николе у Новом Брду. С друге стране, по каменим фасадама у две боје и њиховом хоризонталном и вертикалном рашчлањавању, новобрдска Саборна црква блиска је Светим арханђелима цара Душана и раним моравским споменицима, с којима их повезују и плиткорељефни украси, најближи раним задужбинама кнеза Лазара – Лазарици и Раваници. Исправно је закључено да је највећи број фрагмената с рељефима припадао архиволтама које су обрубљивале прозоре и забате, и они су у књизи подробно описани и добро реконструисани. Уочене аналогије, као и типолошке и стилске одлике архитектуре и скулптуре дозволиле су Поповићу и Бјелићу – иначе одлично упућеним у питања средњовековне уметности – да новобрдску цркву датирају у шездесете или седамдесете године 14. века и да претпоставе да је у питању владарска задужбина, можда цара Уроша или кнеза Лазара. Закључили су, такође, да је црква била грађена као главни православни храм Новог Брда, што треба без ограде прихватити, а могло би се усвојити и њихово мишљење да је она, бар неко време, служила као саборна црква грачаничких (новобрдских) митрополита, од којих је један ту био и сахрањен у време деспота Ђурђа Бранковића.

Неколико деценија после подизања цркве, сигурно ради увећавања богослужбеног простора главног градског храма, али и простора за сахрањивање чланова богатих новобрдских породица, уз источну страну цркве дограђена је пространа грађевина која је преузела улогу наоса и олтара, док је старија црква постала нека врста њеног предворја или нартекса. Резултати претходних археолошких истраживања омогућили су ауторима да тачно утврде обим тог дограђеног дела и да на основу затечених остатака замисле његов изглед и објасне гробне и друге налазе не само у том већ и у старијем делу цркве. Добро је објашњено да су у циљу стварања јединственог простора храма били уклоњени скоро сав источни зид и апсида старије цркве. Тада је била срушена и најстарија једнобродна црква у комплексу и њен је простор укључен у нову грађевину. Та грађевина је у књизи Поповића и Бјелића студијски реконструисана у мери колико је било могуће: утврђено је да је била базиликалног облика са веома широким бродовима, па је стога морала имати дрвену таваницу; фасаде су јој биле оплаћене редовима разнобојног камена, слично старијем делу храма, али без плиткорељефних украса. На унутрашњим странама зидова су се, према нађеним фрагментима, поуздано налазиле фреске са ћириличким натписима. Прихватљива нам је претпоставка аутора да је овај додати део грађевине био близак приморским градским црквама, које су јој могле бити и узор, као што су по угледу на њих у новобрдској цркви изведене многобројне троетажне гробнице, што представља скоро усамљену појаву у српској сепулкралној пракси. Тачније време подизања грађевине на источној страни цркве, у другој деценији 15. века, аутори су утврдили на основу налаза новца деспота Стефана Лазаревића. Нека важна питања овог дела новобрдске Саборне цркве, због степена његове очуваности и данашњих могућности истраживања, и даље ће остати отворена. Чињеница, на пример, да од зидова југозападног угла дограђеног дела цркве нису нађени било какви трагови, навела је Марка Поповића и Игора Бјелића да претпоставе да тај део цркве није био никада завршен.

Нејасном питању јужне стране грађевине врло вероватно су допринеле преградње око 1466. године (али и неке касније), извођене у овом делу цркве приликом њеног претварања у џамију. Аутори књиге су веома подробно објаснили шта је претходило конверзији цркве у џамију, који су радови тада били обављени и како је она изгледала. Потребну пажњу обратили су и остацима солидно зиданог минарета уз југозападни зид грађевине, као и двема фазама постојања исламске богомоље на том месту. Испитали су и исламске гробове око новоосноване џамије, посебно оне репрезентативније, у којима су уочили необичан начин сахрањивања првих новобрдских муслимана-конвертита с чувањем неких хришћанских обичаја, као што су сахране у зиданој гробници, укоп у дрвеном ковчегу и одећи или прекрштене руке покојника. Историја новобрдске џамије се тако у књизи складно и функционално преплиће с постепеним пропадањем и рушењем напуштене цркве Светог Николе, у чијем се источном делу налазила ова џамија.

У закључку можемо рећи да су Марко Поповић и Игор Бјелић написали исцрпну и веома добру студију о цркви Светог Николе у Новом Брду. На основу материјалних остатака на терену, археолошких извештаја, необјављених дневника ископавања, раније начињених фотографија и непотпуно очуваних археолошких налаза, аутори су извели скоро савршену реконструкцију главне новобрдске цркве, јасно је ситуирали у простор највећег нашег средњовековног града и у време његовог процвата у другој половини 14. и у првој половини 15. века. Пажљиво су раздвојили све њене хронолошке и градитељске фазе, објаснили их и уверљиво датовали. Разговетно су и аналитички показали са колико је знања и укуса била саграђена и украшена прва Саборна црква према великим узорима из средине и друге половине 14. века, и у којој је мери она сама – својим облицима и изгледом – била укључена у низ најлепших архитектонских остварења тога доба. Аутори су не само поуздано утврдили везу ове новобрдске цркве са тек мало старијим градитељским делима него су изнели и довољно образложили мишљење да је она могла бити једна од првих грађевина подигнутих у новом духу репрезентативне архитектуре последњих деценија 14. века у Србији. Уз све друго, то је велики домет ове књиге и путоказ будућим истраживањима српске средњовековне уметности, истраживањима која никако не би смела да заобиђу важан допринос Новог Брда њеном развоју. А излагањем о другој фази изградње новобрдске цркве, аутори су отворили проблем продора приморске архитектуре у уметност српских градова, о чему се до сада премало знало – и не само архитектуре и уметности него и нових видова свакодневног живота, понашања, обичаја и градске културе у најширем смислу.

Приказ ове књиге не би био потпун без похвале њеног веома успелог ликовног и графичког изгледа (Данијела Парацки и D_SIGN, Београд) и распореда богате документације (планова, цртежа, фотографија, реконструкција) која визуелно и функционално допуњује текст и значајно доприноси да се он лакше прати и потпуније чита.

Бранислав ТОДИЋ

NOËL DUVAL
(1929–2018)

НОЕЛ ДИВАЛ (Noël Duval), доајен француске и европске археологије, али и велики пријатељ српских колега, напустио нас је заувек. Рођен 1929. у Шеснају (Chesnay), у Француској, непосредно по завршетку академског образовања започео је своју научну каријеру прво као сарадник Француске школе у Риму (L'École française de Rome – EFR), током 1953–1955. године, а затим, између 1955. и 1957. године као асистент на Универзитету у Тунису (Université de Tunis). Од 1962. до 1964. године био је сарадник Националног центра за научна истраживања (CNRS), а од 1969. године професор археологије на универзитетима у Лилу (Université Charles de Gaule – Lille III) и од 1975. до 1992. године у Паризу (Université Paris IV – Sorbonne).

Предавао је и латинску епиграфику у научно-образовној установи École normale supérieure. Својим ангажовањем у Музеју Лувр као кустоса, а затим и управника (1968–1975) Одељења грчко-римских и етрурских старина (Département des Antiquités grecques, étruscues et romaines) оставио је снажан печат у оријентацији те чувене установе, пре свега ангажујући младе сараднике како на теренским истраживањима француских археолошких мисија у свету, тако и на публиковању нових налаза и на темељној анализи старијих. Археологију касноантичког и ранохришћанског периода и византијску уметност Ноел Дивал је на Сорбони предавао до 1992. године, а затим је своја предавања наставио на Универзитету у Барселони (Autonomous Université de Barcelona). Професор *emeritus* на Сорбони постао је 2007. године. Формални одлазак у пензију није му била препрека да настави свој педагошки и научни рад.

NOËL DUVAL, grand archéologue français et européen, aussi bien que grand ami de la Serbie, nous a quittés pour toujours. Né en 1929 à Chesnay, en France, il a commencé sa carrière scientifique, immédiatement après avoir terminé sa formation universitaire, d'abord comme membre de l'École française de Rome (EFR), de 1953 à 1955, puis comme assistant d'histoire à l'Institut des hautes études de Tunis, de 1955 à 1957, et à la Sorbonne, de 1957 à 1962. Entre 1962 et 1963, il a été attaché au Centre national de la recherche scientifique (CNRS), avant d'occuper, à partie de 1963, les fonctions de chargé d'enseignement d'histoire ancienne et d'archéologie à l'Université de Nantes (1963–1964) et à l'Université de Lille (1964–1969), et celles de professeur d'archéologie à l'Université Charles-de-Gaulle – Lille III (1969–1975) et à l'Université Paris IV – Sorbonne (1975–1992).

Il a aussi enseigné l'épigraphie latine à l'École normale supérieure, de 1972 à 1992. Par ses activités au Musée et à l'École du Louvre, en tant que conservateur, puis directeur du Département des antiquités grecques, étrusques et romaines (1968–1975), il a eu un impact important sur les politiques futures de cette célèbre institution, avant tout en recrutant de jeunes collègues au sein de diverses missions archéologiques internationales, ainsi que par son immense effort de publication des trouvailles récentes et d'analyse approfondie des trouvailles antérieures. Noël Duval a enseigné l'archéologie de l'Antiquité tardive et de la période paléochrétienne à Paris IV jusqu'à 1992, mais a continué pendant plusieurs années à faire cours à l'Université autonome de Barcelone (Universitat Autònoma de Barcelona). Il est devenu professeur émérite de l'Université Paris IV – Sorbonne

Усредсредивши своја интересовања на проблеме христијанизације и транзиције античког периода у средњовековни, покренуо је међународну едицију *Antiquité Tardive*, чији је био уредник, а касније благајник, а која континуирано излази од 1993. године. Ова едиција и друштво настало око ње (L'assotiation pour l'Antiquité tardive) окупили су еминентне научнике из целе Европе, а њихове студије, штампане на француском, енглеском, немачком и шпанском језику, и данас су незаобилазно штиво за све оне који се баве проучавањем касноантичког и рановизантијског периода. С поносом напомињемо да су и српски стручњаци били аутори у неким свескама те едиције, као и у посебним издањима библиотеке настале у оквиру асоцијације (Bibliothèque de l'Antiquité tardive) чијим је Научним саветом руководио Ноел Дивал. Упоредо са уредничким пословима и ангажовањем на профилисању тих изузетно важних публикација, он је током 90-их година XX века свој дугогодишњи рад на ранохришћанским споменицима Француске систематизовао и корпус тих налаза публиковао је у три тома (N. Duval, *Les premiers monuments chrétiens de la France*, Paris 1995–1998).

Готово је немогуће осврнути се темељније на огроман научни опус Ноела Дивала, а признања која је добио поставши члан Академије наука и уметности у Барселони, Немачког археолошког института или Британске академије наука само делимично бацају светлост на значај резултата рада Ноела Дивала. Његова библиографија броји више од 750 наслова монографија, студија, научних прилога, уредништава монографија и зборника радова. Срећом, списак тих референци публикован је у два наврата. Најпре су објављени радови изашли до 1993. године (*Orbis Romanus Christianusque ab Diocletiani ab Heraclium. Traveaux sur l'Antiquité tardive rassemblées autour ses recherches de Noël Duval*, éd. F. Baratte, J.-Caillet, C. Metzger, Paris 1995), а затим они публиковани у периоду од 1993. до 2003. године (*Studiola in honorem Noël Duval*, éd. C. Belmelle, P. Chevalier, G. Ripoll, Mélanges d'Antiquité Tardive 5, Turnhout 2004). Па ипак, сумирајући овај обиман корпус научних радова, слободни смо да издвојимо два догађаја која су пресудно утицала на главне правце научне активности Ноела Дивала. Прво, он је на почетку своје каријере постао асистент на Универзитету у Тунису, што је резултовало његовим великим ангажманом на проучавању римских споменика те земље. Монографије и научне едиције које је сам или у сарадњи са својим млађим колегама публиковао представљају темељ за сва будућа проучавања римске цивилизације на тлу северне Африке *(Les ruines de Sufetula*, Tunis 1973; *Haïdra, les ruines d'Ammaedra*, Tunis 1974; *Guides d'Haïdra et de Sbeitla*, Tunis 1976*; Les églises africaines à deux absides*, Paris 1971–1973; *Haïdra I–IV*, Paris 1975–2010).

Други значајан догађај збио се 1976. године када му је позив на сарадњу упутио Владислав Поповић, тада сарадник Археолошког института у Београду, а касније професор Филозофског факултета у Београду и редовни члан САНУ. Сарадња ове двојице врсних научника, а с временом и добрих пријатеља, започела је археолошким ископавањима у Сирмијуму (*Sirmium*), римској престоници провинције Доње Паноније, касније Друге Паноније. Протоколом потписаним између Археолошког института у Београду, Центра „А. Мерлен" (A. Merlin) у име Националног центра за научна истраживања (CNRS) и Француске школе у Риму предвиђен 2007. Са retraite officielle ne l'a aucunement empêché de continuer son travail pédagogique et scientifique.

Concentrant ses intérêts en recherche sur la christianisation et sur la transition au Moyen Âge, il a fondé le périodique international *Antiquité tardive*, dont il a été le rédacteur en chef et le trésorier, qui paraît annuellement depuis 1993. Cette revue – de même que l'association créée autour d'elle, l'Association pour l'Antiquité tardive, dont N. Duval a été le président – réunit des scientifiques éminents du monde entier et les études qu'elle publie, en français, en anglais, en allemand, en italien et en espagnol, constituent aujourd'hui autant d'oeuvres incontournables pour tous ceux qui étudient les périodes tardo-antique et protobyzantine. Notons que plusieurs chercheurs serbes figurent parmi les auteurs, non seulement du périodique, mais aussi de la collection également placée sous le patronage de l'Association : la Bibliothèque de l'Antiquité tardive. Parallèlement à ses activités de rédacteur et d'éditeur, qui furent marquées par une volonté toute particulière d'offrir des publications de très haut niveau, les années 1990 furent aussi, pour lui, celles d'un ample travail de synthèse sur les monuments paléochrétiens de France, concrétisé par la publication de la totalité de ses trouvailles en trois tomes (N. Duval, *Les premiers monuments chrétiens de la France*, t. I–III, Paris 1995–98).

Il est, pour ainsi dire, impossible de faire une rétrospective détaillée sur l'oeuvre scientifique de Noël Duval, tant celle-ci est immense ; la reconnaissance de son apport à la science que constitue sa nomination comme membre de l'Académie des sciences et des arts de Barcelone, de l'Institut archéologique allemand et de l'Académie britannique ne met ainsi en évidence que partiellement l'importance des résultats de son travail. Sa bibliographie comprend plus de 750 monographies, articles, éditions de monographies, actes de congrès et recueils de travaux. Heureusement pour nous, la liste de ces références a été publiée à deux reprises. On en retrouve une première, s'arrêtant à 1993, dans *Orbis Romanus Christianusque ab Diocletiani aetate usque ad Heraclium. Travaux sur l'Antiquité tardive rassemblés autour des recherches de Noël Duval* (éd. F. Baratte, J.-P. Caillet, C. Metzger, coll. De l'archéologie à l'histoire, Paris 1995), et une seconde, pour la période 1993–2003, dans *Mélanges d'Antiquité tardive. Studiola in honorem Noël Duval* (éd. C. Balmelle, P. Chevalier, G. Ripoll, coll. Bibliothèque de l'Antiquité tardive 5, Turnhout 2004). En analysant ce vaste corpus d'ouvrages scientifiques, on prêtera toutefois une attention particulière à deux événements qui ont eu une influence décisive sur la direction générale des activités scientifiques de Noël Duval. Le premier est lié aux fonctions qu'il a occupées à Tunis en tout début de carrière l'ont incité à s'engager pleinement dans l'étude des monuments romains de Tunisie. Les travaux qu'il a publiés seul ou en collaboration avec de jeunes collègues représentent aujourd'hui le fondement de toutes les études ultérieures sur la civilisation romaine en Afrique du Nord (*Les ruines de Sufetula,* Tunis 1973 ; *Haïdra, les ruines d'Ammaedra*, Tunis 1974 ; *Les églises africaines à deux absides*, I–II, Paris 1971–73 ; *Haïdra* I–IV, Paris 1975–2010). Le second événement marquant a eu lieu, quant à lui, en 1976, lorsque Vladislav Popović, alors chercheur à l'Institut archéologique de Belgrade, mais plus tard professeur à la Faculté de Philosophie de Belgrade et membre perpétuel de l'Académie serbe des sciences et des arts (SANU), l'a invité à collaborer.

La collaboration de ces deux scientifiques éminents, devenus de bons amis avec le temps, a commencé à l'occasion des

но је да се истраживања, реализована 1976. и 1977. године, одвијају на две локације. Ископаван је простор на којем је касније изграђен хотел „Сирмијум", а где је констатован и археолошки детерминисан велики касноантички економски објекат. Резултати тих истраживања публиковани су у оквиру већ раније покренуте међународне едиције *Sirmium*, чији је циљ био објављивање и анализа налаза и података о римском Сирмијуму. Ноел Дивал и Владислав Поповић били су у тој едицији уредници свеске VII (*Horrea et thermes aux abords du rempart sud. 1. Architecture*, éd. N. Duval, V. Popović, *Sirmium* VII, Collection de L'Ecole Française de Rome 29/1, Rome–Belgrade: Ecole Française de Rome – Institut archéologique de Belgrade 1977) и свеске *Sirmium* VIII (*Études de numismatiquue danubienne*, éd. N. Duval, V. Popović, Rome–Belgrade 1978). Друга локација на којој су се одвијала археолошка истраживања српских и француских стручњака, а под руководством Ноела Дивала и Владислава Поповића, налазила се на источној градској некрополи. Откривени су некропола и ранохришћански културни објекат, који је на основу пронађеног натписа идентификован са базиликом Светог Иринеја. Потакнути изванредним резултатима ових истраживања, али и другим налазима из Сирмијума, Ноел Дивал и Владислав Поповић су замислили да свеску IX едиције *Sirmium* посвете ранохришћанским споменицима из те панонске метрополе. Нажалост, низ објективних и субјективних околности, међу којима је пресудна била прерана смрт Владислава Поповића 1999. године, спречио их је у реализацији тог пројекта. Потписница ових редова и теренски руководилац на ископавањима базилике Светог Иринеја, некадашњи директор Археолошког института у Београду, Милоје Васић преузели су на себе да као уредници књиге, у сарадњи са Домиником Мороом (Dominic Moreau), професором Универзитета у Лилу, публикују резултате истраживања базилике Светог Иринеја и пратеће некрополе у оквиру монографије – која ускоро треба да буде објављена у издању Понтификалног института за хришћанску археологију (PIAC). Ова публикација ће бити дело *in honorem* Ноелу Дивалу и Владиславу Поповићу.

После истраживања у Сирмијуму двојица врсних научника наставила су француско-српску сарадњу 1978. године и то на ископавањима Царичиног Града (*Iustiniana Prima*). Теренским ископавањима следило је публиковање налаза у оквиру едиције *Caričin Grad*, чије су свеске I (*Les basiliques B et J de Caričin Grad. Quatre objets remarquables de Caričin Grad. Le trésor de Hajdučka Vodenica*, Collection de l'École française de Rome 75/1, Rome–Belgrade 1984) и II (L'acropole et ses monuments – cathédrale, baptistère et bâtiment annexes, Collection de l'École française de Rome 75/3, Rome–Belgrade 2010) под њиховим уредништвом публиковане у издању École française de Rome. О урбанизму Царичиног Града дискутовано је у раду N. Duval, L'urbanisme de Caričin Grad. Une ville artificielle et ces bâtiments d'appart: une spécificité locale ou une étape décisive dans la typologie des *principia* militaires, *Antiquité tardive* 4, 1996, 299–312. На овом се локалитету француско-српска истраживања још увек одвијају, настављајући пут који су трасирали Ноел Дивал и Владислав Поповић, наравно уз примену нових, данас доступних техника археолошких ископавања и проучавања грађе.

Сарадња Ноела Дивала са српским колегама, а посебно с Владиславом Поповићем, била је више него плодна, fouilles archéologiques de Sirmium, l'antique capitale de la province romaine de Pannonie inférieure / seconde. En vertu d'un accord signé entre l'Institut archéologique de Belgrade, le Centre Alfred Merlin du CNRS et l'EFR, les explorations réalisées en 1976 et 1977 se déroulent dans deux secteurs. D'une part, on a fouillé le site aujourd'hui occupé par l'Hôtel Sirmium, construit ultérieurement, où les prospections avaient permis d'identifier un édifice à fonction économique datant de l'Antiquité tardive. Les résultats de ces recherches ont été publiés dans le cadre de la série internationale *Sirmium*, déjà existante, dont le but était de présenter les analyses des découvertes et des données sur la Sirmium antique. Noël Duval et Vladislav Popović ont ainsi édité ensemble les volumes VII (*Horrea et thermes aux abords du rempart sud, 1. Architecture*, Collection de l'École française de Rome 29/1, Rome–Belgrade 1977) et VIII (*Études de numismatique danubienne. Trésors, lingots, imitations, monnaies et fouilles, IV^e^ au XII^e^ siècles*, Collection de l'École française de Rome 29/2, Rome–Belgrade 1978) de cette série. D'autre part, les mêmes experts serbes et français se sont intéressés à la nécropole est de la ville. On y a découvert, en plus de la nécropole, un édifice de culte paléochrétien qui a été identifié, d'après une inscription, avec la basilique Saint-Irénée. Motivés par les résultats exceptionnels de ces explorations, mais aussi par d'autres trouvailles de Sirmium, Noël Duval et Vladislav Popović ont envisagé de consacrer le volume IX de la collection des *Sirmium* aux monuments paléochrétiens de la métropole pannonienne. Malheureusement, une série des circonstances objectives et personnelles, dont la plus fatale fut la mort prématurée de Vladislav Popović en 1999, les ont empêchés de mener à bien ce projet. L'auteure du présent texte et Miloje Vasić, directeur du chantier de la basilique Saint-Irénée et ancien directeur de l'Institut archéologique de Belgrade, se sont donné pour mission d'éditer ce livre, en collaboration avec Dominic Moreau, maître de conférences à l'Université Lille, dans le but de publier enfin les résultats des recherches sur la basilique Saint-Irénée et la nécropole avoisinante, dans une monographie qui est prévue dans les mois à venir, dans l'une des collections de l'Institut pontifical d'archéologie chrétienne (PIAC). Cette publication sera un ouvrage *in honorem* Noël Duval et Vladislav Popović.

Après avoir quitté le site de Sirmium en 1978, les deux scientifiques éminents ont continué la collaboration franco-serbe, dans le cadre des fouilles de Caričin Grad (*Iustiniana Prima*). Leurs travaux de terrain ont été suivis par la publication des trouvailles au sein de la série *Caričin Grad*, dans ses volumes I (*Les basiliques B et J de Caričin Grad. Quatre objets remarquables de Caričin Grad. Le trésor de Hajdučka*, Collection de l'École française de Rome 75/1, Rome–Belgrade 1984) et III (*L'acropole et ses monuments (cathédrale, baptistère et bâtiments annexes)*, Collection de l'École française de Rome 75/3, Rome–Belgrade 2010),. L'urbanisme de Caričin Grad a fait l'objet d'une analyse toute particulière par N. Duval dans : « L'urbanisme de Caričin Grad. Une ville artificielle et ses bâtiments d'apparat : une spécificité locale ou une étape décisive dans la typologie des *principia* militaires », *Antiquité tardive* 4, 1996, 299–312. Aujourd'hui, les recherches franco-serbes continuent sur ce site, suivant la voie tracée par Noël Duval et Vladislav Popović, en s'appuyant, toutefois, sur de nouvelles technologies, qui renouvellent les méthodes de fouille et d'analyse du matériel.

али не увек и идилична. Било је ту академских расправа о различитим научним проблемима, често уз сукобљавања мишљења, али увек толерантним тоном и уз тражење пута ка заједничким ставовима. Створена је таква атмосфера да је свако јавно могао да изнесе свој став. Тако у раду N. Duval, Sirmium "Ville impériale" ou "capitale"?, *XXVI Corso di cultura sull´arte ravennate e bizantina*, Ravenna 1979, 53–90, аутор је изнео своју сумњу да је откривени резиденцијални објекат у Сирмијуму царска палата. Сличне резерве о карактеру Галеријеве палате у Гамзиграду изнео је и у раду N. Duval, Les résidences impériales: leur rapport avec les problèmes de légitimité, les partages de l'Empire et la chronologie des combinaisons dynastiques, in: *Usurpation in der Spätantike. Akten des Kolloquiums "Staatsstreich und Staatlichkeit", 6.–10. März 1996, Solothurn–Bern*, ed. F. Paschoud, J. Szidat, Stuttgart 1997, 127–153, иако је нешто раније омогућио Драгославу Срејовићу, тадашњем истраживачу тог локалитета, да своје теорије о царској палати *Felix Romuliana* у Гамзиграду изнесе у часопису *Antiquité tardive* 2, 1994, 143–152. Речју, Ноел Дивал је желео да научна дискусија и укрштање мишљења утру пут ка оптималном сагледавању неког проблема.

Осим сарадње са српским колегама, блиске контакте остварио је и са хрватским стручњацима, пре свега онима из Сплита. Почевши од 1994. године руководио је истраживањима у Салони (*Salona*), а резултат тог замашног подухвата јесу четири свеске едиције *Salona* (*I. Catalogue de la sculpture architecturale paléochrétienne de Salone*, dir. N. Duval, E. Marin, C. Metzger, Collection de l'École française de Rome 194/1, Rome–Split 1994; *II. Ecclesiae dalmatiae. L'architecture paléochrétienne de la province romaine de Dalmatie (IV^{e}–VII^{e} s.) [En dehors de la capitale, Salona]*, par P. Chevalier, Collection de l'École française de Rome 194/2, Rome–Split 1995; *III. Manastirine. Établissement préromain, nécropole et basilique paléochrétienne*, dir. N. Duval, E. Marin, Collection de l'École française de Rome 194/3, Rome–Split 2000; *IV. Inscriptions de Salone chrétienne, IV^{e}–VII^{e} siècles*, éd. N. Gauthier, E. Marin, F. Prévot, Collection de l'École française de Rome 194/4, Rome–Split 2010), чији је уредник био самостално или у сарадњи са хрватским и француским колегама. Напорно радећи у депоима Археолошког музеја у Сплиту, али и онима Музеја Срема у Сремској Митровици, урадио је упоредну анализу једне специфичне групе споменика – мермерних менси, које се јављају на та два значајна античка локалитета, указујући на дугогодишње културне везе међу њима (N. Duval, *Mensae* funéraires de Sirmium et Salone, *Vjesnik za arheologiju i historiju dalmatinsku* 77 (*Disputationes Salonitanae* II), 1984, 187–226).

Ноел Дивал је био велики пријатељ и поштовалац српских институција науке и културе, а пре свих Археолошког института у Београду. За изузетно значајну библиотеку овај институт му дугује захвалност на претплатама на научне часописе као што су *Révue archéologique* и *Antiquité tardive*, што је за домаће научне институције, због тешке материјалне ситуације у којој се налазе, од непроцењиве важности. И сам је од 1990. године па до своје смрти био члан редакције часописа *Старинар* који ова кућа издаје. Водио је рачуна и о усавршавању наших младих стручњака, омогућујући им студијске боравке у Француској школи у Риму, у библиотекама и институцијама у Паризу, у Центру за историју античке архитектуре у Поу (IRAA). Сваки боравак српских науч-

La collaboration de Noël Duval avec ses collègues serbes, surtout avec Vladislav Popović, fut exceptionnellement fructueuse, sans être nécessairement toujours idyllique. On pense ici, notamment, à tous les importants débats académiques, sur divers problèmes scientifiques, qu'ils entretinrent, souvent avec de fortes divergences d'opinions, mais toujours en restant respectueux et en cherchant le compromis. En vérité, l'ambiance générale permettait à chacun de présenter ouvertement ses idées. Ainsi, Noël Duval, dans son article « Sirmium "ville impériale" ou " capitale" ? » (dans *XXVI Corso di cultura sull'arte ravennate e bizantina, Ravenna, 6–18 Maggio 1979*, Ravenne 1979, 53–90), a exprimé ses doutes sur l'association du grand édifice résidentiel découvert à Sirmium avec un palais impérial. Il a exprimé des réserves similaires à propos du palais de Galère à Gamzigrad, dans son « Les résidences impériales : leur rapport avec les problèmes de légitimité, les partages de l'Empire et la chronologie des combinaisons dynastiques » (dans *Usurpation in der Spätantike Akten des Kolloquiums »Staatsstreich und Staatlichkeit« 6.–10. März 1996 Solothurn – Bern*, éd. F. Paschoud, J. Szidat, Stuttgart 1997, 127–153), en dépit du fait que, quelques années auparavant, Noël Duval avait incité Dragoslav Srejović, qui était, à l'époque, chargé de ce site, à publier ses théories sur le palais impérial de *Felix Romuliana /* Gamzigrad dans la revue *Antiquité tardive* (2, 1994, 143–152). En bref, Noël Duval était d'avis qu'il fallait encourager au maximum la discussion scientifique et l'échange des opinions, de manière à permettre une analyse optimale pour chaque problème donné.

En plus de collaborer avec les collègues serbes, il a aussi entretenu des rapports étroits avec les chercheurs croates, avant tout ceux de Split. À partir de 1994, il dirigea des explorations à Salone (*Salona*) et les résultats de cette entreprise ambitieuse parurent dans quatre volumes de la série internationale *Salona* (*I. Catalogue de la sculpture architecturale paléochrétienne de Salone*, dir. N. Duval, E. Marin, C. Metzger, Collection de l'École française de Rome 194/1, Rome–Split 1994 ; *II.* Ecclesiae dalmatiae. *L'architecture paléochrétienne de la province romaine de Dalmatie (IV^{e}–VII^{e} s.) [En dehors de la capitale, Salona]*, par P. Chevalier, Collection de l'École française de Rome 194/2, Rome–Split 1995 ; *III. Manastirine. Établissement préromain, nécropole et basilique paléochrétienne*, dir. N. Duval, E. Marin, Collection de l'École française de Rome 194/3, Rome–Split 2000 ; *IV. Inscriptions de Salone chrétienne, IV^{e}–VII^{e} siècles*, éd. N. Gauthier, E. Marin, F. Prévot, Collection de l'École française de Rome 194/4, Rome–Split 2010), dont il fut éditeur, seul ou en collaboration avec des collègues croates et français. En travaillant assidûment dans les dépôts du Musée archéologique de Split, mais aussi dans ceux du Musée de Srem à Sremska Mitrovica, il a d'ailleurs pu effectuer une analyse comparative d'un groupe spécifique de mobilier – des *mensae* en marbre contemporaines, qui furent retrouvés sur ces deux sites antiques majeurs –, ce qui a notamment permis de mettre en lumière l'importance des liens culturels entre Salone et Sirmium (N. Duval, *Mensae* funéraires de Sirmium et Salone, *Disputationes Salonitanae II : znanstveni skup u povodu 100. obljetnice Vjesnika za arheologiju i historiju Dalmatinsku = Vjesnik za arheologiju i historiju dalmatinsku* 77, 1984, 187–226).

Noël Duval était un grand ami de la Serbie et un collaborateur très respectueux de ses institutions scientifiques et culturelles, entre autres de l'Institut archéologique de Belgrade. Sa bibliothèque, qui est particulièrement importante, lui doit une

ника у Паризу користио је да им организује сусрет, најчешће на ручку у неком ресторану у Латинском кварту, са француским колегама, али и онима из других земаља који су се у том моменту налазили у француском главном граду. То су биле прилике за нове научне дискусије и размене мишљења. Волео је да долази у Србију не само као коруководилац великих археолошких истраживања већ и касније, када је, већ нарушеног здравља, током 2004. и 2005. године обишао Сирмијум, Медијану и Царичин Град и упознао се с новим налазима. Посебно је био везан за Сирмијум, његове старине и бурну историју, па је сасвим разумљиво то што је постао почасни грађанин Сремске Митровице, што га је веома радовало. Због својих заслуга у унапређењу југословенско-француске научне сарадње одликован је Ноел Дивал Орденом савезне заставе са златним венцем. Његов огроман допринос проучавању ранохришћанске и касноантичке археологије препознала је и САНУ изабравши га 1997. године за свог иностраног члана. Увек уздржан, у тамном оделу и са краватом, као типичан представник француске више средње класе свима је персирао, задржавајући при томе неку само њему својствену достојанствену благост праћену нотом ироније. Радозналог духа, увек је желео да се предузму нова теренска истраживања, а дисциплина у раду коју је поседовао нагонила га је да све бележи и анализира, пружајући најбољи пример ваљаности латинске изреке *nulla dies sine linea*. Стога су последње године живота, које је због тешке болести морао да проведе у изолацији, за њега сигурно биле изузетно тешке, а смрт, иако се некад јавља као избавитељица, ипак је оставила празнину која се у случају Ноела Дивала не може попунити. Јер, нажалост, данашњи систем образовања и успостављених вредности не пружа плодно тле за формирање научника попут Ноела Дивала, ерудите и космополите широких светоназора, што је постао упркос норми традиционалног грађанског миљеа из којег је потекао.

Ивана ПОПОВИЋ

réelle reconnaissance pour ses dons réguliers, par exemple de certaines revues scientifiques comme la *Revue archéologique* et *Antiquité tardive*, ce qui est d'une importance inestimable, considérant la situation financière difficile des institutions scientifiques en Serbie. Depuis 1990 jusqu'à sa mort, il fut membre du comité la rédaction de la revue *Starinar*, publiée par ledit Institut. Il s'occupa aussi d'organiser des stages de formation pour de jeunes chercheurs serbes, en leur donnant la possibilité de faire des séjours d'études à l'École française de Rome, dans les bibliothèques et institutions de Paris et à l'antenne de l'Institut de recherche sur l'architecture antique (IRAA) à Pau. Il a profité de chaque séjour de chercheurs serbes à Paris pour organiser des rencontres, généralement autour d'un déjeuner dans le Quartier latin, non seulement avec les collègues français, mais aussi avec ceux des autres pays qui se trouvaient à ce moment-là dans la capitale française. Ces rencontres étaient l'occasion de nouvelles discussions scientifiques et d'échanges d'idées. Il aimait séjourner en Serbie, non seulement dans le cadre de ses fonctions de co-directeur de fouilles archéologiques, mais aussi en tant que simple visiteur. En 2004 et en 2005, alors que sa santé était déjà fragile, il se rendit ainsi visiter Sirmium, Mediana et Caričin Grad, afin de prendre connaissance des nouvelles trouvailles. Il était tout spécialement attaché à Sirmium, à ses antiquités et à son histoire turbulente. On comprendra donc aisément pourquoi il est devenu citoyen d'honneur de Sremska Mitrovica, un hommage qui lui fit, à l'époque, un immense plaisir. En raison des efforts qu'il a déployés dans le développement de collaborations scientifiques franco-yougoslaves, Noël Duval a été décoré de l'Ordre du Drapeau de Yougoslavie à couronne d'or. Son énorme contribution aux études d'archéologie paléochrétienne et de l'Antiquité tardive a été reconnue par la SANU, qui l'a élu en 1997, en qualité de membre étranger. Toujours discret, dans son costume-cravate sombre, comme un représentant typique de la classe moyenne supérieure française, il vouvoyait tout le monde, tout en gardant une douceur et une noblesse toutes particulières, accompagnées d'une légère ironie. À cause de son esprit curieux, il cherchait toujours à entamer de nouvelles recherches sur le terrain et sa discipline de travail le poussait à tout noter et analyser. L'expression latine *nulla dies sine linea* le caractérisait parfaitement. C'est pourquoi les dernières années de sa vie, qu'il a dû passer en isolement relatif, à cause de sa maladie grave, ont sûrement été très difficiles pour lui et la mort, bien qu'elle apparaisse parfois comme une délivrance, a pourtant laissé un vide qui, dans le cas de Noël Duval, ne pourra pas être comblé. Malheureusement, le système d'éducation et les valeurs actuelles ne représentent pas un sol fertile à la formation de savants tels que Noël Duval, qui fut un parfait érudit cosmopolite, large d'esprit, en dépit des normes du milieu traditionnel bourgeois dont il était issu.

Ivana POPOVIĆ
(traduction d'Amalija Vitezović adaptée avec la collaboration de Dominic Moreau)

EDITORIAL POLICY OF THE JOURNAL *STARINAR*

The journal *Starinar* is dedicated to topics in the areas of archaeology, history, history of arts, architecture and similar scholarly disciplines.

The journal *Starinar* started to be published in 1884 as a periodical publication issued by the Serbian Archaeological Society, and in 1950 it became the periodical of the Institute of Archaeology in Belgrade.

The journal *Starinar* publishes original papers that have not been published previously: original scientific articles, excavation reports, scientific reviews, book reviews, critiqical reviews, bibliographies, necrologies. Some issues of *Starinar* can be dedicated to emeritus researchers in the field of archaeology.

Starinar is an Open Access journal.

Articles can be submitted in English, German or French. If the paper is written in English, summary can be in Serbian (for authors from Serbia) or English (for international authors), while articles submitted in German or French need to have a summary in English.

Papers for *Starinar* have to be submitted to the editorial secretary and must be formatted in accordance with the Guidelines/ Submission instructions for authors.

The Journal is issued once a year.

Online First option is applied in *Starinar*: an electronic version of an accepted manuscript is made available online after the Editorial Board accepts the manuscript for publishing and after the editing and proofreading procedure.

Journal *Starinar* publishes articles from the fields of archaeology, history, architecture, history of arts, classical philology, physical anthropology, etc.

EDITORIAL RESPONSIBILITIES

The Editorial Board is responsible for deciding which articles submitted to ***Starinar*** will be published. The Editorial Board is guided by the Editorial Policy and constrained by legal requirements in force regarding libel, copyright infringement and plagiarism.

The Editorial Board reserves the right to decide not to publish submitted manuscripts in case it is found that they do not meet relevant standards concerning the content and formal aspects. The Editorial Staff will inform the authors whether the manuscript is accepted for publication within 120 days from the date of the manuscript submission.

Editorial Board must hold no conflict of interest with regard to the articles they consider for publication. If an Editor feels that there is likely to be a perception of a conflict of interest in relation to their handling of a submission, the selection of reviewers and all decisions on the paper shall be made by the editor and editorial board.

Editorial Board shall evaluate manuscripts for their intellectual content free from any racial, gender, sexual, religious, ethnic, or political bias.

The Editor and the Editorial Staff must not use unpublished materials disclosed in submitted manuscripts without the express written consent of the authors. The information and ideas presented in submitted manuscripts shall be kept confidential and must not be used for personal gain.

The journal Starinar applies the system of double-blind peer review. Editors and the Editorial Staff shall take all reasonable measures to ensure that the reviewers remain anonymous to the authors before, during and after the evaluation process and the authors remain anonymous to reviewers until the end of the review procedure.

Papers prepared for publishing should be submitted to the editorial secretary between 20 November to 20 December of the current year for the volume that will be published the following year. The Editorial board meets after the submission of all papers. At the first meeting, reviewers are selected and assigned manuscripts for review.

AUTHORS' RESPONSIBILITIES

Authors warrant that their manuscript is their original work, that it has not been published before and is not under consideration for publication elsewhere. Parallel submission of the same paper to another journal constitutes a misconduct and eliminates the manuscript from consideration by *Starinar*.

The Authors also warrant that the manuscript is not and will not be published elsewhere (after the publication in Starinar) in any other language without the consent of the Publisher.

In case a submitted manuscript is a result of a research project, or its previous version has been presented at a conference in the form of an oral presentation (under the same or similar title), detailed information about the project, the conference, etc. shall be provided in front of the first footnote and it should be marked with a star. A paper that has already been published in another journal cannot be reprinted in Starinar.

It is the responsibility of each author to ensure that papers submitted to *Starinar* are written with ethical standards in mind. Authors affirm that the article contains no unfounded or unlawful statements and does not violate the rights of third parties. The Publisher will not be held legally responsible should there be any claims for compensation.

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A submitted manuscript should contain sufficient detail and references to permit reviewers and, subsequently, readers to verify the claims presented in it. The deliberate presentation of false claims is a violation of ethical standards. Book reviews, critical reviews, necrologies and other professional articles are reviewed as well and the decision on their acceptance or rejection is made by the Editorial Board based on reviews.

Authors are exclusively responsible for the contents of their submissions and must make sure that they have permission from all involved parties to make the data public.

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Authors must make sure that all only contributors who have significantly contributed to the submission are listed as authors and, conversely, that all contributors who have significantly contributed to the submission are listed as authors. If persons other than authors were involved in important aspects of the research project and the preparation of the manuscript, their contribution should be acknowledged in a footnote or the Acknowledgments section.

Acknowledgment of Sources

Authors are required to properly cite sources that have significantly influenced their research and their manuscript. Information received in a private conversation or correspondence with third parties, in reviewing project applications, manuscripts and similar materials, must not be used without the express written consent of the information source.

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Plagiarism, where someone assumes another's ideas, words, or other creative expression as one's own, is a clear violation of scientific ethics. Plagiarism may also involve a violation of copyright law, punishable by legal action.

Plagiarism includes the following:

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– Copying equations, figures or tables from someone else's paper without properly citing the source and/or without permission from the original author or the copyright holder.

Please note that all submissions are thoroughly checked for plagiarism. Any paper which shows obvious signs of plagiarism will be automatically rejected and authors will be temporary permitted to publish in Starinar.

In case plagiarism is discovered in a paper that has already been published by the journal, it will be retracted in accordance with the procedure described below under Retraction policy, and authors will be temporary permitted to publish in Starinar.

Conflict of interest

Authors should disclose in their manuscript any financial or other substantive conflict of interest that might have influenced the presented results or their interpretation.

Fundamental errors in published works

When an author discovers a significant error or inaccuracy in his/her own published work, it is the author's obligation to promptly notify the journal Editor or publisher and cooperate with the Editor to retract or correct the paper.

By submitting a manuscript the authors agree to abide by the *Starinar*'s Editorial Policies.

REVIEWERS' RESPONSIBILITIES

Reviewers are required to provide written, competent and unbiased feedback in a timely manner on the scholarly merits and the scientific value of the manuscript.

The reviewers assess manuscript for the compliance with the profile of the journal, the relevance of the investigated topic and applied methods, the originality and scientific relevance of information presented in the manuscript, the presentation style and scholarly apparatus.

Reviewers should alert the Editor to any well-founded suspicions or the knowledge of possible violations of ethical standards by the authors. Reviewers should recognize relevant published works that have not been cited by the authors and alert the Editor to substantial similarities between a reviewed manuscript and any manuscript published or under consideration for publication elsewhere, in the event they are aware of such. Reviewers should also alert the Editor to a parallel submission of the same paper to another journal, in the event they are aware of such.

Reviewers must not have conflict of interest with respect to the research, the authors and/or the funding sources for the

research. If such conflicts exist, the reviewers must report them to the Editor without delay.

Any selected referee who feels unqualified to review the research reported in a manuscript or knows that its prompt review will be impossible should notify the Editor without delay.

Reviews must be conducted objectively. Personal criticism of the author is inappropriate. Reviewers should express their views clearly with supporting arguments.

Any manuscripts received for review must be treated as confidential documents. Reviewers must not use unpublished materials disclosed in submitted manuscripts without the express written consent of the authors. The information and ideas presented in submitted manuscripts shall be kept confidential and must not be used for personal gain.

PEER REVIEW

The submitted manuscripts are subject to a peer review process. The purpose of peer review is to assists the Editorial Board in making editorial decisions and through the editorial communications with the author it may also assist the author in improving the paper.

To every paper submitted to editorial board of Starinar two reviewers are assigned. Reviewers could be members of the Editorial Board, associates of the Institute of Archaeology or eternal associates, with the same or higher scientific degree as the author(s), competent in the field of the manuscript's topic. The suggestions on who the reviewers should be are made by the Editorial Board, and adopted by the Editor-in-Chief.

All papers are reviewed by using the double-blind peer review system: the identity of the author is not known to the reviewers and vice versa. Reviewers shall send their reviews within the period of 30 days after the receipt of the manuscript. Reviewers are not paid for this work.

If a reviewer requires a revision of a manuscript, authors shall send a revised version with changes made in accordance with the reviewer's suggestions within the period of 30 days. In case they consider the revision request unfounded, the authors should send their arguments explaining why they did not make the required revision. The same timeframe applies to revisions of manuscripts that are not written in accordance with the author guidelines.

The decision of acceptance of the paper is made by the Editorial Board of Starinar by majority vote based on the peer reviews and the evaluation of the authors' revision or their arguments, if they did not make changes to the manuscript.

After the final decision on the content of a volume is made, manuscripts are sent for editing and proofreading, and then to a graphic designer, who is responsible for computer layout, design and prepress. Before printing, the authors will have the opportunity to proofread their paper twice in the PDF format. The final approval for printing is given by the Editor-in-Chief. The whole volume should be send to the printing press by 1 October.

The reviewers selected by the Editorial Board, receive a peer review form with questions that they should answer. The purpose of the questions is to indicate all aspects that they should consider in order to make a decision on the destiny of a paper. In the final part of the form, reviewers are supposed to write their opinion and suggestions how to improve the paper. The identity of reviewers is unknown to authors, before, during and after the review procedure. The identity of authors is unknown to reviewers before, during and after the review procedure (until the paper is published). It is suggested to authors to avoid formulations that could reveal their identity. The Editorial Board shall ensure that before sending a paper to a reviewer, all personal details of the author (name, affiliation, etc.) will be deleted and that all measures will be undertaken in order to keep the author's identity unknown to the reviewer during the review procedure.

The choice of reviewers is at the Editorial Board's discretion. The reviewers must be knowledgeable about the subject area of the manuscript; and they should not have recent joint publications with any of the authors.

All of the reviewers of a paper act independently and they are not aware of each other's identities. If the decisions of the two reviewers are not the same (accept/reject), the Editor may assign additional reviewers.

During the review process Editor may require authors to provide additional information (including raw data) if they are necessary for the evaluation of the scholarly merit of the manuscript. These materials shall be kept confidential and must not be used for personal gain.

The Editorial team shall ensure reasonable quality control for the reviews. With respect to reviewers whose reviews are convincingly questioned by authors, special attention will be paid to ensure that the reviews are objective and high in academic standard. When there is any doubt with regard to the objectivity of the reviews or quality of the review, additional reviewers will be assigned.

PROCEDURES FOR DEALING WITH UNETHICAL BEHAVIOUR

Anyone may inform the editors and/or Editorial Staff at any time of suspected unethical behaviour or any type of misconduct by giving the necessary information/evidence to start an investigation.

Investigation

- Editor-in-Chief will consult with the Editorial Board on decisions regarding the initiation of an investigation.
- During an investigation, any evidence should be treated as strictly confidential and only made available to those strictly involved in investigating.
- The accused will always be given the chance to respond to any charges made against them.
- If it is judged at the end of the investigation that misconduct has occurred, then it will be classified as either minor or serious.

Minor misconduct

Minor misconduct will be dealt directly with those involved without involving any other parties, e.g.:

- Communicating to authors/reviewers whenever a minor issue involving misunderstanding or misapplication of academic standards has occurred.
- A warning letter to an author or reviewer regarding fairly minor misconduct.

Major misconduct

The Editor-in-Chief, in consultation with the Editorial Board, and, when appropriate, further consultation with a small group of experts should make any decision regarding the course of

action to be taken using the evidence available. The possible outcomes are as follows (these can be used separately or jointly):

– Publication of a formal announcement or editorial describing the misconduct.
– Informing the author's (or reviewer's) head of department or employer of any misconduct by means of a formal letter.
– The formal, announced retraction of publications from the journal in accordance with the Retraction Policy (see below).
– A ban on submissions from an individual for a defined period.
– Referring a case to a professional organization or legal authority for further investigation and action.

When dealing with unethical behaviour, the Editorial Staff will rely on the guidelines and recommendations provided by the Committee on Publication Ethics (COPE): http://publicationethics.org/resources/.

RETRACTION POLICY

Legal limitations of the publisher, copyright holder or author(s), infringements of professional ethical codes, such as multiple submissions, bogus claims of authorship, plagiarism, fraudulent use of data or any major misconduct require retraction of an article. Occasionally a retraction can be used to correct errors in submission or publication. The main reason for withdrawal or retraction is to correct the mistake while preserving the integrity of science; it is not to punish the author.

Standards for dealing with retractions have been developed by a number of library and scholarly bodies, and this practice has been adopted for article retraction by Starinar: in the electronic version of the retraction note, a link is made to the original article. In the electronic version of the original article, a link is made to the retraction note where it is clearly stated that the article has been retracted. The original article is retained unchanged, save for a watermark on the PDF indicating on each page that it is "retracted."

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By applying the new rules (Acta) for publishing activities issued by the Institute of Archaeology, Belgrade and in accordance with the editorial policy of the Starinar journal, the editorial board of the Starinar journal have decided to improve its quality and, thus, contribute to its full integration into the international system of exchanging scientific information.

The Starinar journal is dedicated to topics from the scientific areas of archaeology, history, history of arts, architecture and similar scientific disciplines.

The Starinar journal publishes original papers that have not been previously published: original scientific articles, excavation reports, scientific reviews, book reviews, critiques, bibliographies and necrologies.

Articles can be submitted in English, German or French. If the paper is written in English, the summary can be written in Serbian (for authors from Serbia) or English (for foreign authors), while articles submitted in German or French need to have the summary in English.

Articles submitted to the Starinar editorial board must contain customary data. Each article should therefore include: title; author's forename and surname; affiliation; abstract; key words; main text; summary; graphic images with list of captions; bibliography; contact details.

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1. The title should be short and clear, reflecting as much as possible the content of the article. The title should include words which are easy to index and search for. If there are no such words integrated into the title, it is preferable to have an added subtitle. The title should appear in either the fifth or sixth row under the upper margin, in bold, with a font size of 14 pts.

2. The author or authors should include their full names.

3. The author or authors should write the official name and address of the institution they represent, together with, where applicable, the official name and address of the location where they performed their research. With complex institutions, all names should be included (e.g. University of Belgrade, Philosophical Faculty, Department of Archaeology, Belgrade).

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5. The key words should include words or phrases that effectively describe the content of the article, and which are easy to index and search for. They should be selected according to an internationally recognised source (index, vocabulary, and thesaurus), such as the list of key words Web of Science. The number of key words should not exceed ten.

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Footnotes can be included in the main paper. They should contain less important data, required explanations and cited literature. (A separate chapter of the Submission Instructions details the required method for quoting that is to be applied when writing a paper).

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Quotation within a footnote: (Поповић 1994, 65)

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1**. How to quote an author's books:**

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In a footnote: (Popović 2006, 21)

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b. Two authors

In a footnote: (Vasić, Milošević 2000, 125)

In the list of references: **Vasić, Milošević 2000** – M. Vasić, G. Milošević. 2000. *Mansio Idimvm rimska poštanska i putna stanica kod Medveđe*, Beograd, 2000.

c. Three or more authors

In a footnote: (Petković et al. 2005, 129–131)

In the list of references: **Petković et al. 2005** – S. Petković, M. Ružić, S. Jovanović, M. Vuksan, & Z. K. Zoffmann. 2005. *Roman and Medieval Necropolis in Ravna near Knjaževac*. Belgrade, 2005.

2**. Quotation of papers in serial publication, collection of papers:**

In a footnote: (Popović 2014, 261)

In the list of references: **Popović 2014** – I. Popović, The Motif of Christogram on the Architectural Elements of the Imperial Palace in Sirmium, in: *The Edict of Serdica (AD 311). Concepts and Realizations of the Idea of Religious Toleration*, (ed.) V. Vachkova, D. Dimitrov, Sofia 2014, 261–276.

3. **How to quote prepared editions (editor, translator or preparator instead of author):**

In a footnote: (Поповић 1994, 65)

In the list of references: **Поповић 1994** – И. Поповић, (прир.), *Античко сребро у Србији*, Београд 1994. (I. Popović, (prir.), *Antičko srebro u Srbiji*, Beograd, 1994.)

4. **How to quote books without indicated author:**

In a footnote: (*Гамзиград. Касноантички царски дворац* 1983, 43)

In the list of references: ***Гамзиград. Касноантички царски дворац* 1983** – *Гамзиград. Касноантички царски дворац*, Београд 1983. (*Gamzigrad. Kasnoantički dvorac*, Beograd, 1983.)

5. Quoting several books of the same author:

a. written in different alphabets

In a footnote: (Поповић 2002, 23–26; Popović 2006, 33)

In the list of references:

Поповић 2002 – И. Поповић, *Накит са Јухора, остава или сакрални тезаурус*, Београд 2002. (I. Popović, *Nakit sa Juhora, ostava ili sakralni tezaurus*, Beograd, 2002.)

Popović 2006 – I. Popović, *Roma Aeterna inter Savum et Danubium.* Belgrade, 2006.

b. written in the same year

In a footnote: (Dawkins 1996a; 1996b)

In the list of references:

Dawkins 1996a – R. Dawkins, *Climbing Mount Improbable*, London, 1996.

Dawkins 1996b – R. Dawkins, *River out of Eden*, London, 1996.

6**. Quoting chapters or parts of books:**

In a footnote: (Кондић 1994, 66)

In the list of references: **Кондић 1994** – Ј. Кондић, Рановизантијско сребро, у: *Античко сребро у Србији*, И. Поповић, (ур.), Београд 1994, 65–67. (J. Kondić, Ranovizantijsko srebro, u: *Antičko srebro u Srbiji*, I. Popović, (ur.), Beograd 1994, 65–67.)

7. **Quoting chapters or parts of previously published books (as an original source):**

In a footnote: (Cicero 1986, 35)

In the list of references: **Cicero 1986** – Cicero Quintus Tullius, Handbook on canvassing for the consulship, in: *Rome: Late republic and principate*, W. E. Kaegi, P. White (eds.), vol. 2, Chicago, 1986, 33–46. Originally published in: E. Shuckburgh (trans.) *The letters of Cicero*, vol. 1, London, 1908.

8. **Quoting books which have been published on-line:**

In a footnote: (Kurland, Lerner 1987)

In the list of references: **Kurland, Lerner 1987** – Ph. B. Kurland, R. Lerner, (eds.) *The founders' Constitution*. Chicago 1987. //press-pubs.uchicago.edu/founders/, accessed (date of visit to the page)

ARTICLES FROM PRINTED PERIODICALS OR PERIODICALS PUBLISHED ON-LINE

9**. Quoting an article from a printed periodical:**

In a footnote: (Vasić 2004, 91, fig. 17)

In the list of references: **Vasić 2004** – M. Vasić, Bronze railing from Mediana. *Starinar* LIII–LIV 2004, 79–109.

10**. Quoting an article from a periodical published on-line:**

In a footnote: (Van Eijck 2009, 41)

In the list of references: **Van Eijck 2009** – D. Van Eijck, Learning from simpler times, *Risk Managemen*t, vol. 56, no 1, 2009, 40–44. http://proquest.umi.com/, accessed (date of visit to the page)

DOCTORAL AND MASTER THESES

11. **Quoting doctoral or master theses:**

In a footnote: (Ilić 2005, 25–32)

In the list of references: **Ilić 2005** – O. Ilić, *Ranohrišćanski pokretni nalazi na području dijeceze Dakije od IV do početka VII veka.* Unpublished MA thesis, University of Belgrade, 2005.

LECTURES FROM SCIENTIFIC GATHERINGS

12. **Quoting a published lecture or communication presented at a scientific gathering:**

In a footnote: (Vasić 2008, 69, fig. 3)

In the list of references: **Vasić 2008** – M. Vasić, Stibadium in Romuliana and Mediana. *Felix Romvliana 50 years of archaeological excavations*, M. Vasić (ed.), (Papers from the International Conference, October, 27–29 2003, Zaječar, Serbia), Belgrade–Zaječar 2006, 69–75.

13. **Quoting an unpublished lecture or communication presented at a scientific gathering:**

In a footnote: (Gavrilović 2004)

In the list of references: **Gavrilović 2004** – N. Gavrilović, *Interpretatio Romana* of Oriental Cults in Upper Moesia from I to IV century A.D. Paper presented at the 10th Annual meeting of the European Association of Archaeologists, September 7–12, 2004 in Lyon, France.

POPULAR MAGAZINES (PERIODICALS) AND NEWSPAPER ARTICLES

14. **Quoting an article from a popular magazine:**

In a footnote: (Јањић 2007, 32–33)

In the list of references: **Јањић 2000** – Ј. Јањић, Прво хришћанско знамење, *НИН*, јул 2007. (J. Janjić, Prvo hriščansko znamenje, *NIN*, jul 2007.)

15. **Quoting an article from a newspaper:**

In a footnote: (Марковић-Штрбац 1999)

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