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фото: М. Ерич; цртеж саркофага: Iványi 1877, pl. 1

Sur la couverture: Le sarcophage provenant de Titel (Musée de Banat, Temisoara)
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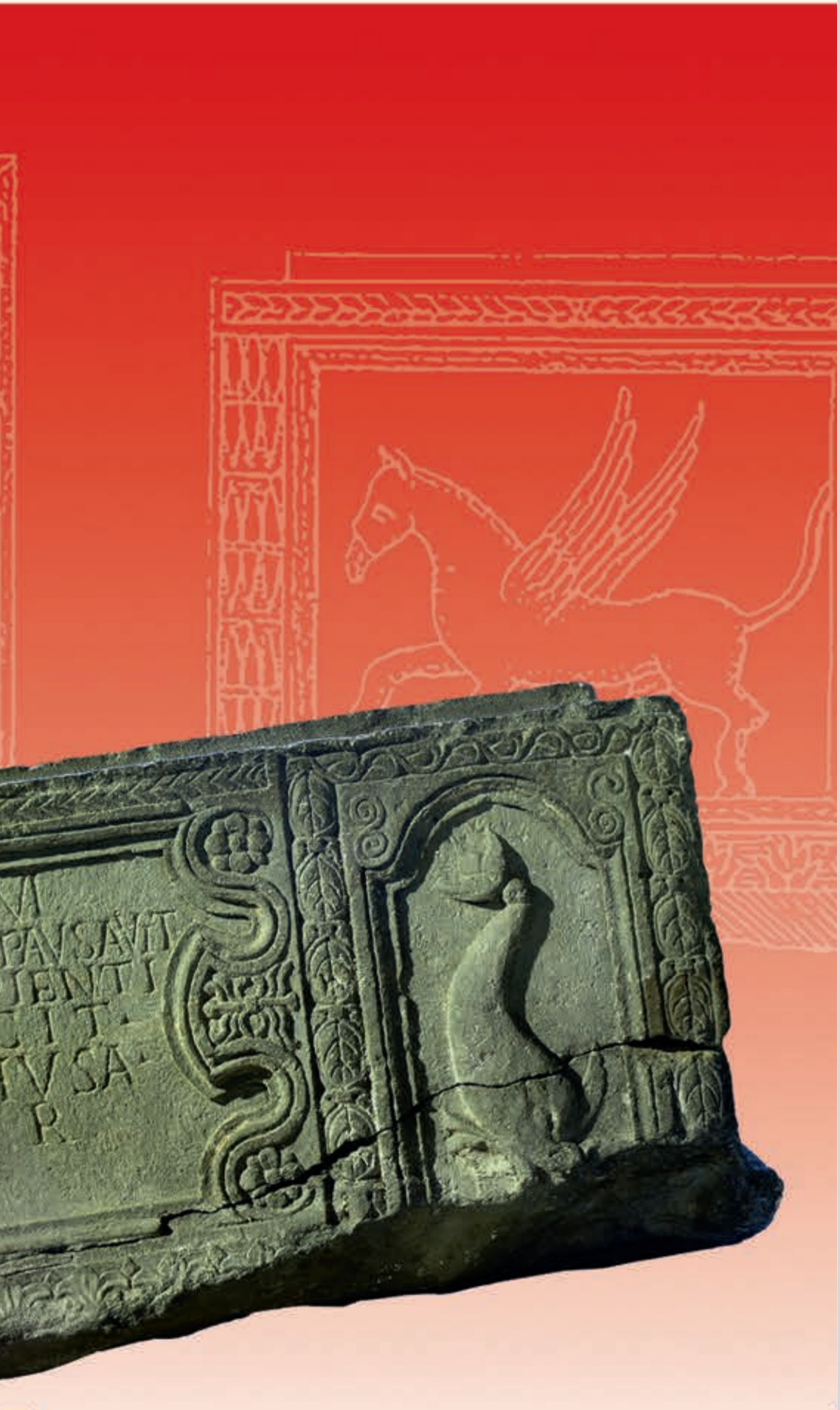

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SOME REMARKS ON THE GENESIS OF THE EARLY ENEOLITHIC IN THE CENTRAL BALKANS

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Abstract. – The study addresses an imprecisely defined period between the end of the Neolithic and the beginning of the Eneolithic in the Central Balkans. The study primarily refers to the characteristic ceramic forms common to both the Vinča culture and the Early Eneolithic groups, especially the Bubanj–Hum I group. The pottery under consideration originates exclusively from absolutely dated sites, single-layered sites, and sites that possess a well-defined vertical stratigraphy. The analyses of pottery, combined with brief reviews on economic strategies, the chipped stone industry, settlement topography and the process of metallurgy indicate that the transitional period from the Vinča culture to the Bubanj-Hum I group was a gradual process in the Central Balkans, without major external factors, yet continuous cultural contacts with the neighbouring communities, especially into the east. This gradual process of vertical genetic transmission between the 47th and the 45th century calBC resulted in the formation of the Bubanj–Hum I group.

Key words. – Central Balkans, Late Vinča culture, Early Eneolithic, Bubanj–Hum I group, characteristic ceramic elements, absolute dates

Each transition, whether it concerns an individual or community is difficult, not only for the turbulent process of the transition itself but also for the effects that such a transition implies. The social changes are complex processes of shifts in the social structure of a community and, therefore, have short and long term effects on each individual, as well as on the entire society. The short term effects caused by such changes are usually distinguishable, while, on the other hand, the long term effects are more difficult to notice, yet cause lasting and intensive changes in the social structure of a community. Certainly, the intensity and character of the effects caused by changes are dependent on the conditions in which they took place.

One such tradition occurred during the 5th millennium BC, when a vast prehistoric "proto-civilization", the Vinča culture, ceded its centuries-old place on the historic stage of the Balkans to the Copper Age communities. Those communities were interpreted by several authors as intruders with different degrees of social awareness, originating from foreign territories.[1] However, the question remains; was that the case?

The zenith of that transition, meaning the end of the second and the beginning of the third quarter of the 5th millennium BC is one of the least addressed prehistoric periods in the Central Balkans. The period in question remains under-researched in almost all of its aspects: the material culture, which was usually primarily defined, the spiritual culture, economy, settlement topography, architecture, and other aspects of everyday life, as well as chronological frameworks. Recently, however, based on new data, the absolute dates, and research into metallurgy, papers regarding the subject have been published, actualizing this problem once again.

[1] Garašanin 1979, 204–205; Tasić 1995, 28–29; Срејовић 1998, 223–224.

Manuscript received 14th May 2020, accepted 13th October 2020

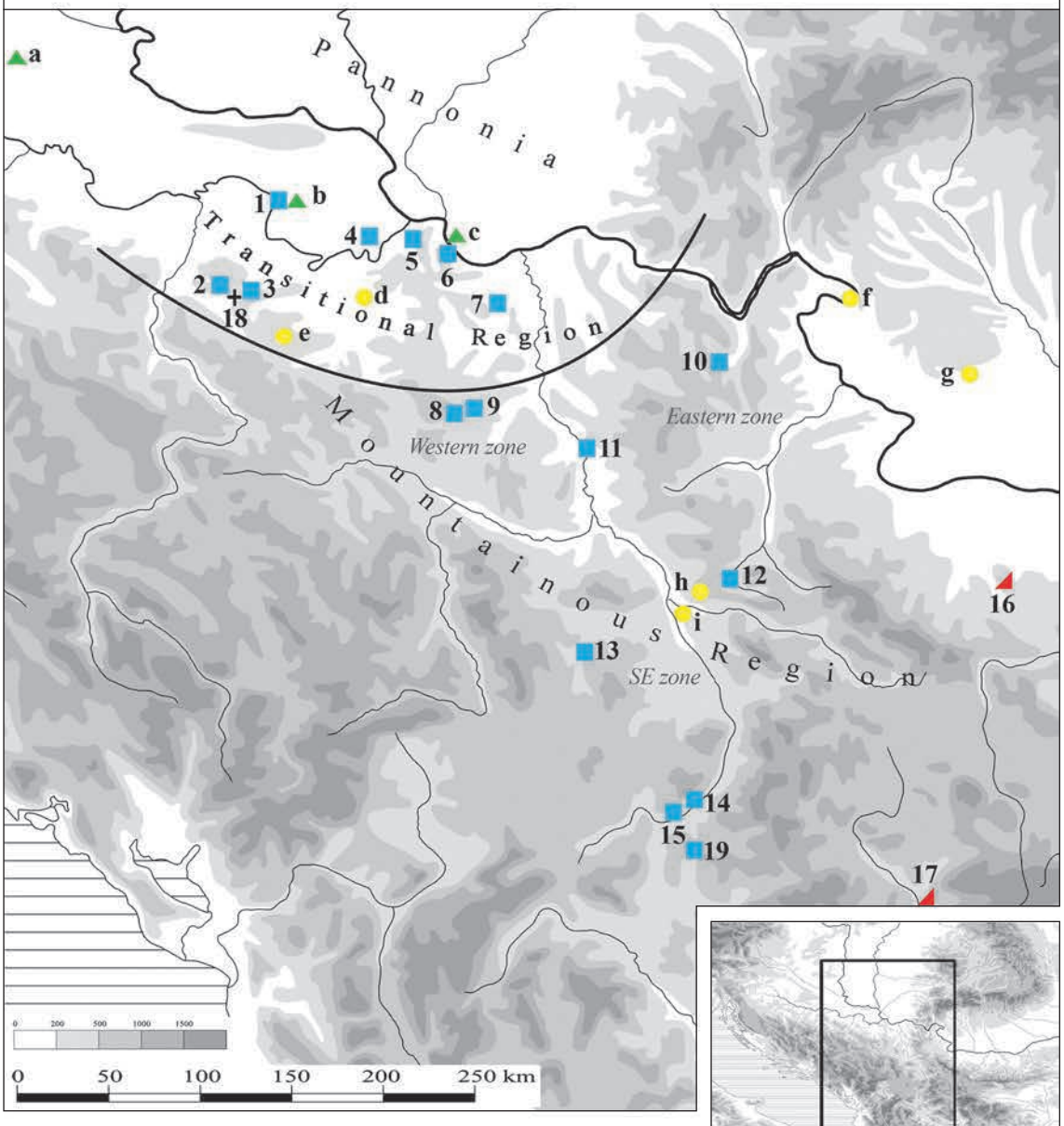
SITES/ НАЛАЗИШТА

Late Neolithic – Transitional Phase/Касни еолит – Прелазна фаза:

1. Gomolava
2. Spasovine
3. Rumska
4. Kormadin
5. Banjica
6. Vinča
7. Selevac
8. Grivac
9. Divostin
10. Rudna Glava
11. Supska
12. Niševac
13. Pločnik
14. Donje Vranje
15. Gumnište
16. Gradeshnica
17. Slatino
18. Srebrne Rupe
19. Prohor Pčinjski

Early Eneolithic / Рани енеолит:

a. Jurjevac
b. Gomolava
c. Vinča
d. Livade
e. Bodnjik
f. Ostrovul Corbului
g. Salcuța
h. Velika Humska Čuka
i. Bubanj



Vinča culture sites
Bubanj–Hum I group (BSK) sites
Panonian groups Early Eneolithic sites
Srebrne Rupe
Gradeshnica–Slatino–Dikili Tash II sites

Fig. 1. Sites mentioned in this study (background of the map is provided courtesy of M. Milinković)

Сл. 1. Налазишта поменута у тексту (на позадини мапе захваљујемо М. Милинковићу)

The study of Neolithic cultures of the Central Balkans has always been the focus of archaeologists, as the research regarding the Vinča culture started quite early, at the beginning of the 20th century, and with almost the same intensity continues even today.[2] The phenomenon of Vinča culture has intrigued and still intrigues both domestic and foreign archaeologists, which has proved valuable for the international renown of the Vinča culture and its continued scientific popularity.[3]

The long term research of the culture has defined its chronological framework and the characteristics of its material and spiritual culture.[4] Still, its cultural and chronological relationships with the preceding Starčevo culture and the following Early Eneolithic cultural groups remain unclear. This especially refers to the reasons behind the gradual disappearance of the Vinča culture, a problem addressed in particular by numerous domestic and foreign professionals.[5] There are several different opinions regarding the disintegration of the Vinča culture. M. Garašanin considers that the development of the Vinča culture was interrupted by the communities identified as the bearers of the Bubanj–Hum group, who penetrated the southern Morava Region. The same author highlights the penetration of Bubanj–Salcuţa–Krivodol (BSK) elements from Oltenia.[6] A similar opinion is shared by N. Tasić and D. Srejović, who connect such population shifts with Indo-European migration.[7] R. Tringham considers profound social changes within the Vinča community as the key reasons for the disintegration of the culture. Namely, due to the low level of staple resources, communities were unable to function within the vast social network that Vinča settlements represented. That led to the fractionation of large settlements and the dispersal of small groups of individuals that formed new settlements and settlement networks.[8]

Chapman shares this opinion and highlights the decrease of soil fertility and deforestation as key factors which led to the unsustainability of the ever-growing population.[9]

The main focus of this paper will not be on the development and disintegration of the Vinča culture, which has been thoroughly discussed,[10] but the character of relationships between the late Vinča culture and Early Eneolithic groups that took its place in the Central Balkans, as well as the process of formation of those groups. Research of Early Eneolithic sites has recently yielded new results that deserve a thorough archaeological interpretation. The analysis primarily refers to the characteristic ceramic forms common to both the Vinča culture and Early Eneolithic groups, and especially the Bubanj–Hum I group. The study exclusively addresses pottery from dated sites, except for single-layered sites and sites that possess a well defined vertical stratigraphy. The pottery in question is represented by plates with a thickened inner side of the rim, carinated bowls, slightly biconical bowls, bowls with an inverted rim, beakers with two handles (*kantharoi*), etc. Besides the characteristic stylistic and typological elements of the material culture, the paper will also address the settlement topography and the economy of those communities, as well as other relevant aspects of life in this turbulent period. Due to the specific geographic characteristics of the Central Balkans and in order to make the following of the paper easier, the territory of the Central Balkans has been interpreted through two separate geographic regions – the Transitional Region and the Mountainous Region. Unfortunately, the study does not include the sites from the Morava Region (Supska, Drenovac, Motel Slatina, etc.), which was one of the most densely inhabited regions at the time, since, despite the intensive research conducted in past years, there are no absolute dates for those sites.

The Transitional Region

This region encompasses the territory between the Drina River to the west, the Sava and Danube rivers to the north, the mountain massif comprised of the Gučevo, Sokolske, Povlen, Maljen, Suvobor and Rudnik mountains to the south and the Homolje mountains to the east. In geographic terms, aside from the parts of the Sava and Drina valleys, this region is comprised of the valleys of the Jadar, Kolubara, and Tamnava rivers and the lower course of the Velika (Great) Morava River, Mt Cer, and the mountainous area to the south and the east, which is bordered by the mentioned

[2] Vasić 1902; Fewkes 1936; Holste 1939; Milojčić 1950 and other.

[3] Tringham 1992; Schier 1996; Chapman 1981; Borić 2009 and other.

[4] Garašanin 1979; Borić 2015; Tasić *et al*. 2015 and other.

[5] Гарашанин 1973; Tasić 1995; Bankoff, Winter 1990.

[6] Garašanin 1979, 204–205. Hereinafter BSK.

[7] Tasić 1995, 11; Srejović 1987, 45–49.

[8] Tringham 1992, 137–138.

[9] Chapman 1981.

[10] Borić 2015, 158–162 with cited literature.

mountains. The region is suitable for agriculture, with composite river valleys comprised of alluvium dominated areas and highly fertile chernozem.

Since there is abundant data from the Neolithic sites in the eastern part of this region (the sites of Vinča and Banjica), the focus will be directed towards its western parts – the Mačva and Jadar regions.

According to the earlier researchers who addressed the Late Neolithic of the Central Balkans, this region falls within the domain of the Vinča culture,[11] although it is the opinion of some authors that other elements are represented, such as the Butmir and Tisza culture elements.[12] The research of Neolithic cultures in the regions of Mačva and Jadar, besides the site of Gomolava,[13] was intensively conducted by M. Vasiljević and V. Trbuhović,[14] who coined the term "Benska Bara III phase" for the Late Neolithic in this region. In the latest monograph that deals with the prehistory of the Šabac region, the phase is completely omitted, [15] while Bulatović, Filipović, and Gligorić[16] highlight it to a certain degree, considering that the authors have properly argued the separation of such a phase of the Late Neolithic and the Early Eneolithic, although they did not define it through all of the aspects.

According to Trbuhović and Vasiljević, the Benska Bara III phase is defined based on the stratigraphy of the multilayered settlement at the site of Jela–Benska Bara, in the present-day city of Šabac. The settlement, excavated during the '60s and '70s, was located on a slight elevation, surrounded by water, in the marshy terrain within the former centre of the city of Šabac.[17] In the course of the excavations, a total of three phases of the Neolithic were separated, of which the youngest was marked as the Benska Bara III phase. Unfortunately, the authors do not highlight the stylistic and typological characteristics of pottery attributed to that phase, save for the appearance of pseudo-barbotine wares (the site of Kik in Svileuva).[18] Based on the characteristic pottery recorded at the sites attributed to the Benska Bara III phase, which is presented in monographs on prehistory in Šabac and Loznica, the main stylistic and typological characteristics of pottery from this phase were established. Those are primarily slightly biconical bowls, bowls with an inverted rim, which are sometimes on a hollow conical foot, with modelled tongue-shaped or circular handles, conical plates, occasionally with a thickened inner side of the rim, shallow bowls with a thickened belly and funnelled neck, deep carinated bowls, globular vessels with a short cylindrical neck and narrow mouth, beakers with two handles in line with the rim, high narrow vessels (amphorae) with arched, button-shaped or wart-like handles, *pyraunos* pots, etc.[19]

The phase was incorporated into the Vinča culture by Trbuhović and Vasiljević, with one of the characteristics being the copper axe-adze,[20] which would in fact position the phase into a later period, the Early Eneolithic.[21] On the other hand, the authors attribute the site of Bodnjik in Družetić to the same phase,[22] which, based on absolute dates, falls within the Early Eneolithic.[23] Such a different chronological and cultural perception of the Benska Bara III phase indicates that the authors have separated it rationally, yet did not completely define it.

In the course of the recent archaeological excavations at the site of Spasovine in the village of Milina (Fig. 1/2), located on a hill above the right bank of the Milina River, not far from its estuary with the Lešnica River, two enclosed archaeological features were recorded – a shallow circular feature in Trench 1, filled with daub, and a portion (approximately a quarter) of an oval feature in Trench 2, filled with daub, soot, and portable archaeological material.[24] Judging by the thick layer of burnt shaped daub in the lower portion and the layer of ashy soil mixed with soot in the upper portion, the feature in Trench 2 could represent a semi-sunken dwelling with the above-ground portion built using the wattle and daub technique (Fig. 2). The feature contained several typical and numerous atypical potsherds and chipped stone tools. The ceramic forms are represented by slightly biconical bowls with an inver-

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[11] Garašanin 1979, 146 with cited literature.

[12] Стојић, Церовић 2011, 23–34

[13] Brukner 1988.

[14] Трбуховић, Васиљевић 1983, 27.

[15] Стојић, Церовић 2011.

[16] Bulatović *et al*. 2017, 43–47.

[17] Трбуховић, Васиљевић 1983, 26.

[18] Трбуховић, Васиљевић 1983, 73.

[19] Стојић, Церовић 2011 (the sites of Rumska, Janjići, Ševar, Provo, Nakučani, Desić, Riđake, etc.); Bulatović *et al.* 2017 (the sites of Jerinin Grad, Bojića Ada, Lipovica, etc.).

[20] Трбуховић, Васиљевић 1983, 85–86.

[21] Compare Antonović 2014, Taf. 60; Bulatović *et al*. 2017, 42–47.

[22] Трбуховић, Васиљевић 1983, 74.

[23] Палавестра *et al.* 1993; Živanović 2013, 54.

[24] The excavations were conducted in 2018 as a part of the Jadar Project, realised by the Institute of Archaeology, in Belgrade and Brooklyn College, in New York (Mladenović *et al*. 2020).

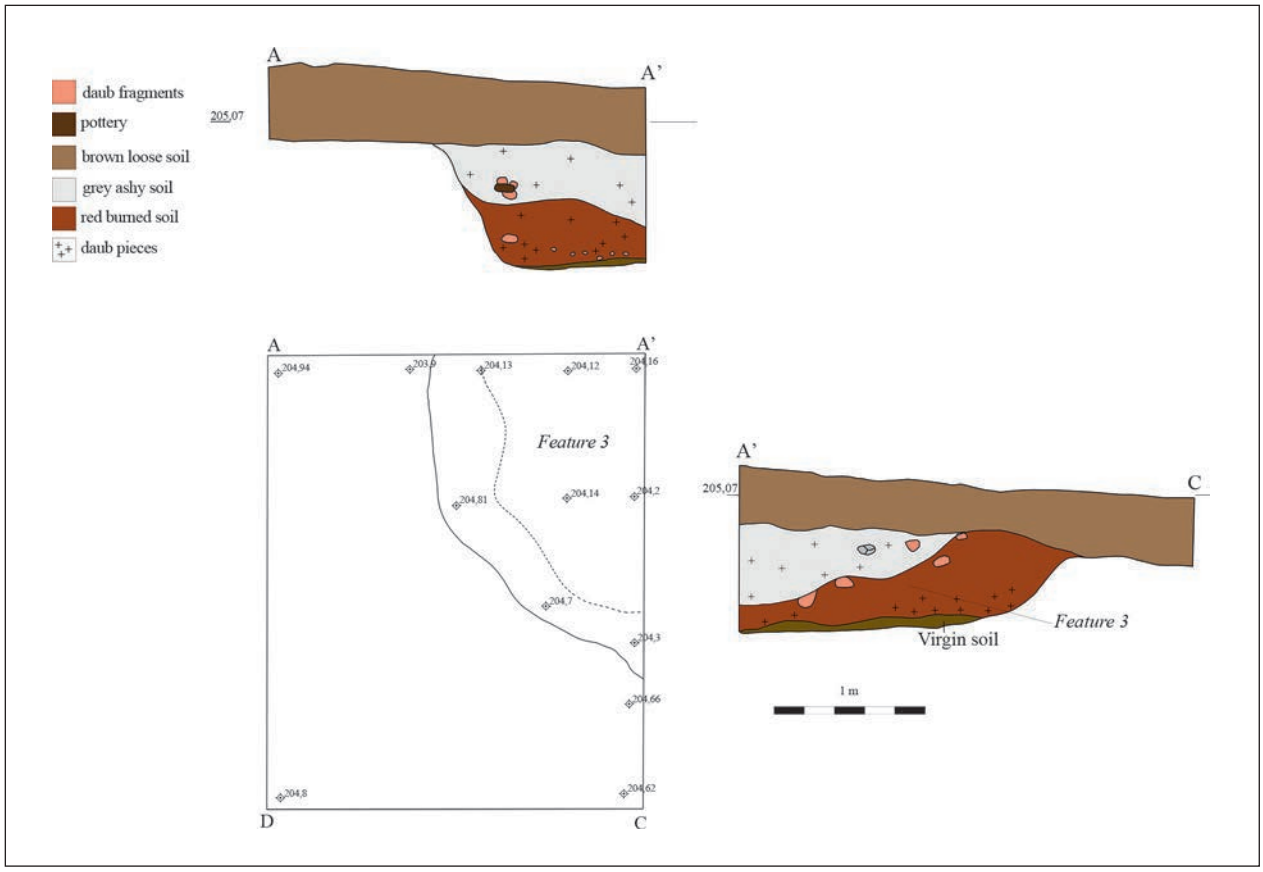

Fig. 2. Milina, the site of Spasovine, ground plan and cross-sections of Feature 3 in Trench 2

Сл. 2. Милина, налазиште Спасовине, основа и пресеци објекта 3 у сонди 2

ted rim, often with modelled tongue-shaped handles on the shoulder (Fig. 3/1, 2), globular vessels with a narrow mouth (Fig. 3/4, 5), vessels (bowls) with a funnelled neck (Fig. 3/3), vessels on a foot (Fig. 3/7) and short arched horizontally perforated handles (Fig. 3/6). The layer surrounding the feature yielded fragments of a beaker with a handle in line with the rim (Fig. 3/12), bowls identical to the examples from the feature (Fig. 3/8, 9), a globular vessel with a short cylindrical neck (Fig. 3/10, 11), and a large barrel-shaped and slightly biconical vessel with modelled application on the belly (Fig. 3/13). The ornamentation is represented by modelled applications and shallow vertical parallel incised lines (Fig. 3/13–15). The potsherds from the feature in Trench 1 correspond to the stylistic and typological characteristics of pottery from Trench 2, with the occurrence of bowls with an inverted rim, which are numerous, and plates with a semi-circularly thickened inner side of the rim (Fig. 3/16, 17).

A sample of soot from the feature in Trench 2 dated the feature into the period between the 46th and the 45th-century calBC (Fig. 8/11).[25] This also dates the archaeological material from the layer, and most likely from Trench 1, since this part of the site is single-layered.

Identical ceramic forms are recorded on the sites in the nearby territory of Mačva, especially at those sites which Trbuhović and Vasiljević attributed to the Benska Bara III phase (the sites of Rumska, Janjići, Ševar, Provo, Nakučani, Desić, Riđake, etc.),[26] but

[25] The analysis was conducted by the University of Arizona AMS Laboratory (Lab. nr. AA 113502), with the result 5706±25 BP, which is calibrated to 4611–4461 calBC (95% probability).

[26] Трбуховић, Васиљевић 1983, 46/15, 56/103, 63/159, 70/11, 71/15, 73/21. Compared the illustrations from these sites from: Стојић, Церовић 2011 and Bulatović *et al*. 2017.

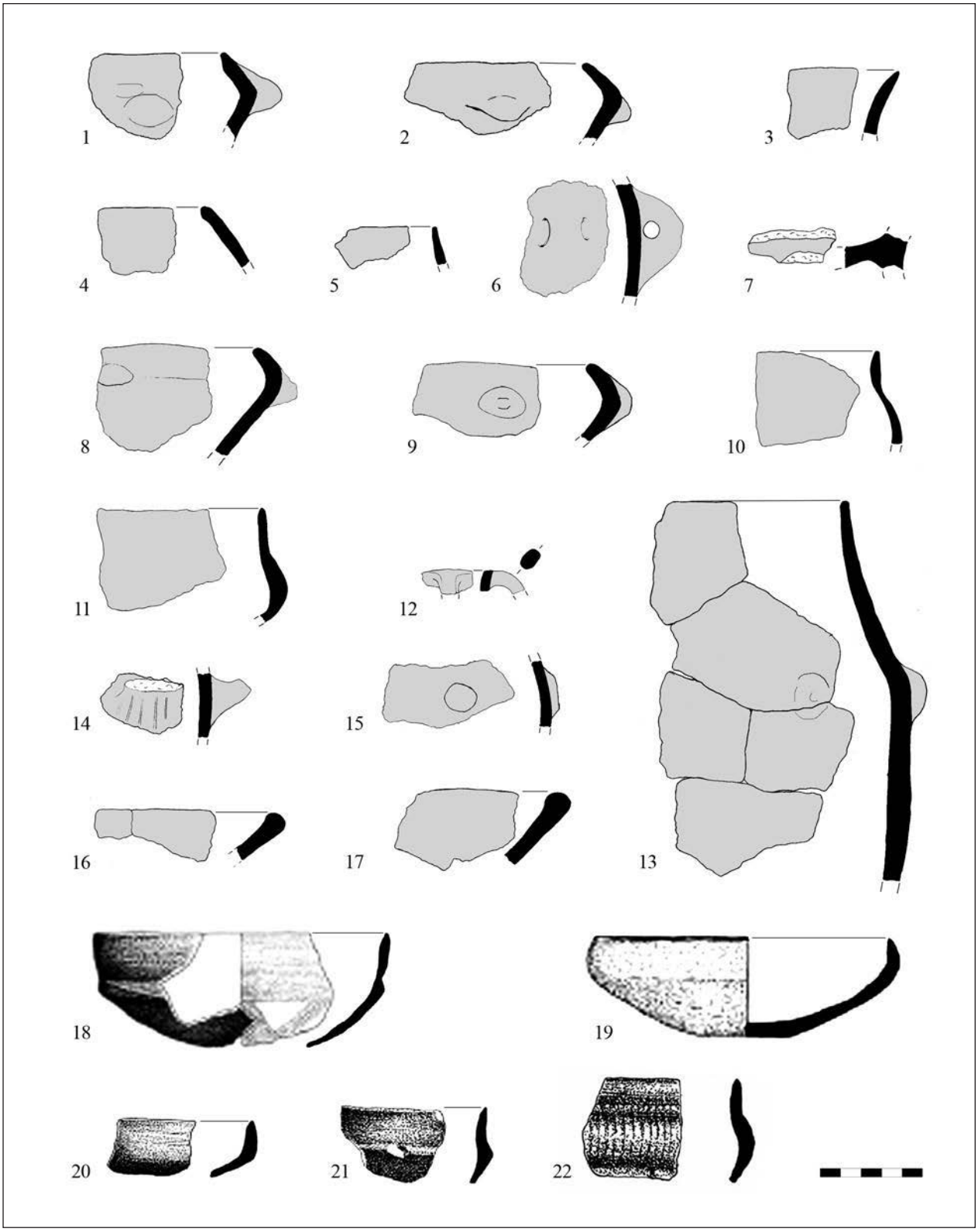

Fig. 3. Spasovine: 1–7) Feature 3 in Trench 2; 8–13) Layer around the feature; 14–17) Feature in Trench 1. Vinča: 18–22) The youngest Neolithic horizon (Tasić et al. 2015)

Сл. 3. Спасовине: 1–7) објекат 3 у сонди 2; 8–13) слој око објекта; 14–17) објекат у сонди 1. Винча: 18–22) најмлађи неолитски хоризонт (Tasić et al. 2015)

also at sites within the Loznica Region, such as Jerinin Grad, Bojića Ada, and Lipovica.[27] Such forms have also been recorded in the surroundings, within the youngest Vinča layer at the site of Gomolava,[28] at the site of Mali Borak,[29] and the sites within the Morava and Šumadija regions (Supska, layers 3–1; Divostin IIb; Grivac, horizon VI)[30] and the Danube Region (the youngest burnt Neolithic layer at the site of Vinča).[31] Interestingly, a copper axe of the *Jászladány* type was recorded at the nearby site of Crkvine in Rumska (Fig. 1/3),[32] and the pottery from the site bears similar stylistic and typological characteristics as that from the site of Spasovine (Fig. 4/1–9).

Some of the highlighted stylistic and typological elements of the final phase of the Late Neolithic are recorded within the Early Eneolithic groups in the region and, therefore, the differentiation between the Late Vinča and the Early Eneolithic sites can sometimes be marked solely by the accompanying archaeological material, such as forms and ornaments which are characteristic exclusively for one of the periods. Bowls with an inverted rim are recorded in both periods, as well as small vessels (beakers) with handles (or handle) in line with the rim or directly below the rim. It is exactly those ceramic forms within the feature and the cultural layer that are dated to the 46th century calBC at the site of Spasovine, to the 46th–45th century calBC at the site of Gomolava, to a period between the 48th and the 46th-century calBC at the site of Divostin (IIb)[33] and between the 45th and the 44th century calBC at the site of Bodnjik (Fig. 8/16, 17).[34] Almost identical forms from the sites of Velika Humska Čuka and Bubanj are dated to the period between the 45th/44th and the 43rd century calBC (Fig. 8/18).[35] According to the current chronology of the Neolithic and the Eneolithic in Serbia, the mentioned dates fall between the final phase of the Late Neolithic, the Vinča culture (Vinča D), and the developed phases of the Early Eneolithic.

It is important to highlight that three copper axes, two of the *Jászladány* type and one of the Kladari type were recorded at the site of Staro Selo–Detinji Potok (the name varies in publications) in the region of Milina.[36] Unfortunately, the site was never precisely located, and its spatial relationship with the site of Spasovine remains unknown.

In contrast to sites in the western part of the Transitional Region, the eponymous site of Belo Brdo in Vinča (Fig. 1/6) is one of the best researched and most scientifically renowned Neolithic sites in the Balkans. For this study, the importance lies in the youngest Neolithic phase at the site, which, according to a series of new absolute dates, ends during the mid-46th century calBC,[37] which approximately corresponds to the settlement at the site of Spasovine. During this phase of the Neolithic at the site of Vinča, carinated bowls from the earlier phase are represented (Fig. 3/18, 21, 22), with the appearance of slightly biconical bowls (Fig. 3/19, 20), which is also the case in other regions of the Central Balkans during the later phase of the culture. This form is one of the most common forms within the Early Eneolithic cultural groups in the Central Balkans, especially the variant with a short upper cone (the so-called bowls with an inverted rim).

A total of five housing layers were recorded at the site of Banjica in Belgrade (Fig. 1/5), of which the two youngest layers (layers I and II) have not been preserved to a great degree.[38] The slightly biconical bowls and bowls with an inverted rim appear within horizon III, which is dated between the 44th and the 42nd century calBC.[39] Such an early date most likely represents contamination from the upper layers. However, the site of Banjica yielded two absolute dates which could, according to the vertical stratigraphy of the site and the stylistic and typological characteristics of the pottery from features of horizon III, correspond to that horizon. Those absolute dates position horizon III between the 47th and the 45th century calBC (Fig. 8/10),[40] a period corresponding to the settlements at the sites of Spasovine, Divostin IIb, Gomolava II, and the final Neolithic settlement at the site of Vinča.[41]

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[27] Bulatović *et al.* 2017, T. XXXII–XXXIII, XLIX–LI, LXIII.

[28] Brukner 1988, Taf. 4/1–4.

[29] Спасић 2011, T. III–V, VII, XIX/4, XXI/5, 8, 9, XXVI/1–3, 8.

[30] (Гарашанин М., Гарашанин Д. 1979, T. I/1, 7, II/1, III/1–4, VI/1–4; Madas 1988, figs. 6.2–6.4, 6.6–6.7 and other; Nikolić 2008, fig. 9.70, 9.71)

[31] Tasić *et al*. 2015, Fig. 6; Borić 2015, Fig. 5.

[32] Atonović 2014, 74.

[33] Madas 1988, fig. 6.21; Borić 2009, tab. 4.

[34] Живановић 2013, 54, fig. 2.

[35] Bulatović, Vander Linden 2017; Bulatović *et al.* 2018.

[36] Antonović 2014, 66–82; Bulatović *et al.* 2017, 46–47.

[37] Tasić *et al.* 2015, 1077; Whittle *et al.* 2016, 19.

[38] Трипковић 2007, 45–46.

[39] Трипковић 2007, 46.

[40] Borić 2009, Appendix 1with cited literature.

[41] Madas 1988, fig. 6.21; Borić 2009, tab. 4; Tasić *et al.* 2015.

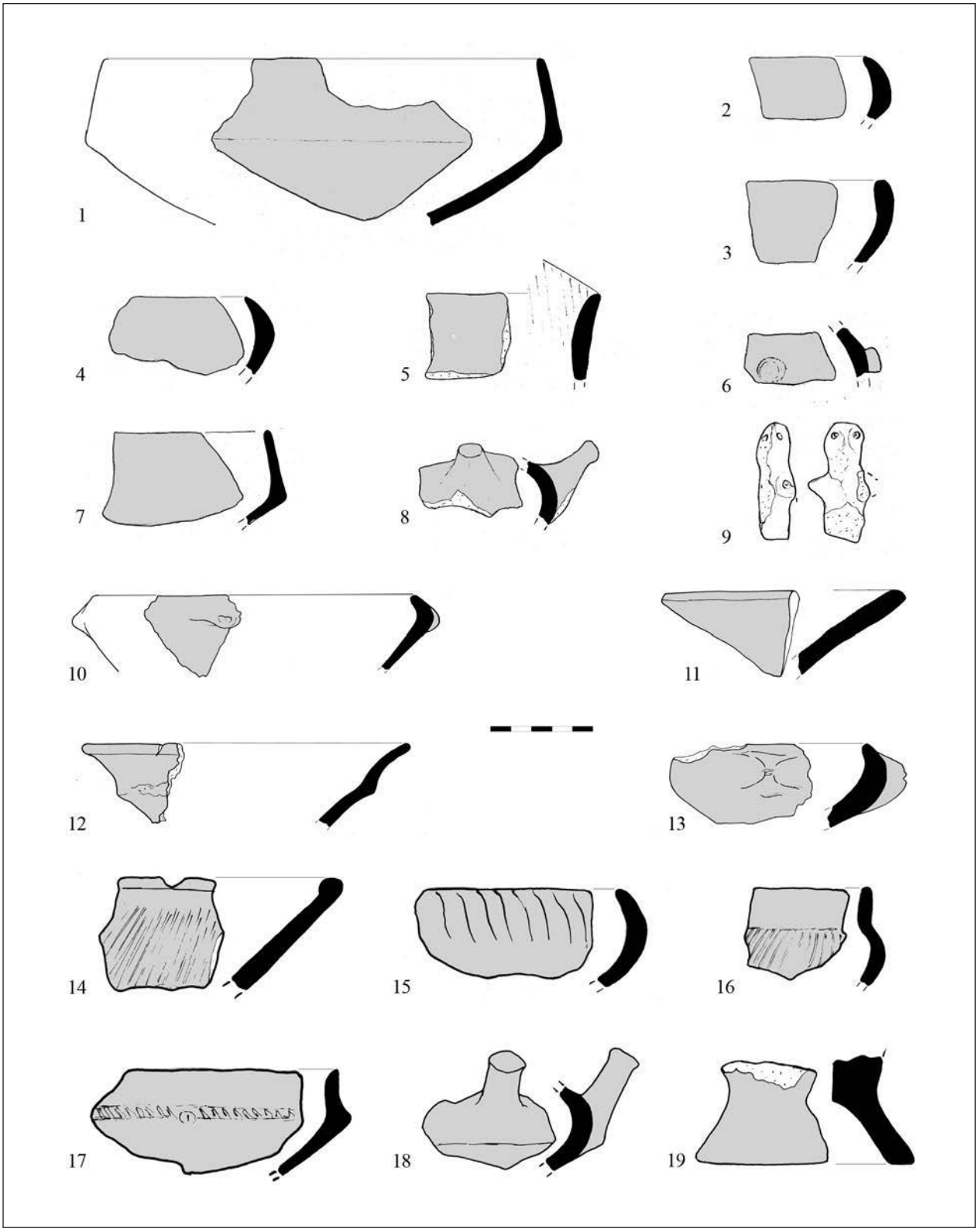

Fig. 4. 1–9) Rumska; 10–13) Gomolava (after Brukner 1988);
14–19) Grivac, horizon VI (after Bogdanović 2008)

Сл. 4. 1–9) Румска; 10–13) Гомолава (Brukner 1988);
14–19) Гривац, хоризонт VI (Bogdanović 2008)

At the site of Selevac near Smederevska Palanka, located within the central part of the so-called Transitional Region of the Central Balkans (Fig. 1/7), bowls with an inverted rim (occasionally with oblique channels) have been recorded mostly within the latest horizon IX, which is dated to the second quarter of the 5th millennium BC (5670±80 BP and 5750±80 BP, calibrated to 4618–4424 calBC and 4693–4515 calBC with a probability of 68%) (Fig. 8/12).[42] In terms of the ceramic elements characteristic of the Early Eneolithic in the region, vessels on a tall, hollow foot are registered from the earliest horizon II at Selevac, as well as bowls and plates with a thickened rim, which appear from horizon III, which is chronologically positioned into the final quarter of the 6th millennium calBC.[43]

The Mountainous Region

The Mountainous Region is comprised of mountainous areas of the Central Balkans, which are divided by large Velika Morava (Great Morava), Ibar, Zapadna Morava (West Morava), etc. and other smaller rivers. It can be further divided into eastern, western, and south-eastern zones. The eastern zone is comprised of volcanic Carpathian-Balkan mountains that represent one of the largest ore mineralisations in South-eastern Europe. The western zone is comprised of fold mountains rich in forests and tin and copper ores. The south-eastern zone is comprised of the Serbian-Macedonian mountain massif. Within the Mountainous Region, the soil is of the forest type and erosive, and soils suitable for agriculture are represented in a few basins and within the areas of milder slopes and lower altitudes.

A total of four absolute dates originate from the Neolithic layer at the well stratified Neolithic site of Grivac in the western zone of the Mountainous Region (Fig. 1/8). According to M. Bogdanović,[44] none of the dates originate from the youngest Neolithic horizon, horizon VI, which would be the most suitable for this study, since it hosts ceramic forms similar to those from the sites of Spasovine, Divostin IIb and Gomolava II and other sites of the Late Vinča culture (Fig. 4/14–19), and which continue into the Early Eneolithic. However, absolute dates from earlier periods allow for a presumption that horizon VI at the site of Grivac falls after the 48th/47th century calBC.[45] The date published in Srdoč *et al*.,[46] separately and significantly earlier than the monograph on the site of Grivac, is quite baffling.[47] The date allegedly originates from horizon V (Fig. 8/14) and yielded a value of 5600±140 BP, which is calibrated to 4557–4367 calBC with a probability of 68%.[48] However, the date and, especially, its upper border (the 46th/45th century calBC) would rather correspond to the youngest horizon VI, which is also indicated by the stylistic and typological characteristics of pottery from this horizon and the mentioned concurrent sites in the region. It is interesting that certain ceramic forms characteristic of the Early Eneolithic in the area, especially the Bubanj–Hum I group, such as plates with a thickened rim, appear in horizon V at the site of Grivac, which is dated to the end of the 6th and the first quarter of the 5th millennium calBC.

Approximately 10 km east of the site of Grivac, the site of Divostin (Fig. 1/9), within the housing horizon IIb,[49] dated to the second quarter of the 5th millennium calBC,[50] finds characteristic of the Early Eneolithic, such as bowls with an inverted rim, are complemented by a pear-shaped beaker with two handles (*kantharos* type), bowls with a short cylindrical neck and a rounded and thickened belly, often decorated with channels, and a hollow conical foot, and a large amphora with a narrow mouth (Fig. 5/1–9).[51] The shape of the figurine head from the site of Divostin IIb (Fig. 5/10) somewhat resembles a figurine head attributed to the Bubanj–Hum I group from the site of Velika Humska Čuka.[52]

A significant number of Early Eneolithic sites, all attributed to the Bubanj–Hum I group, have been recorded within the western and eastern zones of the Mountainous Region.[53] Numerous elements characteristic of that group, such as plates with a thickened rim, vessels on a hollow foot, slightly biconical bowls and bowls with an inverted rim (often decorated with

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[42] Tringham, Krstić 1990, 50. The calibration was conducted using the CalPal online calibration programme, http://www.calpal-online.de/, on 21.04.2020.

[43] Tringham, Krstić 1990, 50.

[44] Bogdanović 2008, 460.

[45] Bogdanović 2008, 457–459, Fig. 15.5.

[46] Srdoč *et al.* 1987, 140.

[47] Bogdanović 2008, 441–460.

[48] The calibration was conducted via CalPal online calibration programe, http://www.calpal-online.de/, on 20.04.2020.

[49] Madas 1988, 143.

[50] Borić 2009.

[51] Madas 1988, fig. 6.21/9.

[52] Bogdanović 1990, Abb. 7.

[53] Key-sites: Panjevački rit, Blagotin, Mokranjske stene, Ćetaće. The complete overview of the Bubanj–Hum I sites in the Central Balkans is presented in Kapuran *et al.* 2018, Fig. 7.3.

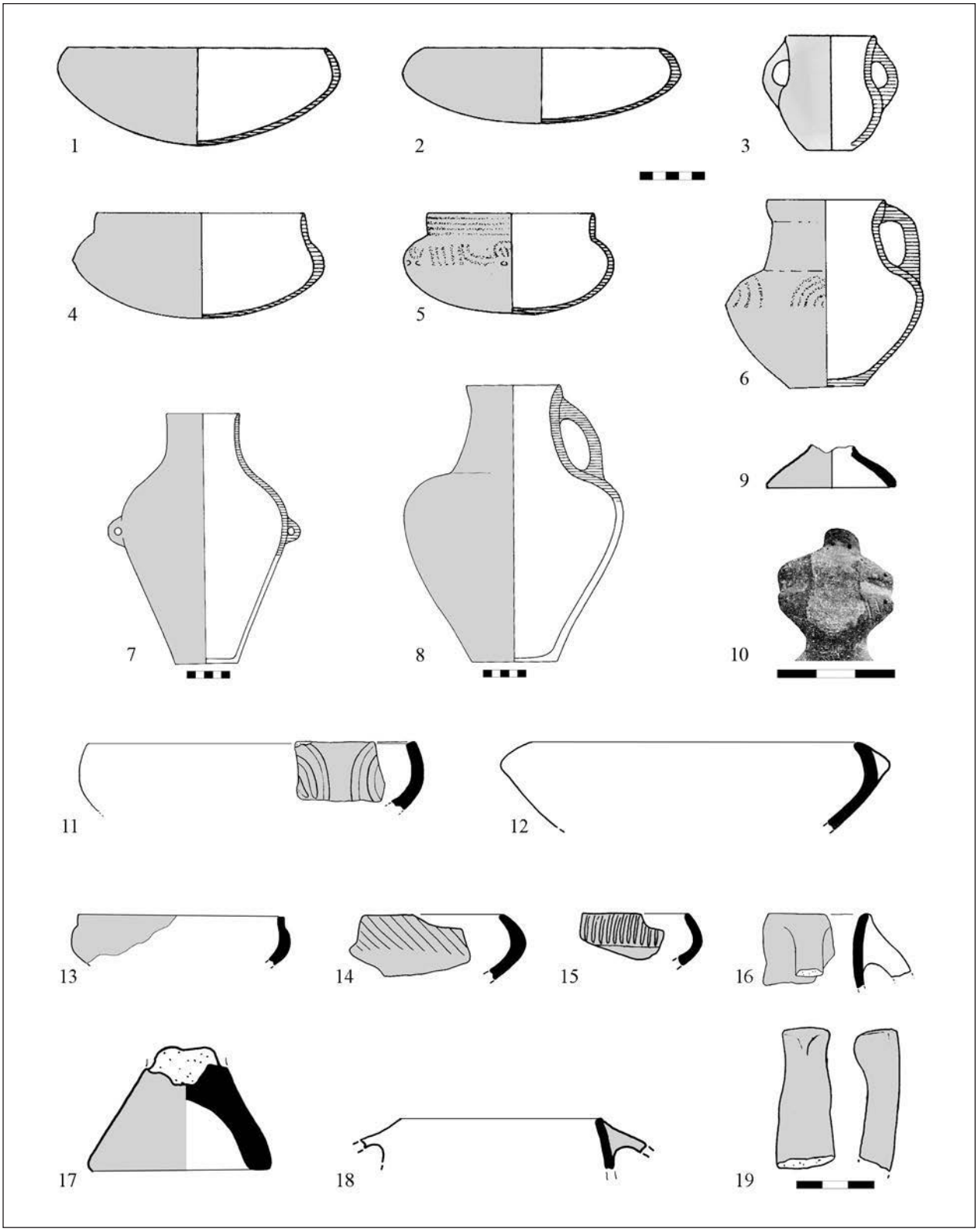

Fig. 5. 1–10) Divostin horizon IIb (after Madas 1988; Bogdanović 1990); 11–19) Prohor Pčinjski

Сл. 5. 1–10) Дивоштин, хоризонт IIb (Madas 1988; Bogdanović 1990); 11–19) Прохор Пчињски

channels) and carinated bowls existed in the region within the preceding period, meaning the Late Vinča culture. The exception is the Timočka Krajina Region, where numerous Bubanj–Hum I sites have been registered, yet no Late Neolithic Vinča sites have been registered, despite the high degree of research.[54]

Although several Neolithic sites have been intensively excavated within the south-eastern zone of the Mountainous Region, as well as several Early Eneolithic sites, none of the sites possessed horizons from both periods, which could potentially determine their stratigraphic and cultural-chronological relationships. This is similar to the western and eastern zone of the region.

The highest degree of research of the Neolithic sites within the south-eastern zone was conducted at the site of Pločnik (Fig. 1/13). According to the authors of the excavations, D. Šljivar and J. Kuzmanović Cvetković, several cultural layers, representing the phases of the Vinča culture, have been recorded at the site, starting from the earliest Vinča–Tordoš I phase, to the Gradac phase.[55] The series of published absolute dates from the site does not correspond to the aforementioned chronology of the site.[56] According to those dates, the life at the settlement started somewhat later than previously suggested, during the Vinča–Tordoš II phase (the final quarter of the 6th millennium calBC, the Vinča B phase) and also ended later, during the Vinča–Pločnik II phase (the second quarter of the 5th millennium calBC, the Vinča D phase). The text which presents trench VIII/A, excavated in 1978,[57] points to a clear stratigraphy of the trench and the context for the find of a copper chisel, with the accompanying pottery from that housing horizon. This horizon will be addressed in the paper, as it represents the best stratified and presented context from the youngest layer at the site of Pločnik. Besides the usual forms of the so-called southern variant of the Vinča culture (plates with a thickened rim, which occur from the earliest layers together with carinated bowls), the pottery from the context is represented by slightly biconical bowls, meaning bowls with an inverted rim, which were not recorded in earlier layers.[58] Another copper chisel, almost identical in form and dimensions to the example from the site of Pločnik, was recorded in a similar housing horizon at the site of Velika Humska Čuka, together with typical material of the Bubanj–Hum I group and dated to a period between the 44th and the 43rd century calBC (Fig. 8/20).[59] The housing horizon with a copper chisel at the site of Pločnik is not dated, yet, based on the find of a similar chisel and the analogy from the site of Velika Humska Čuka, as well as the occurrence of bowls with an inverted rim within the same context, the horizon could correspond to the youngest published date from the site.[60] The date in question originates from a context in which a similar copper chisel was recorded in 2000 and falls within the second quarter of the 5th millennium calBC (Fig. 8/5), which corresponds to dates from other sites in the Central Balkans in which similar bowls have been recorded (Spasovine, Vinča, Divostin, Grivac and Selevac).[61] Besides the aforementioned bowls, beakers with two handles in line with the rim (the so-called *kantharoi*), characteristic of the Early Eneolithic in the area, were recorded within the youngest layer at the site of Pločnik. However, it remains unclear whether those originate from this layer dated to the second quarter of the 5th millennium calBC, or a younger layer that is, for the time being, stratigraphically and chronologically undefined.[62]

Of all of the excavated Early Eneolithic sites within the south-eastern zone of the Mountainous Region of the Central Balkans, only the sites of Bubanj and Velika Humska Čuka have been absolutely dated (Fig. 1/i, h). The stylistic and typological characteristics of pottery from those sites can be completely attributed to the Bubanj–Hum I group, as a regional variant of a wider BSK (Bubanj–Salcuţa–Krivodol) cultural complex. The earliest date originates from the site of Velika Humska Čuka, from the earliest floor of a residential structure located on a solid rock foundation. The date indicates that the site was primarily settled between the mid-45th and the mid-44th century calBC,[63] which is almost identical to the date from the site of Bodnjik (Fig. 8/15 and 16). Material typical of the Bubanj–

[54] Compare Bulatović *et al.* 2013 and Kapuran *et al.* 2014.

[55] Шљивар, Кузмановић-Цветковић 1997; Шљивар 1999.

[56] Borić 2009, 211–215, Tab. 3.

[57] Шљивар 1999.

[58] Шљивар 1999, T. I/7, T. II/9, 11.

[59] Bulatović *et al.* 2018, 21, Fig. 2, Pl. I/1–8; Pl. III/1.

[60] Borić 2009, 211–215, Tab. 3.

[61] Borić 2009, 211.

[62] Based on the oral account by the author of the excavations, D. Šljivar, to whom we are grateful. However, N. Tasić points to the existence of a Bubanj–Hum I horizon at the site of Pločnik, which was largely destroyed by farming (Tasić 1995, 29). If that is correct, the beakers could originate from that horizon.

[63] The date was aquired in the Isotoptech ZRT, Laboratory in Debrecen.

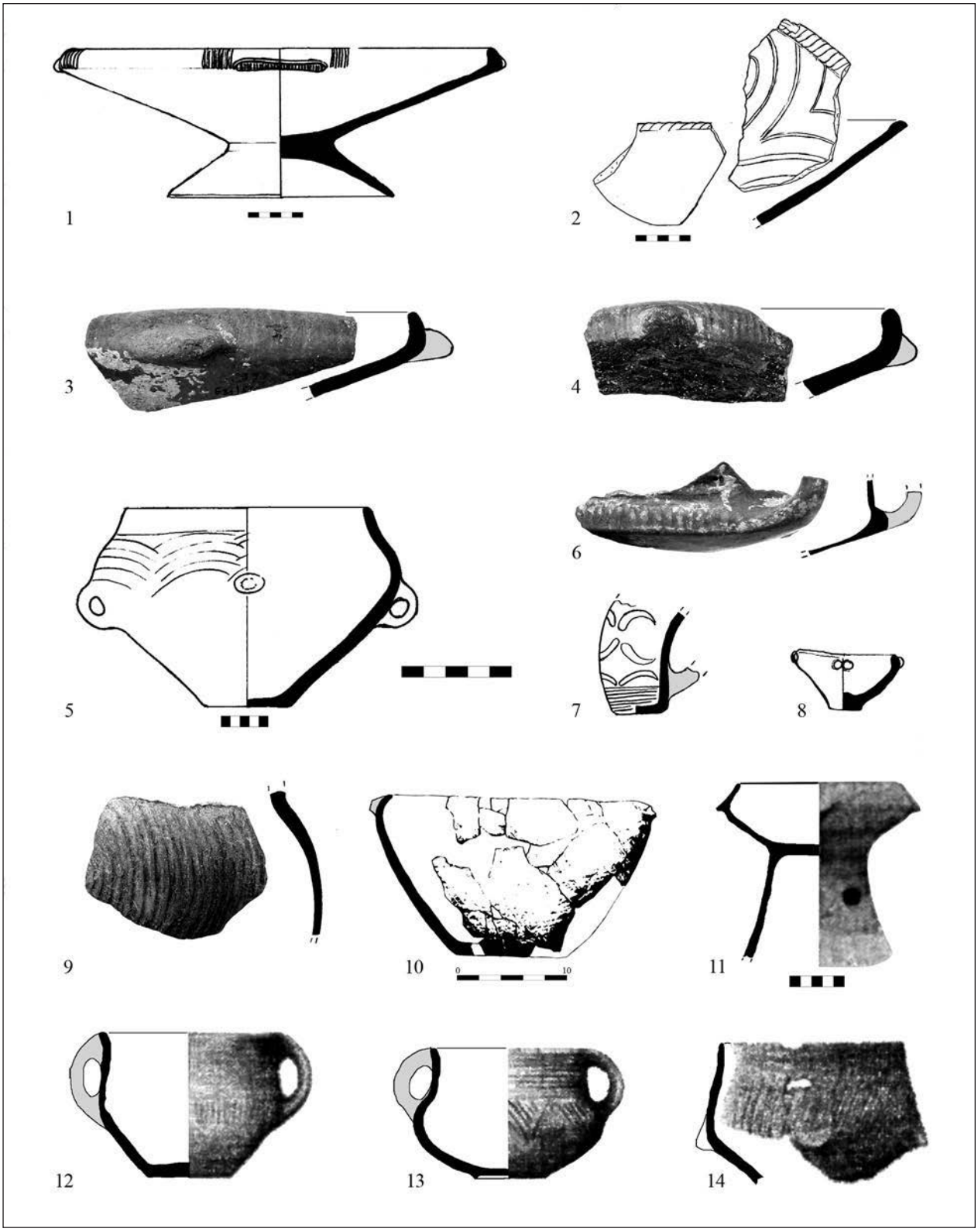

Fig. 6. 1–9) Velika Humska Čuka, feature 2/S1/19;
10–14) Družetić, site of Bodnjik (after Палавестра et al. 1993; Живановић 2013)

Сл. 6. 1–9) Велика Хумска Чука, објекат 2/S1/19;
10–14) Дружетић, локалитет Бодњик (Палавестра et al. 1993; Живановић 2013)

Hum I group was recorded in this horizon, such as bowls with an inverted channelled rim (Fig. 6/3, 4), short beakers with two handles in line with the rim (Fig. 6/6), bowls with an inverted and channelled rim on a hollow foot (Fig. 6/1), plates with a thickened inner side of the rim (Fig. 6/2), large biconical vessels with arched handles and arched channels on the neck (Fig. 6/5), etc. The dominant ornamentation is represented by channels (Fig. 6/1, 2, 4–7), and a sort of shallow and narrow groove-like ornament (Fig. 6/1–3). It has been noticed that the plate with the thickened and channelled rim resembles examples from the Late Vinča culture, which will be further discussed. The remaining dates from the site of Velika Humska Čuka correspond to dates from the nearby site of Bubanj and the other sites of a BSK complex in western Bulgaria (Krivodol) and Oltenia (Ostrovul Corbului, Salcuța) (Fig. 8).[64]

DISCUSSION

The Transitional Region

Based on the presented data regarding the result of the latest research, and short reviews of necessary previous results, it can be noted that, in terms of chronology, the late phase of the Vinča culture, dated at the sites of Spasovine and the site of Gomolava, and the Early Eneolithic, dated at the site of Bodnjik, are practically concurrent in the territory of western Serbia. The eventual difference could be within a scope of several decades, comparing the highest range of dates from the sites of Gomolava and Bodnjik (Fig. 8/9, 16). Such chronological continuity between the Late Neolithic and the Early Eneolithic cultures in this area is further supported by the stylistic and typological characteristics of the pottery, such as slightly biconical bowls, bowls with an inverted rim, plates with a thickened inner side of the rim, beakers with one or two handles in line with the rim (*kantharoi*), vessels on a hollow foot, etc. Such forms occurred during the Late Neolithic at numerous sites in the area and in other regions of the Central Balkans (the sites of Spasovine, Gomolava, Vinča, Banjica, Divostin, Grivac, Pločnik, etc.) and also represent one of the main characteristics of the Early Eneolithic ceramic inventory, especially the Bubanj–Hum I group (Figs. 6, 7).[65] Plates with a thickened and mostly channelled rim are recorded within the earliest settlement (horizon V) at the site of Banjica,[66] which is unfortunately undated, yet, according to the ceramic finds, is attributed to the late Vinča – Tordoš phase of the Vinča culture.[67] However, such plates occur from horizon III at the site of Selevac, which is dated to the final quarter of the 6th millennium calBC.[68] Interestingly, such forms have not been recorded within the horizon III at the site of Banjica, and a similar lack has been noted for the site of Kormadin, likewise dated to the Vinča–Pločnik phase of the Vinča culture.[69] On the other hand, such forms have been recorded at the site of Spasovine (Fig. 3/16, 17), which is approximately concurrent with the settlements of Banjica III and Kormadin II. Carinated bowls occur from horizon V at the site of Banjica and continue throughout later horizons,[70] and similar bowls have been noted for Selevac, where they occur sporadically within horizons III–V and become more common within the later horizons.[71]

Slightly biconical bowls appear later within the Vinča culture in the Transitional Region and stand connected with the Divostin IIb horizon, the youngest Neolithic layer at the site of Vinča, horizons II and III at Kormadin,[72] and layer IX at Selevac, which corresponds to the youngest phase of the Vinča culture, meaning the second quarter of the 5th millennium calBC in absolute dates.[73] A beaker with two handles (*kantharos*) has also been recorded within the horizon III at Kormadin.[74]

Early Eneolithic finds from the Mačva Region and the transitional area between the Pannonian Plain and the mountainous regions of the Central Balkans in general, are usually defined within the inventory of the Bubanj–Hum I group (or BSK complex), with certain elements of Pannonian groups such as the Tiszapolgár–Bodrogkeresztúr, the Lasinya, and the Sopot–

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[64] The second date for the site of Velika Humska Čuka (Fig. 8/17) was also acquired in the Isotoptech ZRT. Laboratory in Debrecen. For further reading on the absolute dates from those sites, refer to Boyadzhiev 1995, Bulatović, Vander Linden 2017 and Bulatović *et al.* 2018.

[65] Благојевић 2005.

[66] Трипковић 2007, 147, 155, 161.

[67] Трипковић 2007, 45.

[68] Tringham, Krstić 1990, 50.

[69] Булатовић *et al.* 2010, 11–42.

[70] Трипковић 2007, 135, 136, 143, 179, 184.

[71] Tringham, Krstić 1990, Fig. 9.3/307, 373, 370, 389.

[72] Булатовић *et al.* 2010, T. III/7–9, T. V/7–10.

[73] Tringham, Krstić 1990, 50.

[74] Булатовић *et al.* 2010, T. V/15.

Lengyel,[75] which is not unexpected considering the geographic position of the region. At some of the sites, such as Vinča, a Bodrogkeresztúr necropolis was registered,[76] and further to the east, a BSK complex grave was registered at the site of Lepenski Vir,[77] which all illustrate the directions of the process of cultural transmission at the southern fringe of Pannonia during the beginning of the Eneolithic period.

Speaking of changes, a specific distribution of axes of the *Jászladány* type in a relatively small area of the Cer and Mačva regions is notable. Namely, on the south-eastern slopes of Mt Cer and its immediate vicinity, in an area covering approximately 50 km^2, a total of seven such axes have been recorded (Milina, Tekeriš, Pomijača, Gornja Sipulja and Rumska).[78] Similar finds have been noted in the neighbouring region of Mačva, which continues to the northeast of the Cer Region, comprising one wider area. A total of 18 such axes (complete and fragmented) have been recorded within the Mačva Region, with the majority (10 examples) being registered in the Štitar hoard.[79] A large number of axes in this relatively small area could indicate the possibility of their production within the mentioned area. However, there is currently no evidence that could confirm this thesis, such as traces of metallurgy in settlements, although M. Stojić and M. Cerović mention certain "ceramic moulds" from the sites of Đipovi in Riđake and Benska Bara in Šabac.[80] The same authors also note that the analyses of some of the axes have pointed out that they were made from the local copper ore from Mt Cer.[81] It is important to highlight that possible surface exploitation of copper was recorded within the region, at the location of Srebrne Rupe (Fig. 1). Allegedly, copper was extracted from this location in the narrow canyon of the Kramska River,[82] some 1.5 km east of Tekeriš and 4 km west of the site of Crkvine in Rumska, meaning between two sites at which copper axes of the *Jászladány* type were recorded. According to Vasiljević, who cites the data from Maszek, Preusehen and Pittioni, it is a sulphide ore of chalcopyrite.[83] Deep and wide pits cut into the riverbank, connected to the riverbed with channels, are visible at the location even today. The walls of the pits consist of greasy greyish-green rock.[84]

Likewise, such a large number of axes recorded within a relatively small area could indicate a trade zone between the populations in Pannonia, where such axes are numerous, and the Mountainous Region of the Central Balkans, with sporadic finds of such axes. The highest distribution of such axes is recorded in the Carpathian Basin, and it can be assumed that the production centres were located within this area, yet again without finds of moulds and metallurgical activities connected with those objects. From this point, such axes could have reached the southern fringe of Pannonia through cultural interaction, and were then distributed further to the south. Contacts between the Pannonian populations and the populations that inhabited the Transitional Region of the Central Balkans are also reflected in the stylistic and typological characteristics of pottery from the Early Eneolithic sites in this area, such as the sites of Livade in Kalenić, Velimirovi Dvori, and Bodnjik, which correspond to the Pannonian Eneolithic groups such as the Lasinya and the Tiszapolgár–Bodrogkeresztúr.[85]

The chronology of those axes also remains unclear, especially the time of their initial occurrence. According to most authors, they are dated to the Early Eneolithic, meaning the period after the mid-5th millennium calBC.[86] However, at the site of Rumska, where a similar axe was recorded several decades ago, no Early Eneolithic material was recorded during several surveys, only Late Neolithic material (Vinča D), which could be dated to the second quarter of the 5th millennium calBC, based on numerous analogies (Fig. 4/1–9).[87] Ceramic material with identical stylistic and typological characteristics to the sites of Spasovine, Rumska, and other mentioned sites was also registered at the site of Jasupovac in Velika Vranjska,[88] together with a copper axe of the *Jászladány* type, which could provide yet another argument for the

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[75] Blagojević 2005, 66–72; Bulatović *et al.* 2017, 45.

[76] Јевтић 1986.

[77] Летица 1970.

[78] Compare Antonović 2014.

[79] Antonović 2014, 66–82.

[80] Стојић, Церовић 2011, 30.

[81] Maczek *et al*. 1952.

[82] Васиљевић 1967, 133.

[83] Maczek *et al*. 1952.

[84] Bulatović *et al.* 2017, 236.

[85] Blagojević 2005; Bulatović *et al.* 2017, 45; Stevanović 1998, Sl. 4/a–c; Живановић 2013, 54. Compare the Lasinya material from Jurjevac in eastern Srem in Balen *et al.* 2017, Pl. 5/8; Pl. 6/7, Pl. 7/1 and Raczky *et al.* 2014, 331–337, Figs. 5 and 6.

[86] Todorova 1981; Boroffka 2009; Antonović 2014.

[87] Стојић, Церовић 2011, T. CXVIII.

[88] Стојић, Церовић 2011, 190, T. CCIX.

possibility of the earlier occurrence of such axes than previously thought. The site of Spasovine in Milina, dated to the final century of the third quarter of the 5th millennium calBC, could serve as an additional argument, as a hoard comprised of three such axes was recorded in the same village (the site is not precisely located). If data on the chronological determination of the sites of Rumska and Velika Vranjska is correct (it would appear, according to the material, the both sites are attributed to the Late Vinča culture), those would represent the earliest axes of the mentioned type.

All of the presented arguments indicate the possible production of the *Jászladány* type of axes in this region, but without interdisciplinary analyses and the comparison of the physical-chemical composition of the copper and lead isotopes of the copper axes and the ore from the Srebrne Rupe location, which remains the only hypothetical outcrop of copper in the area, the subject remains in the domain of assumptions.

The eastern and western zones of the Mountainous Region

All of the registered Early Eneolithic sites within the eastern and western zones of the Mountainous Region of the Central Balkans are attributed to the Bubanj –Hum I group. The largest number of sites in this region is located within the Timočka Krajina Region and the wider confluence area of the Zapadna Morava (West Morava) and Velika Morava (Great Morava) rivers. A significantly lower distribution of sites is registered within the Iron Gates (Đerdap) and Ključ regions and the upper course of the West Morava River, while only one site has been registered within the Velika Morava Basin.[89] A ceramic inventory characteristic for Bubanj –Hum I group was recorded at all of the sites, such as slightly biconical bowls, bowls with an inverted rim (often vertically or obliquely channelled), plates with a thickened inner side of the rim, *kantharoi*, vessels (mostly bowls) on a hollow foot, carinated bowls with a funnelled neck, etc.

Plates with a thickened rim, the carinated form of bowls, and hollow feet of vessels have been recorded in the eastern and western zones of the Mountainous Region of the Central Balkans, within the early phases of the Vinča culture. The carinated form of bowls occurs at the site of Grivac from horizon IV,[90] although positioned on the shoulder of the bowl, while bowls with a thickened belly and carinated form are recorded in horizon V and continue through horizon VI.[91] Plates with thickened rims, often decorated with channels, were recorded in horizon V, and in horizon VI, where such forms were less emphasised and mostly undecorated.[92] At the site of Supska, which is, unfortunately, undated, yet possesses a solid stratigraphic determination, carinated bowls, and plates with a thickened rim have been registered from the 8th layer, continuing up to the youngest layers.[93]

Besides those forms, vessels with a hollow foot were recorded at the site of Supska, starting from the earliest 9th layer[94] and starting from horizon IV at the site of Grivac.[95] According to the absolute dates from the site of Grivac, the occurrence of such forms in this area can be connected with a period not later than the final quarter of the 6th millennium calBC.[96]

The south-eastern zone of the Mountainous Region

A similar situation occurs within the south-eastern zone of the Mountainous Region of the Central Balkans. In the course of excavations of the Antique town of *Timacum Maius* in Niševac, a portion of a Neolithic Vinča settlement was recorded. Aside from globular bowls decorated with shallow channels, meaning burnished narrow strips, the characteristic forms were represented by plates with a thickened rim and carinated bowls.[97] The absolute date from one of the pits from this site is unpublished and falls within 6240±36 BP, meaning 5303–5207 calBC, with a probability of 65.2%, which positions the site into the 53rd century calBC, slightly earlier than settlement IV at Grivac.[98] Save for globular bowls decorated with oblique channels, plates with a thickened rim, often decorated with channels, a hollow vessel foot, and a few carinated bowls with a less emphasised belly have also been recorded at the Neolithic site of Donje Vranje, in the upper course of

[89] Kapuran *et al.* 2018.

[90] Bogdanović 2008, Fig. 9.14/j, f, Fig. 9.15, 9.16 and other.

[91] Bogdanović 2008, Fig. 9.23/g, j, 9.24/a, c, Fig. 9.28/h, j, Fig. 9.74 i 9.75 and other.

[92] Bogdanović 2008, Fig. 9.24/j, k, Fig. 9.26/b, f–i, Fig. 9.77/a–c and other.

[93] Гарашанин Д., Гарашанин М. 1979, Т. XXIX/3–5.

[94] Гарашанин Д., Гарашанин М. 1979, Т. XXXVII/6.

[95] Bogdanović 2008, Fig. 9,19/c, f, i.

[96] Bogdanović 2008, 459.

[97] Булатовић *et al.* 2014, Т. I.

[98] The lab-code of the sample is SUERC 54882. The date from Niševac was provided by the ERC-funded research project Eurofarm (Stg-313716) directed by M. Vander Linden.

the South Morava River.[99] An absolute date from this site positions the settlement into the final quarter of the 6th millennium calBC.[100] Plates with a thickened rim have also been recorded within the Gumnište II horizon in Pavlovac, together with globular vessels characteristic for the Vinča–Tordoš II phase, which remained in use within the younger Gumnište III horizon, together with slightly biconical bowls and carinated bowls.[101]

All of the absolute dates indicate that the plates with a thickened rim, bowls with a carinated form and vessels on a hollow foot were common for the Vinča culture within the so-called Mountainous Region of the Central Balkans during the final quarter of the 6th millennium calBC, which corresponds to the Vinča–Tordoš II phase, according to M. Garašanin and Vinča B phase, according to V. Milojčić. Contrary to the other regions of the Central Balkans, plates with a thickened rim occur earlier and represent a preferred ceramic form in the south-eastern zone of the Mountainous Region.[102] On the other hand, such plates were mostly not utilised in the north of the Mountainous Region or the Transitional Region, and even disappeared during the Vinča–Pločnik phase at numerous sites, or sporadically appear with mild thickening and no ornamentation.

Interestingly, plates with a thickened rim have been recorded at the site of Karanovo in Thrace, starting from horizon III,[103] which is radiocarbon dated to the 55th–54th century calBC,[104] meaning slightly earlier than at the settlements in the Central Balkans. Also, those plates lasted through all of the horizons at Karanovo, including horizon VI, which belongs to the Eneolithic period, although such plates are sporadic after horizon III and the thickening on the rim is mild and usually undecorated.[105]

A similar situation has been noted for the so-called carinated bowls (thickened and acutely profiled belly), which, as previously mentioned, occur at the site of Supska from the 8th layer and horizon IV at Grivac. They are also recorded within settlements in the southeast of the Mountainous Region, at the sites of Niševac, Donje Vranje, and Pločnik.[106] Such a form occurs at Banjica from horizon V and lasts throughout the younger horizons.[107] Based on the absolute dates, this form, possibly the most dominant and long-lasting ceramic form of the Vinča culture, occurs in the Central Balkans starting from the Vinča–Tordoš II phase, according to M. Garašanin (Vinča B, according to V. Milojčić), meaning the final quarter of the 6th millennium calBC. This bowl profile, although slightly modified (acute profile, less emphasised thickening positioned on the funnelled neck of the vessel) prevailed within the Bubanj–Hum I group.[108]

In terms of slightly biconical bowls, especially bowls with an inverted and often channelled rim, and *kantharoi*, meaning beakers with handles in line with the rim, which are, beside the plates with the thickened rim, the most dominant ceramic forms of the Bubanj–Hum I group, it is noticed that those forms also appear in the south-eastern zone of the Mountainous Region within the Vinča culture, but, in contrast to carinated bowls and plates, during its later phase. Similar to the Transitional Region, slightly biconical bowls, meaning bowls with an inverted rim, occurred during the Vinča–Pločnik II phase within the Mountainous Region of the Central Balkans. This is indicated by finds from Divostin IIb (Fig. 5/1, 2), layer II at the site of Supska, horizon III at the site of Grivac (Fig. 4/15), the context with copper chisel in trench VIII/A at Pločnik, horizon Gumnište III at the site of Pavlovac and at Prohor Pčinjski (Fig. 5/1–5), some of which possess a channelled rim (Fig. 5/14, 15).[109] According to the absolute dates for horizons with such bowls at the sites of Grivac and Divostin, they could be positioned within the second quarter of the 5th millennium BC. There are no absolute dates for the Gumnište III horizon in Pavlovac, and the authors position it into the end of the Vinča–Pločnik I phase,[110] which approximately corresponds to the mentioned chronology. The finds from Prohor Pčinjski, which originate from the same horizon, represent a sort of

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[99] Kapuran *et al.* 2016, T. 1/4, 7, T. II/9, T. III/2, 3.

[100] Kapuran *et al.* 2016, 125.

[101] Perić *et al.* 2016, T. III/4, 10; T. V/1, 3, 5, 6.

[102] Schrier 2000.

[103] Hiller, Nikolov 2005, Taf. 19/2, 10, Taf. 22/5–10.

[104] Thissen 2000, Tab. 7

[105] Hiller, Nikolov 2005, Taf. 42, Taf. 43/1, 2, Taf. 52/2, Taf. 67/6, Taf. 124.

[106] Шљивар 1999, T. II/7, 8, T. V/4; Булатовић *et al.* 2014; Kapuran *et al.* 2016.

[107] Трипковић 2007, 135, 136, 143, 179, 184.

[108] Стојић, Јоцић 2006, T. LXV/40; Булатовић, Милановић 2015, T. I/1; Булатовић *et al.* 2013, T. XXXVI/1, 3, T. XXXVI-II/2, T. LXXV/12–14; Капуран *et al.* 2014, T. VI/49, T. LXXVI/16–23.

[109] Perić *et al.* 2016, T. V/2, 11, 12; Булатовић 2007, 244–247.

[110] Perić *et al.* 2016, 262–263.

mixture of the Late Vinča culture and the Bubanj–Hum I group.[111]

Beakers with two handles in line with the rim (*kantharoi*) have also been recorded within the late phase of the Vinča culture at Divostin IIb (Fig. 5/3),[112] within layer 2 at the site of Supska,[113] the youngest layer at the site of Pločnik[114] and the sites of Spasovine (Fig. 3/12) and Kormadin III. Based on the absolute dates from Spasovine and Divostin (Fig. 8), they can be positioned within the second quarter of the 5th millennium BC.

Interestingly, beakers with two handles in line with the rim (*kantharoi*) primarily occur within the ceramic inventory of the Gradešnica–Slatino–Dikili Tash II and the Akropotamos–Topolnica groups in the territory of present-day western Bulgaria, in the Struma Valley and lower Vardar Region[115] during the first quarter of the 5th millennium calBC,[116] approximately concurrent with the appearance of bowls with an inverted rim in the same region.[117] Beside those forms, bowls with a triangularly thickened belly and a cylindrical or conical neck (carinated bowls),[118] similar to the Late Vinča examples from the sites of Vinča, Gomolava and Grivac VI (Fig. 3/21, Fig. 4/12, 17), appear in these groups as well. Bowls with a thickened rim have also been recorded within the ceramic inventory of those groups,[119] which is, in general, similar to the ceramic inventory of the Vinča culture. Slightly biconical bowls also occurred in Oltenia during the Rast III phase, which corresponds to the Vinča–Pločnik II phase.[120] Painting as a pottery decoration technique, which was quite common for the Gradešnica–Slatino–Dikili Tash II and the Akropotamos–Topolnica group, has only been sporadically recorded within the Late Vinča culture,[121] yet it represents one of the most common decoration techniques of the Bubanj–Hum I group.

* * *

From all that has been presented above, it can be noticed that certain ceramic forms characteristic of the Early Eneolithic Bubanj–Hum I group, such as plates with a semi-circularly thickened inner side of the rim, bowls with a triangularly acute thickening on the belly or shoulder (the so-called carinated profile),[122] as well as vessels on a tall hollow foot (Fig. 6/1, 2, 11, Fig. 7/1, 3, 11) are represented in the ceramic inventory of the Vinča culture and, more precisely, the earlier phases of the culture, in all of the regions of the Central Balkans. According to the available absolute dates, such ceramic forms are represented in this territory from the final quarter of the 6th millennium calBC, which corresponds to the Vinča–Tordoš II phase, according to M. Garašanin or Vinča B phase, according to V. Milojčić. It has been noted that the same ceramic forms were represented in Thrace during approximately the same period,[123] which used to be explained by contacts between the Vinča culture and the Neolithic cultures of Thrace, through the existence of a unique Balkan–Anatolian Neolithic complex that originated in south-eastern Thrace and western Anatolia.[124] The appearance of new elements within the Vinča culture, represented by plates with a thickened rim, which prevailled within the ceramic inventory of the Bubanj–Hum I group, is defined as the Gradac phase of the Vinča culture.[125] According to M. Garašanin, the phase can be observed at a depth of between 6 and 6.5 m at the site of Vinča, and at the eponymous site of Gradac near Zlokućani. In terms of cultural and chronological aspects, the phase is quite similar to the Karanovo IV horizon in Thrace.[126]

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[111] A portion of the finds originates from excavations in the 1980s and a smaller portion originates from the excavations conducted in the early 2000s, which were directed by T. Čerškov from the Institute for Cultural Heritage Preservation, in Niš. I would like to take this opportunity and thank him for the insight into the material.

[112] Madas 1988, Fig. 6.21/9.

[113] Гарашанин Д., Гарашанин М. 1979, Т. III/4.

[114] Based on the oral account by the author of excavations, D. Šljivar. The question remains whether the youngest layer belongs to the bearers of the Bubanj–Hum I group, as N. Tasić (1995, 29) considers.

[115] Тодорова 1986, 46/6; Pernicheva 1995, Fig. 6/191, 193, 194, Fig. 8/259, 266, Fig. 9/297, Fig. 12/418; Treuil (ed.) 2004, Pl. 4/1, Pl. 5/4, Pl. 59/1, Pl. 81/2.

[116] Boyadzhiev 1995, 182, Tab. 5.

[117] Тодорова 1986, 46/12; Treuil (ed.) 2004, Pl. 13, 58, 62, 68, 71.

[118] Тодорова 1986, 46/1; Treuil (ed.) 2004, Pl. 69/2, Pl. 84/4, 5, Pl. 97/3, 4.

[119] Treuil (ed.) 2004, Pl.91/1, 2, Pl. 101/3, Pl. 104/4–7.

[120] Гарашанин 1973, 11.

[121] Булатовић *et al.* 2011, Т. VI/10–12. Васић 1936, сл. 281, 283. Compare with Vajsov 2007.

[122] According to M. Garašanin (Garašanin 1979, 166), the carinated vessels appear during the Vinča-Tordoš I phase, but without the characteristic thickening.

[123] Hiller, Nikolov 2005.

[124] Гарашанин 1973, 122.

[125] Garašanin 1979, 151–152.

[126] Гарашанин 1973, 122–124; Garašanin 1979, 151–152, 174.

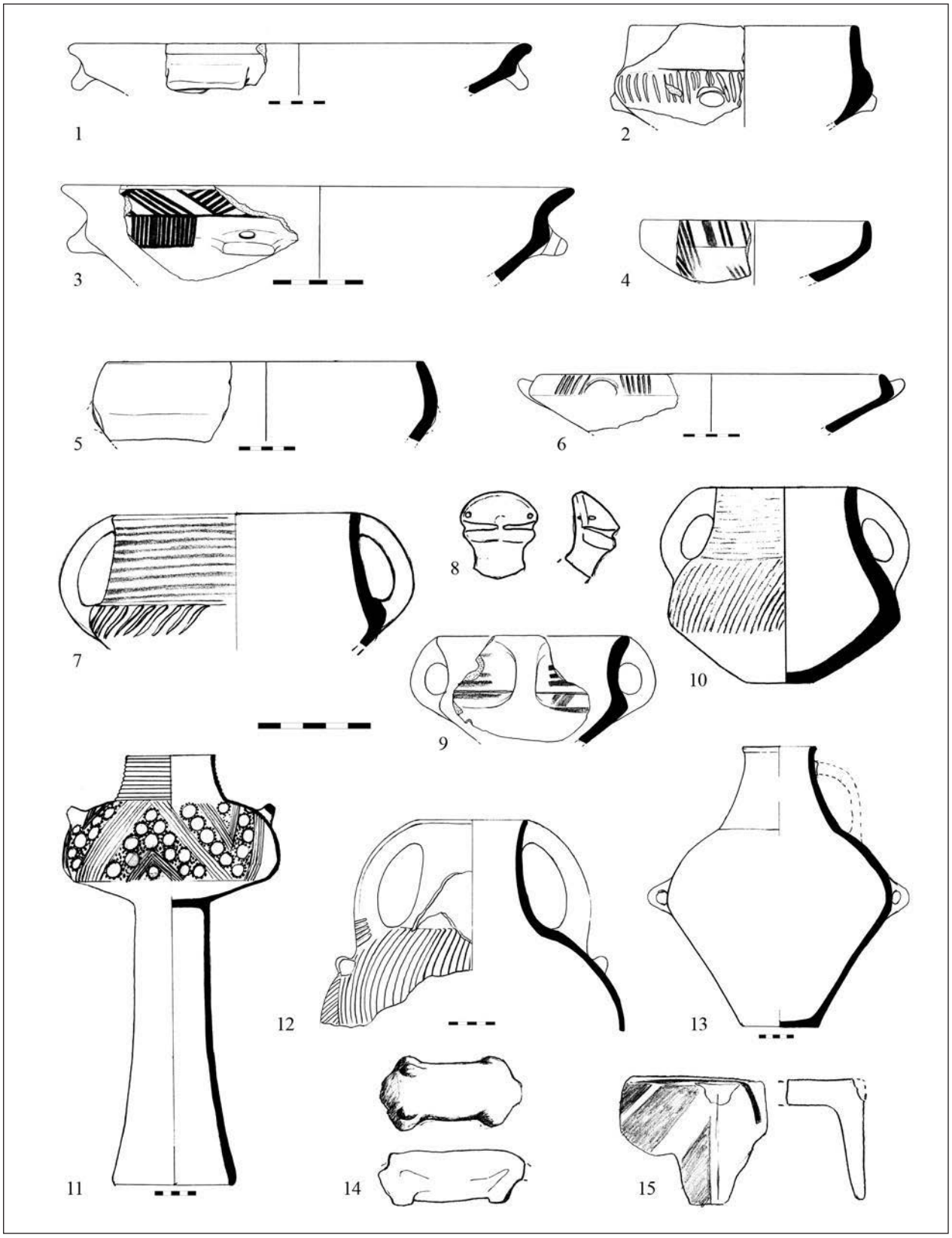

Fig. 7. Characteristic pottery of Bubanj–Hum I group: 1–9, 11–15) Velika Humska Čuka; 10) Bubanj

Сл. 7. Карактеристичне посуде Бубањ – Хум I групе: 1–9, 11–15) Велика хумска чука; 10) Бубањ

Without addressing the origin of the Vinča culture, these elements, especially the plates with a thickened rim, occur in Karanovo from the earliest Late Neolithic horizon (Karanovo III), which is chronologically correlated with the third quarter of the 6th millennium BC. Interestingly, without the absolute chronology and solely based on the material culture, certain authors have determined the origin point for the Gradac phase in the east, in Thrace, and on the shores of the Sea of Marmara.[127] On the other hand, S. Perić criticises the previous definition of the Gradac phase and considers that it should be defined as a "turning point" within the Vinča culture when hilltop settlements appeared together with lowland settlements.[128]

As the subject of this paper is not exclusively the Vinča culture, but rather its role in the genesis of the Bubanj–Hum I group, its origin and development phases will not be further addressed. It was important for this study to point to the fact that the connection between the Vinča culture and Thrace was also highlighted by previous colleagues and that they have built a solid relative chronology of those contacts, despite the lack of absolute dates. The present absolute chronology indicates that certain ceramic forms (plates with a thickened rim) occurred in Karanovo during the earliest phase of the Late Neolithic (Karanovo III), dated to the third quarter of the 6th millennium calBC, somewhat earlier than the examples in the Central Balkans (the final quarter of the 6th millennium calBC). It is peculiar that such forms, especially plates with a thickened rim, were more represented within the south-eastern zone of the Mountainous Region of the Central Balkans (in which the characteristics of the so-called Gradac phase are most represented), in which they prevail into the youngest phases of the Vinča culture, although with less emphasised thickening and usually without ornamentation (channels), common for the earlier phases. In the north, their representation within the ceramic inventory of the Vinča culture decreases, but they are still occasionally represented within the later phases of the Vinča culture. Judging by their distribution, it seems that the most intensive transmission with the territory of Thrace was through the Nišava Valley.

The process of cultural transmission with the population which inhabited the territory east of the Vinča cultural domain continued in the later phases of the Late Neolithic, which is illustrated by the appearance of few *kantharoi* and the massive representation of slightly biconical bowls in the Vinča D phase, meaning during the third quarter of the 5th millennium calBC. Identical forms occurred during the first and became common during the second quarter of the 5th millennium BC in the lower Vardar Basin, Struma Basin, and at the sites located on the northern slopes of the western portion of the Balkan Mountains.[129] As the distribution of *kantharoi* and slightly biconical bowls was more or less equal in all of the regions within the territory of the Vinča culture (from Gumnište in Pavlovac, to Spasovine in the Cer Region and Vinča in the Danube Region), and sites attributed to the Vinča culture have not been recorded in eastern Serbia, it is assumed that the communication route of cultural transmission was through the Nišava Region and possibly the Danube transversal. Finds from a house at the site of Poduen, in the Sofia Basin, which represents a certain mixture of Vinča and Karanovo V elements, is one of the most discernible examples of evidence for those contacts and their communication routes.[130] An additional argument supporting Late Vinča contacts with the cultural groups from the Struma Valley and lower Vardar Region is painted pottery, which is sporadically represented at Vinča sites in the Central Balkans, but became a common ornamentation technique for the Bubanj–Hum I group and the entire BSK complex.

Besides the aforementioned ceramic forms common for both the Vinča culture and the Bubanj–Hum I group, one should also highlight the semi-globular bowls with a thickened belly, often decorated with channels, and a modelled handle with arched incision or a channel above it (Fig. 4/11, 16, Fig. 5/5, Fig 7/2, Fig. 7/6 – handle with an arched channel above),[131] large ovoid amphorae with a narrow mouth with small horizontally perforated arched handles on the belly (Fig. 7/13), or a large arched handle that connects the vessel rim and shoulder,[132] and also the figurine head

[127] Jovanović 2006, 225.

[128] Perić 2006, 244.

[129] Тодорова 1986; Pernicheva 1995.

[130] Todorova 1990, 165, T. I–III.

[131] Such vessels have also been recorded at the sites of Pločnik (Шљивар 1999, T.III/1, T. V/7), Belovode, but without the arched ornament (Шљивар, Јацановић 1997, T. II/4), Grivac V, without arched ornament (Bogdanović 2008, Fig. 9.31/e), Grivac VI (Bogdanović 2008, fig. 9.71/g), Kormadin (Булатовић *et al.* 2010, T. I/7, T. IV/6) and numerous other sites.

[132] Similar amphorae have also been recorded at the sites of Banjica (Трипковић 2007, 186, 187); Divostin IIb (Madas 1988, Fig. 6.2/2, 6.6/10), Vinča, at a 4 m depth (Borić 2015, Fig. 5) and other.

Nr	Site	Context (Culture)	Lab.code	BP	calBC	Published
1	Strumsko	(Acropotamos-Topolnitsa)	Bln-2612	6020±50	4983–4855 (68% CalPal)	Boyadzhiev 1995
2	Slatino	(Gradešnica-Slatino-Dikili Tash II)	Bln-3350	5860±80	4823–4623 (68% CalPal)	Boyadzhiev 1995
3	Belovode	Ttrench 7, spit 4 (Late Vinča)	OxA-14628	5800±36	4764–4545 (95%)	Borić 2009
4	Divostin	House 13, feature 21 (Late Vinča)	OxA-14694	5775±34	4720–4530 (95%)	Borić 2009
5	Pločnik	burnt building debris, Trench 16, spit 7 (Late Vinča)	OxA-14685	5765±35	4710–4530 (95%)	Borić 2009
6	Gomolava	Burial 21 (Late Vinča)	OxA-14708	5739±35	4688–4498 (95%)	Borić 2009
7	Vinča	House 6, sector II, segment III (Late Vinča)	OxA-16597	5728±34	4686–4491 (95%)	Borić 2009
8	Vinča	House 1/06, sector II (Late Vinča)	UBA-22024	5720±37	4630–4518 (68% CalPal)	Tasić *et al.* 2015
9	Gomolava	House 9/80, block VII, sq. E3, 4, spits 17/18 (Late Vinča)	GrN-13160	5710±60	4711–4401 (95%)	Borić 2009
10	Banjica	(Late Vinča)	GrN-1542	5710±90	4670–4468 (68% after CalPal)	Vogel,Waterbolk 1963
11	Spasovine	trench 2/feature 3 (Late Vinča)	AA 113502	5706±25	4577–4509 (68% CalPal) 4611–4461 (95%)	This study
12	Selevac	horizon IX(?) (Late Vinča)	HAR 3218	5670±80	4618–4424 (68% after CalPal)	Tringham, Krstić 1990
13	Vinča	House 01/06, the uppermost burnt horizon (Late Vinča)	NOSAMS-67686	5650±30	4519–4463 (68% after CalPal)	Tasić *et al.* 2015
14	Grivac	Charcoal from trench A, level 5 (Late Vinča)	Z-1507	5600±100	4557–4367 (68%, CalPal)	Srdoč *et al.* 1987
15	Ostrovul Corbului	(Salcuţa IIIb)	SMU-585	5591±82	4519–4371 (68% after CalPal)	Lazarovici 2006
16	Bodnjik, Družetić	Below house floor in House IV, qv. J8/1994 (Bubanj–Hum I)	OxA-?	?	4468–4347 (95%) 4448–4369 (68.2%)	Živanović 2013
17	Velika Humska Čuka	Trench II/19, feature 2/S2/19, the oldest floor on the bedrock (Bubanj–Hum I)	DeA 21482	5571±39	4465–4342 (99%), 4447–4373 (68% CalPal)	This study
18	Velika Humska Čuka	Trench 1/19, feature 2/S1/19 (Bubanj–Hum I)	DeA 21483	5481±40	4375–4253 (91%), 4360–4282 (68% after CalPal)	This study
19	Salcuţa	(Salcuţa IIb)	GrN-1990	5475±55	4377–4275 (68% after CalPal)	Echrich and Bankoff 1992
20	Velika Humska Čuka	Trench III/16, feature 2 (Bubanj–Hum I)	AA 109498	5473±31	4352–4326 (51.0%) 4365–4259 (95.4%)	Bulatović *et al.* 2018
21	Bubanj	feature 69 (Bubanj-Hum I)	SUERC 50666	5452±28	4343–4266 (68.2%) 4351–4257 (95.4%)	Bulatović, Vander Linden 2017
22	Vinča	Burial 1, female 20–30 years (Tiszapolgar-Bodrogkerestur)	OxA-24922	5451±35	4344–4263 (68.2%) 4354–4244 (95.4%)	Borić 2015
23	Krivodol	(Krivodol I)	Bln-2114	5445±45	4338–4266 (68% after CalPal)	Boyadzhiev 1995
24	Bubanj	feature 37 (Bubanj–Hum I)	Lyon 13690	5440±30	4346–4246	Bulatović *et al.* 2018

Fig. 8. Absolute dates for the Late Vinča and the Early Eneolithic sites in the Central Balkans

Сл. 8. Апсолутни датуми за касну винчанску културу и локалитете раног енеолита на централном Балкану

from the site of Velika Humska Čuka (Fig. 7/8), which rather resembles Vinča examples (Fig. 5/10),[133] as well as zoomorphic figurines and altars (Fig. 7/14, 15), which differ little from the Vinča examples. The latter indicates a certain continuity in the spiritual life, which, based on those relics as parts of a ritual, did not change compared to the Late Neolithic. However, a difference in pottery surface treatment and quality has been noticed – during the Early Eneolithic, pottery possessed a burnished slip, mostly brown, while Vinča pottery was mostly black polished or grey without slip (especially during the late phase). However, this could possibly be explained by the shift in settlement topography and with that the selection of clay sources, as well as by different affinities of the Bubanj–Hum I population. Channels and polished bands represent a common ornament in the Vinča culture which prevailed within the Bubanj–Hum I group, although combined with incisions. Unlike Vinča pottery, vessels of the Bubanj–Hum I group were often decorated with paints of various colours and with graphite.

The two earliest sites of the Early Eneolithic, meaning the Bubanj–Hum I group, are interestingly recorded in different regions of the Central Balkans – the Transitional Region (Bodnjik) and the Mountainous Region (Velika Humska Čuka) – at a distance of more than 250 km apart. The absolute dates from those sites are almost identical and correspond with the latest dates for the Vinča culture from the sites of Vinča, Spasovine, Grivac, and Selevac (Fig. 8). According to those dates and the common stylistic and typological characteristics of pottery at these two sites, the stylistic and typological characteristics of pottery of the Late Vinča culture and the Early Eneolithic, as well as according to approximately the same territories in which the Vinča culture and the Bubanj–Hum I group were represented, it seems that the group originated from the Vinča culture.

The territory in which the BSK complex was formed with the Bubanj–Hum I group as a regional variant matches the territory of the Late Vinča culture. Therefore, besides the Central Balkans, the Late Vinča culture has also been recorded in Oltenia and the Sofia Basin, which would later fall under the domain of the BSK complex. This also indicates that the traditions of the Late Vinča populations were involved in the formation of the BSK complex. One of the earliest absolute dates for the Salcuţa group (a regional variant of the BSK complex) from the site of Ostrovul Corbului, dates the group slightly earlier, concurrently with the settlements at Bodnjik and Velika Humska Čuka (Fig. 8),[134] and indicates that the BSK complex was formed approximately simultaneously in all of its geographical regions. This is also confirmed by an absolute date for the Šuplevac–Bakarno Gumno group, which represents a regional variant of the BSK complex in Macedonia, from the site of Spančevo in eastern Macedonia, which is concurrent with the previously mentioned dates.[135]

Although the territories of the Vinča culture and the Bubanj–Hum I group and BSK complex mostly match, the topography of Bubanj–Hum I settlements is significantly different when compared to the topography of the Vinča settlements in the Central Balkans. The habitation horizon of the Bubaj–Hum I group has not been recorded at Late Vinča settlements within the Mountainous Region of the Central Balkans, which complicates the determination of their relations. The Early Eneolithic settlements in this region were not established even in the vicinity of previous Vinča settlements, and the reason for that probably lies in certain climate changes during the second quarter of the 5th millennium BC, as noted by Todorova.[136] Namely, the temperature rise started around 4700/4600 BC and caused the intensive dry period and the depopulation of the area south of the Rhodope Mountains, northern Greece, and the Struma Region, where the Slatino–Dikili Taš II and the Akropotamos–Topolnica groups existed. It could be the case that the depopulation is directly reflected in the appearance of new ceramic elements from these groups within the ceramic inventory of the Late Vinča culture, which would imply not only direct or indirect contacts of these populations with the Vinča culture, but also certain population shifts from these regions towards the north and northwest. This climate shock most likely influenced the Central Balkans as well and could be the reason behind the transformation of settlement topography, meaning the selection of settlement locations of the Bubanj–Hum I group. The Vinča settlements were mostly established on mild slopes and lowlands close to rivers (68%) and rarely on barely accessible and dominant elevations (16%) which is usually the case within the south-eastern and western zones of the

[133] Bogdanović 1990, Abb. 7; Игњатовић 2008, кат. бр. 41, 63.
[134] Lazarovici 2006.
[135] Здравковски 2009, 20.
[136] Todorova 2007.

Mountainous Region, as well as on elevations along the Danube within the Transitional Region.[137] The percentage of settlements located on dominant elevations rises to 35% within the Bubanj–Hum I group, while settlements established on mild slopes and river terraces are represented with 43%. Interestingly, only in extraordinary cases do the populations of the Bubanj–Hum I group inhabit Vinča sites and usually hilltop sites. The reason for the abandonment of lowland Vinča sites could lie in the exhaustion of fertile soil surrounding those sites, since those were usually inhabited for a longer period. On the other hand, the reason for the emergence of a larger number of sites located on dominant and sometimes inaccessible elevations on the fringe of valleys and basins could be sought in various threatening factors (anthropogenic or natural), which endangered the existence of the population. A similar pattern has been noted for the Carpathian Basin during the transition from the Neolithic to the Eneolithic when, despite the overwhelming Neolithic tradition in culture, Eneolithic populations abandoned long-lasting tell settlements and established settlements in new locations.[138]

A series of absolute dates from both lowland and hilltop settlements could eventually provide interesting data and answers regarding the possibility that the hilltop settlements are older than lowland settlements, as indicated by the available dates, or whether such settlements are contemporaneous and the topography is based on the economy of the population and other factors.

The thesis that the territories of the Late Vinča culture and the Bubanj–Hum I group are mostly matching is, however, completely contradicted by one region. In the region of Timočka Krajina, which is relatively well researched in the field, and where the complete prehistoric corpus from local museums was recently published, not a single Vinča site was recorded, besides the site of Rudna Glava, which served exclusively for the exploitation of copper ore.[139] The fact that this region was utilised for the exploitation of copper ore and not for settling indicates that it was, for some reason, undesirable for settlement. One of the reasons could be climate-related: the rise of temperature and humidity, and the formation of dense forest and low vegetation during the Late Neolithic, which made this terrain impassable and unsuitable for settling. If that was the case, the question is how did the Late Neolithic population discover the outcrops of copper ore in the first place, without a lengthly and detailed prospection of the terrain, which would in such a setting be completely impossible? The argument which could indirectly support such a thesis is the climate change that was recorded after 4700/4600 BC, causing deforestation and making the terrain suitable for occupation.[140] The other possible reason behind the depopulation of the Timočka Krajina Region during the Vinča culture could be sociological, concerning the relationship between humans and the natural phenomena, which were of great significance in life. A good example of this is found in Late Bronze Age natural sanctuaries in the north of Macedonia (the sites of Pelince and Kokino), whose wide surroundings were completely uninhabited as they represented a "forbidden" sacred space.[141] This could be the reason why the Vinča settlements are not represented in the Timočka Krajina Region, as settlements from the preceding Early Neolithic and later Early Eneolithic were recorded in numbers. The thesis that this territory was uninhabited and utilised solely for the exploitation of copper ore, thus a significant and "forbidden" sacred space, is supported by the youngest date from the site of Rudna Glava, which indicates that the mine was utilized up to the 47th century calBC.[142] The region was uninhabited in the period of copper exploitation, and a dense occupation of the region occurred after this period, in the time of the Bubanj–Hum I group.

In terms of copper exploitation and metallurgy in the Central Balkans, several papers have been published recently that unequivocally indicate that the process of copper exploitation and processing in the area was utilised since the Vinča–Tordoš II phase, which is confirmed by portable finds and absolute dates.[143] Radivojević *et al*. argue for the utilisation of copper during the end of the 6th millennium calBC by two different techniques – cold bead making and copper smelting.[144] Interestingly, save for lumps of slag, direct evidence of copper smelting, such as crucibles, blowpipes and smelting kilns are lacking, which is ex-

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[137] Kapuran *et al.* 2018.

[138] Raczky *et al.* 2014, 339.

[139] Булатовић *et al.* 2013; Капуран *et al.* 2014; Kapuran 2014.

[140] Todorova 2007.

[141] Stankovski 2007, 11; Булатовић, Станковски 2012, 269 with cited literature.

[142] Borić 2009.

[143] Капуран *et al.* 2014, 28–29, Figs. 22–35; Borić 2009.

[144] Radivojević *et al.* 2010.

plained by the fact the copper smelting took place in pits.[145] As opposed to the Neolithic, copper objects are more numerous and typologically diverse during the Early Eneolithic and objects which were supposedly used within the metallurgical process, such as ceramic blowpipes and possible crucibles, were recorded at the sites of Bubanj and Kmpije.[146] This is also confirmed by numerous copper objects found at Bubanj–Hum I settlements, such as chisels, pins, axes, etc., unfortunately, usually without a context. Such objects are significantly more numerous at the Early Eneolithic sites in Pannonia and the Transitional Region than in the territory of the Bubanj–Hum I group within the Mountainous Region of the Central Balkans.[147] It is important to highlight that the process of copper metallurgy initiated during the Neolithic did not stop, but evolved during the Early Eneolithic, which indicates a certain vertical transmission within the Neolithic and Eneolithic society in the area, and the transition of (metallurgical) information within several generations of one population. Such knowledge was utilised during the Early Eneolithic, as even certain types of tools prevailled from the Late Neolithic, such as a type of chisel (*schmale keile* according to D. Antonović).[148] Such a chisel was dated to the 47th/46th century calBC at Pločnik[149] and to the 44th/43rd century calBC at the site of Velika Humska Čuka.[150] Despite the evolution of copper metallurgy and the technology of production of copper objects, the Early Eneolithic population exploited the same oxidic or mixed oxidic-sulphidic copper outcrops in the Central Balkans[151] and utilised the same technological knowledge inherited from the preceding period.

Interesting conclusions can be highlighted by comparing the economic affinities of the Neolithic and the Early Eneolithic. From the archaeozoological aspect, the analyses of small samples indicate that there was no interruption in the representation of domestic species within the Bubanj–Hum I group, compared to the Late Neolithic sites. The relationship of species is slightly different, and the dominant role of domestic cattle during the Late Neolithic was distorted by the presence of ovicaprines, which were equally represented during the Early Eneolithic, while the representation of domestic pig rose during the Early Eneolithic.[152] In terms of the representation and relationship of crop spectra, the data is similar for the Late Neolithic and the Early Eneolithic, with the underrepresentation of certain types of wheat during the Eneolithic compared to the Neolithic in the same area (the samples originate from the sites of Pločnik and Bubanj, separated by less than 50 km). This could be explained by the regional distribution of certain species.[153] Certainly, the samples were not in relevant numbers, or from a large number of sites, and, therefore, the results should be considered with caution and not as definite conclusions.

A similar observation has been made in terms of the chipped stone industry. By comparing the samples from multiple Neolithic sites (the final Neolithic horizon at Vinča, Crkvine in Mali Borak, Pločnik, and the final phase at the site of Divlje Polje near Kraljevo) and samples from two Early Eneolithic houses at the site of Velika Humska Čuka, it can be concluded that the production of blades and end-scrapers on blades continued in a similar way to the final phases of the Vinča culture (ca. 4500 BC),[154] yet with less detailed treatment, and a similar trend is noted in terms of the procurement of raw materials, as the tendency for the utilisation of high-quality cherts and cherts that attest to less regular knapping properties have been recorded. There were no major oscillations after 5000 BC, when a significant shift in the production of lithic raw materials had already occurred at the break of the millennium, reflected in the higher production of tools based on flakes, even though the trend of the standardised blade production prevailed.[155]

Based on analyses of finds from two houses at the site of Velika Humska Čuka, it is not unusual that a spectrum of higher to lower quality raw material is represented, which is understandable considering that the Kremenac flint outcrop is located less than 3 km from the site. The outcrop was most likely exploited during the Early Eneolithic at the site of Velika Humska Čuka. Hence, during the Early Eneolithic, it is possible to follow the continuation of Vinča's technological package, but also the deterioration of criteria –

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145 Radivojević *et al.* 2010, 2785.

146 Јовановић 2006, Fig. 3; Bulatović, Milanović 2020, Pl. 28/7, 8.

147 Compare: Todorova 1981; Antonović 2014.

148 Antonović 2014.

149 Borić 2009.

150 Bulatović *et al.* 2018.

151 Powell *et al.* 2017.

152 Filipović *et al.* forthcoming.

153 Filipović *et al.* forthcoming.

154 Bogosavljević Petrović 2015; Bogosavljević Petrović 2018.

155 Bogosavljević Petrović 2018.

the selection of raw materials of different quality, the variety of knapping techniques, swift adaptation, and the occasional revival of the simplest knapping with the use of direct percussion with a hammerstone. Aside from the raw material from Kremenac and the so-called Balkan Flint, obsidian tools have been recorded to a lesser degree at the sites of Velika Humska Čuka and Bubanj.[156] The selection of obsidian, as well as the selection of Balkan Flint for chipped stone tools, also represents the heritage of the Vinča culture.

As obsidian outcrops have not been recorded in the area, it is clear that the obsidian (or finished products) was brought to the area through contacts and connections with populations outside the Central Balkans. Contacts between the Central Balkan populations with populations that inhabited the territory of Pannonia during the Early Eneolithic (the Bubanj–Hum I group) are illustrated by numerous finds. Especially in the north, in the so-called Transitional Region of the Bubanj–Hum I group, ceramic finds typical of the Early Eneolithic of Pannonia occur together with Bubanj–Hum I finds. This phenomenon is particularly characteristic for the Bubanj–Hum I sites within the Transitional Region, such as Bodnjik and Livade, but also within the ceramic inventory of the Early Eneolithic cultural groups in Pannonia, where finds characteristic of the Bubanj–Hum I group, such as beakers with two handles (*kantharoi*), have been recorded.[157] Contacts are also confirmed by certain "Pannonian" stylistic and typological features within the ceramic inventory of the Mountainous Region of the Central Balkans (Fig. 7/11) and numerous finds of axes of the *Jászladány* type, with the highest distribution in the Carpathian Basin, from where they spread towards the Central Balkans and especially the Transitional Region.

The brief review of all of the essential parameters of the Late Vinča and the Early Eneolithic life in the Central Balkans conducted in this study affirms the thesis that the Early Eneolithic in the area, meaning the Bubanj–Hum I group, likely formed from the traditions of the Vinča culture, although gradually throughout the final quarter of the 5th millennium calBC. Based on the relationship of the represented stylistic and typological characteristics of ceramic inventory within the dated settlements, such as Spasovine, Grivac (horizon VI), Divostin (horizon IIb), and Banjica (horizon III), a transitional phase from the Vinča culture to the Bubanj–Hum I group could be defined. Despite the lack of absolute dates and a smaller scope of research, this was highlighted decades ago by M. Garašanin, who defined the phase as Vinča–Pločnik IIb, and by V. Trbuhović and M. Vasiljević, who defined it as the Benska Bara III phase, within the Jadar and Mačva regions.[158]

A similar peaceful and gradual transition has been recorded in Pannonia, between the Vinča culture and the early Tiszapolgár group,[159] which calls for a re-evaluation of the previous interpretation, which considered that the process of the disintegration of the Vinča culture and the formation of the Early Eneolithic groups in the Central Balkans unquestionably included potential migrations, usually from the east.[160]

CONCLUSION

Following the disintegration of the Vinča culture in the Central Balkans, the Bubanj–Hum I group was formed as a part of a larger Bubanj–Salcuţa–Krividol complex, named after the eponymous sites. The precise period of this transition and its character has remained without an answer, despite the continuous and intensive research into the Vinča culture. This study presents certain characteristic ceramic forms and absolute dates for the Late Vinča culture, the Bubanj–Hum I group, and several related groups that took part in the formation of the Early Eneolithic in the Central Balkans. The numerous stylistic and typological characteristics highlight the numerous common forms that occur both in the Vinča culture (especially the Late Vinča culture) and the Bubanj–Hum I group.[161] The differences are represented by the surface treatment, pottery quality, and ornamentation. Aside from the channels inherited from the Vinča culture, Bubanj–Hum I pottery is often painted with different colours and with graphite.

The territory of the Bubanj–Hum I group matches the territory of the Late Vinča culture to a great extent, while the BSK complex surpasses the territorial reach

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156 Šarić 2020.

157 Balen *et al.* 2017, Pl. 6/7; Sava 2015, Pl. 118/3.

158 Гарашанин 1973, 94–95; Трбуховић, Васиљевић 1983, 27.

159 Schrier 2008, 61.

160 Garašanin 1979, 204–205; Tasić 1995, 28–29; Срејовић 1998, 223–224.

161 In the recent study, Whittle *et al.* suggested that the characteristic shapes of the Vinča pottery remained relatively stable in Vinča D phase (2016, 44) which indicates certain cultural continuity till the very end of the Vinča culture.

of the Vinča culture, although Vinča sites have also been recorded in the Sofia Basin, Bregalnica Valley, and Oltenia.

Interestingly, the earliest dates for the BSK complex, including the Bubanj–Hum I group, originate from the peripheral areas of its territory (Spančevo in the Bregalnica Valley, Bodnjik in the so-called Transitional Region of the Central Balkans and Ostorvul Corbului in Oltenia), indicating that the complex originated from the Vinča culture and developed relatively simultaneously in all of the regions around 4450–4400 calBC. This data negates the previous thesis on the disintegration of the Vinča culture and the formation of the Bubanj–Hum I group, which emphasised the role of migrations of populations from the east in this process, but rather indicates that the complex was formed almost simultaneously within its entire territory, upon a unique cultural base.

It is difficult to precisely determine the period of the beginning of a certain cultural group, especially if such a large territory is in question. However, it seems that certain sites with elements characteristic of the Bubanj–Hum I group, which appear together with Vinča material, and considering the absolute dates from those sites, could be attributed to the "transitional" phase of the gradual process between the Vinča culture and the Bubanj–Hum I group. The phase, which approximately took place between 4650 and 4450 calBC (according to the available absolute dates), marked by the abandonment of long-lasting Vinča settlements and the utilisation of different topographic positions, is well illustrated by the sites of Spasovine, Grivac (horizon VI), Divostin (horizon IIb), Banjica (horizon III), Kormadin (horizon III), Prohor Pčinjski, Supska (horizons 1 and 2), etc.

The formation of the Early Eneolithic culture, meaning the Bubanj–Hum I group, was gradual and lasted for almost two centuries. It was marked by the abandonment of large settlements and the formation of smaller settlements in other locations, compared to Vinča settlements. The population of the period still utilised "Vinča" ceramic forms, yet some new forms appeared, which would be characteristic of the Early Eneolithic and the Bubanj–Hum I group. The gradual transition did not interrupt the life of the "Vinča" population and, besides the process of cultural transmission with neighbouring regions, especially to the east, no intensive social processes have been noted.

This is the phase, or the transitional phase (period) within the transition between the Vinča culture and the Eneolithic groups (in this case the Bubanj–Hum I group) that was marked as the Benska Bara III phase decades ago by V. Trbuhović, and M. Vasiljević, and which M. Garašanin defined as the Vinča–Pločnik IIb phase.

Such a gradual transition allowed a certain cultural uniformity in this territory, which could already be noted during the developed Vinča culture, in the final quarter of the 6th millennium calBC. A cultural connection with populations east of the Vinča territory was achieved, especially in Thrace, which formed a sort of "similar" cultural basis in this territory, based on the intensified processes of horizontal cultural transmission. This similar cultural base, which would develop into the Early Eneolithic Gumelnița–Kodjadermen–Karanovo VI and BSK cultural complexes, prevailed within the later phases of the Neolithic, during the first half of the 5th millennium calBC. In that period, those contacts became more intensive, especially with the population of present-day western and south-western Bulgaria and the lower Vardar Region. This interaction resulted in a sporadic occurrence of painted pottery in the Central Balkans at the end of the second quarter of the 5th millennium calBC, within the so-called transitional phase of the Vinča culture. Painted pottery would later be well represented within the Bubanj–Hum I group, at least at the sites in the Morava Region and the Timočka Krajina Region.

Besides the material culture, the Bubanj–Hum I group inherited other knowledge and experiences from the Vinča culture through the process of so-called vertical genetic cultural transmission.[162] These were related to the metallurgy, and chipped stone industry, and, based on numerous finds of altars, spiritual life during the Eneolithic did not differ from the preceding period. The general economic strategies remained more or less the same, with small regional variations, despite the shift in settlement topography. The reasons for such a shift remain unclear, yet it can be assumed that the exhaustion of fertile soil surrounding the long-lasting Vinča settlements or climate change during the second quarter of the 5th millennium calBC played an important role.

At the same time, similar changes occurred in Pannonia, where the Tisza culture, with some regional Late Neolithic groups (Proto-Tiszapolgar phase of Herpaly group, Csoszhalom-Oborin group, etc.) gradually

[162] Eerkens, Lipo 2007, 243.

developed into the early Tiszapolgár group.[163] Likewise, the Eneolithic population abandoned long-standing Neolithic settlements, which was one of the few changes within this transition. Such a character of transition indicates a peaceful, long-lasting and gradual shift, without the significant impact of external factors, which is completely opposed to previous theses, which considered the migrations from the east as one of the key factors for the disintegration of the Vinča culture and the formation of the Eneolithic groups in the Balkans. Therefore, it seems as though there was no disintegration of the Vinča culture, but rather its transformation into the Early Eneolithic groups, the Bubanj–Hum I group in our case.

At the end of the 5th and the beginning of the 4th millennium BC, certain changes took place in the Central Balkans. Those changes could partially represent the result of potential migrations within the Lower Danube Region, but such a subject surpasses the chronological framework of this study.

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[163] Diaconescu 2009, 261–262.

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Aleksandar BULATOVIĆ, H. Arthur BANKOFF, Wayne POWELL, Vojislav FILIPOVIĆ
Some Remarks on the Genesis of the Early Eneolithic in the Central Balkans (9–40)

Резиме: АЛЕКСАНДАР БУЛАТОВИЋ, Археолошки институт, Београд
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НЕКЕ ЗАБЕЛЕШКЕ О ГЕНЕЗИ РАНОГ ЕНЕОЛИТА НА ЦЕНТРАЛНОМ БАЛКАНУ

Кључне речи. – централни Балкан, касновинчанска култура, рани енеолит, Бубањ – Хум I група, карактеристични керамички елементи, апсолутни датуми

У овој студији реч је о недовољно јасно дефинисаном периоду на крају неолита и почетку енеолита на централном Балкану. Главна тема овог текста нису развој и дезинтеграција позне винчанске културе, о чему је доста писано у последње време, него карактер и хронологија односа између позне винчанске културе и раноенеолитске групе која ће је наследити на овој територији (Бубањ – Хум I као регионална варијанта комплекса Бубањ–Салкуца–Криводол – скраћено БСК), као и процес настанка те групе. Ова студија, стога, анализира одређене карактеристичне керамичке форме које потичу искључиво са апсолутно датираних локалитета, једнослојних или оних са добро дефинисаном вертикалном стратиграфијом, као и хронологију (апсолутне датуме) касновинчанске културе и групе Бубањ – Хум I на централном Балкану.

Због специфичних географских карактеристика централног Балкана, али и ради лакшег праћења излагања, територија централног Балкана интерпретирана је у раду путем две засебне географске регије – прелазне регије (део Посавине и Подриња, басени Јадра, Колубаре, Тамнаве и доњег тока Велике Мораве, планина Цер, као и побрђе на југу и истоку ограничено планинама Гучево, Повлен, Маљен, Сувобор и Рудник) и планинске регије (планинска област централног Балкана).

Анализа стилских и типолошких карактеристика керамике указала је на бројне заједничке керамичке форме које се јављају како у винчанској култури (посебно касној винчанској култури), тако и у групи Бубањ – Хум I. Разлике се уочавају у површинској обради, квалитету грнчарије и техници и мотивима украшавања.

Територија групе Бубањ – Хум I, такође, у великој мери подудара се са територијом касновинчанске културе, а занимљиво је да најранији датуми за БСК комплекс, укључујући групу Бубањ – Хум I, потичу са периферних подручја његове територије (Спанчево у долини Брегалнице, Бодњик у такозваној прелазној регији централног Балкана и Осторвул Цорбулуи у Олтенији), што може да указује на то да је овај раноенеолитски комплекс проистекао из винчанске културе и да се развијао приближно истовремено у свим регионима почевши од око 4450–4400. пре н. е. Ови подаци би могли да доведу у питање претходну тезу о распаду винчанске културе и формирању групе Бубањ – Хум I, која је истицала улогу миграција становништва са истока у том процесу, те да укажу на то да је раноенеолитски комплекс настао приближно истовремено на целокупној својој територији, на мање-више јединственим, а највећим делом аутохтоним културним основама.

Резултати анализа стилско-типолошких одлика карактеристичних керамичких форми винчанске културе и културне групе Бубањ – Хум I, уз осврт на њихове економске стратегије, духовну културу, индустрију окресаног камена, топографију и архитектуру насеља као и процес металургије, показују да је прелазни период од краја винчанске културе до појаве класичне Бубањ – Хум I групе био постепен и континуиран процес који се на простору централног Балкана одвијао уз извесне културне контакте са суседним заједницама, посебно на истоку. Овај културни процес између 47. и 45. века пре н. е. резултирао је формирањем групе Бубањ – Хум I, која ће егзистирати током друге половине V миленијума на највећем делу територије централног Балкана.

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LOCAL PROVENANCE OF RAW MATERIALS FOR PREHISTORIC POTTERY PRODUCTION AT THE SPASOVINE TIN PLACER SITE (WESTERN SERBIA)

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Abstract. – Archaeological finds at Spasovine, on the south flank of Mt Cer, near the town of Milina, indicate that it was settled in the Eneolithic and seasonally inhabited for tin placer mining in the Late Bronze Age. The site is highly disturbed and abraded domestic pottery is the most common material found. An analysis of the mineralogical assemblages that comprise the temper sand in a subset of the prehistoric pottery sherds from the site indicate that the sand was obtained from the adjacent Milinska River. Key minerals that link the pottery to on-site production from local materials include almandine-spessartine series garnets, the tin-bearing mineral cassiterite (SnO_2) and a microlite group mineral ($[Ca,Sn,U]_2[Ta,Nb]_2O_6(OH,F]$). The unusually common occurrence of cassiterite within the pottery sherds relative to the abundance in the Milinska today suggests that the tin ore grade in the Milinska River may have been significantly higher in prehistory.

Key words. – Eneolithic, Bronze Age, Pottery, Provenance, Temper, Mt Cer

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The archaeological survey[1] identified four archaeological sites south of Mt. Cer that contain Bronze Age material, all of which are situated on river terraces adjacent to the tin-bearing Milinska, Lešnica and Cernica rivers.[2] All sites have dominantly Late Bronze Age material on the surface, mixed with earlier and/or later material. The Spasovine site (44°34'31.8"N, 19°27'44.9"E) is located 82 km east-southeast of Belgrade (Fig. 1). It yielded the highest quantity of archaeological material, including ceramics that securely date site occupancy to the Eneolithic, Late Bronze Age and Roman period, and show characteristics related to other known sites from the region. The five hectare site lies on top of a gently sloping plateau overlooking the valley of the Milinska River, at the confluence of the Milinska and Lešnica rivers, and coincides with the highest concentrations of placer cassiterite at Mt Cer (Fig. 1). [2] A thorough pedestrian survey of the site at Spasovine resulted in finds of stone hammers and abraders, prehistoric pottery of varying ages, fragments of burnt daub, and a stone mould for casting pins or needles, and crucibles, suggesting metallurgical activity on site.[3]

The field surveys provided many surface finds from the metal periods (Eneolithic, Bronze and Iron ages), as well as from the Late Roman period.[4] Local museums house copper and bronze objects found in the area immediately surrounding Spasovine, possibly even Spasovine itself (reported locations: Detinji potok and Staro selo). These objects verify the chronological

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[1] The joint multidisciplinary international project Archaeological Investigations of the Settlement Systems, Burial Customs, and Mining Resources in the Bronze Age of North-western Serbia is realised by the Institute of Archaeology in Belgrade and the Brooklyn College CUNY.

[2] Huska *et al.* 2014.

[3] Huska *et al.* 2014, 487, fig. 8.

[4] Bankoff *et al.* 2013, 63; Huska *et al.* 2014; Bulatović *et al.* 2017, 213.

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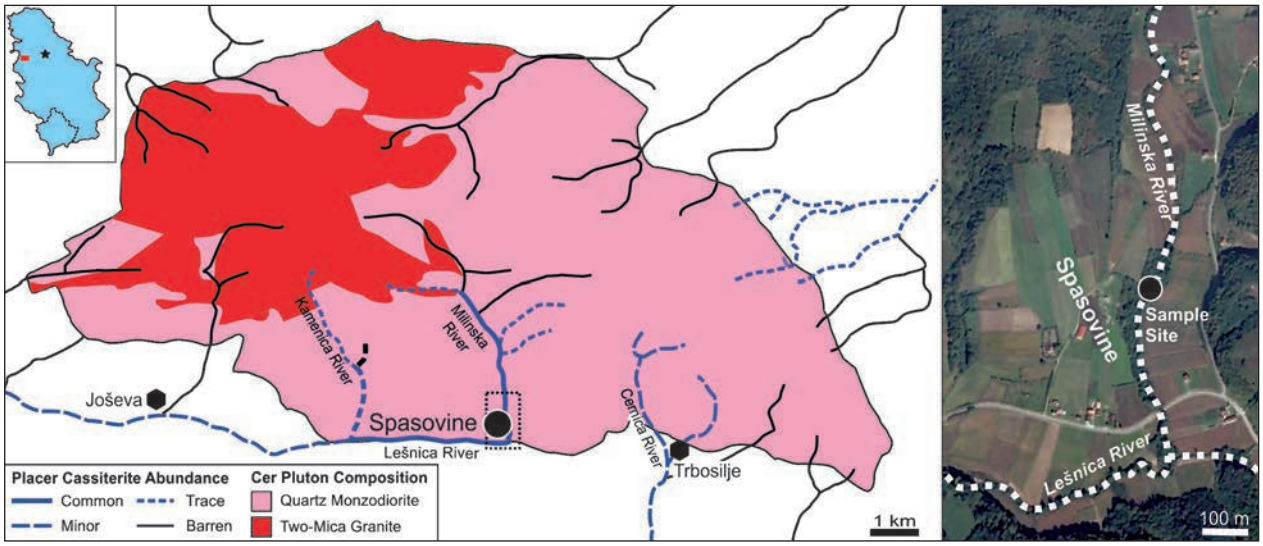

Fig. 1. Location and geology of Mt Cer and the Spasovine site. Pegmatite and aplite bodies are not illustrated due to their small size (Intrusive phases are based on Filipović et al. 1971 and Mojsilović et al. 1975)

Сл. 1. Положај и геологија планине Цер и локалитета Спасовине. Формације пегматита и аплита нису приказане услед њихове мале величине (Интрузивне фазе су преузете из Filipović et al. 1971 and Mojsilović et al. 1975)

span from the Late Eneolithic, via Late Bronze to the Early Iron Age.[5] Small exploratory trenches were excavated at Spasovine, which yielded additional artefacts, and evidence for stratigraphy. One Late Eneolithic burnt wattle and daub house discovered by geomagnetic surveying in 2018 indicated that the site was settled at that time.[6] However, no Late Bronze Age architectural features have been discovered, despite the presence of artefacts from this time.

Both coarse and fine ceramic wares at Spasovine occur as small (<50 mm), abraded, and rounded fragments. Their condition is consistent with surface material from later Bronze Age sites and single-period Eneolithic sites in the area south of the Danube. Such sites are shallow, usually consisting of a single cultural layer covered by active humus. They are easily destroyed by ploughing, especially under modern machine-aided agriculture. The worn and rolled condition of the pottery at Spasovine is consistent with having been destroyed by ploughing and erosion. For this study, small pottery pieces with medium and coarse temper were examined.

South of Mt Cer, Late Bronze Age pottery is only found on river terraces adjacent to cassiterite-bearing streams, suggesting that these sites were occupied for the purpose of placer tin mining.[7] Local Late Bronze Age tin mining is further supported by the proximity of Spasovine to the Paulje necropolis, 10 km to the south-west, which contains some of the most varied Late Bronze Age bronze finds in Serbia. These include 13 bronze pins up to a metre in length, which are unique to the region.[8]

A similar pattern has been noted in the tin-rich Erzgebirge of Bohemia/Saxony. Regions rich in tin placers lack evidence of permanent habitation during the Bronze Age. However, stray finds and pottery in proximity to tin placer deposits suggest the temporary presence of people for the purpose of tin mining.[9] Recently, geoarchaeological evidence has confirmed that placer tin mining occurred in the western Erzgebirge between 1900 and 1400 BC,[10] coeval with the Únětice culture and their princely graves. Thus, temporary, likely seasonal, occupation of tin placer sites appears to have been the norm in the Bronze Age across Central Europe and the Balkans.

[5] Bulatović *et al.* 2017, 214–215.
[6] Mladenović *et al.,* in press.
[7] Huska *et al.* 2014.
[8] Vasić 2003, 47–49.
[9] Bartelheim *et al.* 1998; Bouzek *et al.* 1989.
[10] Tolksdorf *et al.* 2019.

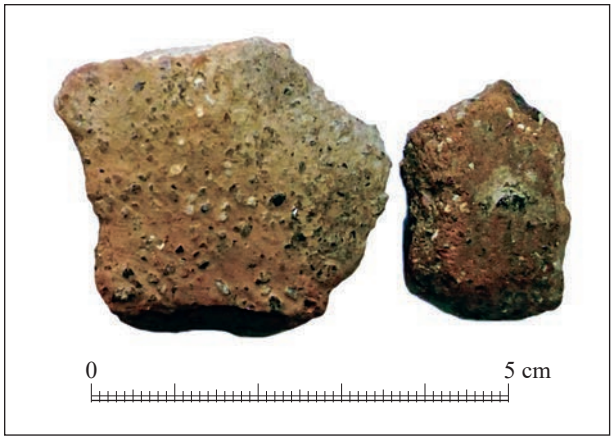

Fig. 2. Representative examples of coarse-ware pottery fragments analysed

Сл. 2. Примерци анализираних ӣрубих фраӣмената керамике

With a lack of architectural features and the paucity of artefacts found at placer mining sites across Europe, little is known about the complexity and longevity of these camps. Given that pottery fragments are by far the predominant artefact at Spasovine, they provide the most opportune means by which to discover aspects of life in these mining camps, specifically, regarding the complexity and longevity of habitation. Analysis of the pottery can reveal whether it was imported to the site during seasonal mining activities, or produced on site from local materials. The latter would imply longer periods of habitation and/or a more complex social structure with division of labour. Here we report on the mineral composition of the temper sand in Spasovine coarse-tempered pottery sherds from the metal ages, and potential river sand sources for the purpose of determining the location of ceramic production and its implications for the nature of the Spasovine tin mining habitation.

Materials and Methods

A representative set of 40 small sherds (<50 mm) of coarse-temper Late Eneolithic and/or Late Bronze Age ceramics lacking ornamentation (Fig. 2) were selected for analysis under the supervision of project archaeologists. For most of the fragments it is not possible to determine a precise chronology, but all were from prehistory. Samples C13 and C24, however, could be assigned definitively to the Eneolithic period (A. Bulatović, pers. comm., 2019). Each sherd was photographed and examined under a binocular microscope for the presence of exposed heavy mineral temper grains. Seven samples that displayed sand particles of garnet on their surface were set aside, and both inner and outer surfaces were examined under a SEM-EDS (Hitachi TM3030Plus scanning electron microscope at 15kV and an Oxford Instruments AZtec energy dispersive spectrometer with an AZtecOne software platform) to identify all heavy mineral grains observed. These semi-quantitative analyses were used to define the major element components of each mineral grain so that mineral formulae/identities could be deduced stoichiometrically, in conjunction with the physical features observable under the scanning electron microscope (form, cleavage) and binocular microscope (colour, lustre).

Twenty-five of the remaining sherds that displayed only a quartz and feldspar temper on their surfaces were crushed to <2mm, and sieved into coarse (>1mm), medium (0.4–1.0 mm), and fine (<0.4mm) fractions. Heavy minerals were extracted from the medium fraction using flotation separation with a solution of sodium polytungstate ($3Na_2WO_4 \bullet 9WO_3 \bullet H_2O$) having a density of 2.9 g/cm³. For each crushed sherd, all heavy minerals (i.e., those denser than 2.9g/cm³) were analyzed and identified using the SEM-EDS, as described above. In addition, a minimum of five grains of the ceramic body were analyzed using the SEM-EDS to determine the major element chemical composition of the clay component.

Representative samples of sand from the Milinska River adjacent to Spasovine were obtained using a portable sluice box (see Fig. 1 for sample site). The sluice output was panned on site to a “black-sand” concentrate, which was then dried and sieved. An Olympus Delta portable x-ray fluorescence device (pXRF) was used to determine the tin content of the “black-sand” concentrate on site. Using the same procedure, heavy mineral concentrates were obtained from the neighbouring rivers (the Kamenica at its confluence with

	C1	C2	C3	C4	C5	C7	C9	C10	C11	C13	C17	C18	C21	C24	W4	W5	W6	W7	Total #	Total %
Garnet	7	8		7	33	40	8	8	25	24	42	30	34		25	7	11	9	70	17
Allanite					15		38	13				10	21	15		7	1		29	7
Anthophyllite	14	17		14															10	2
Apatite	17	8						4		6				8			1		12	3
Biotite	2							4		6		5			33	13	14	64	27	7
Cassiterite	7		5		4		8			6		10					1		10	3
Chlorite	2																		1	0
Epidote	5	8		21			8	4		8			4	8			1		14	3
Hornblende	19	25	68	14		40		33	8	12	8	25	25	62		20	7		78	19
Ilmenite		8													8	7	25	9	22	5
Monazite																			0	0
Muscovite	5								25								11		13	3
Pyrite		8		7			8		17										5	1
Rutile	2							8	8			10	2		17	7	7		15	4
Sphalerite				7					8			10							4	1
Titanite	2		23		41	10	8	16	8	25			13		8		3		38	9
Tourmaline	12					10	15			12	50								16	4
Tremolite	7	8	5		7			13		12			2	6					14	3
Xenotime																7		9	2	0
Zircon	2	8													8	33	18	9	22	5
Number	42	12	22	14	27	10	13	24	12	17	12	20	53	13	12	15	73	11		

Table 1. Heavy mineral temper sand grains identified in Spasovine pottery fragments

Табела 1. Инклузије тешких минерала из фрагмената керамике са локалитета Спасовине

the Lešnica River; Cernica, south of Trbosilje; Fig. 1) and two other tin-bearing streams in the region, Dugačko Creek on Mt Bukulja (Serbia), and the Lepenica River on Motajica (Bosnia). Subsequent sodium polytungstate flotation produced 57.5 g of heavy mineral concentrate from the 0.4 to 0.8 mm fraction from the Milinska, 56.0 g from the Cernica, 19.4 g from the Kamenica, 46.5 g from the Dugačko, and 440.0 g from the Lepenica. The heavy mineral assemblages were further subdivided based on magnetic susceptibility using a Frantz Isodynamic Magnetic Separator, after magnetite was removed using a hand magnet. Each magnetic separate was weighed and an aliquot was taken to produce a polished thin section or grain mount. Minerals were identified and point-counted using the binocular microscope and SEM-EDS.

Results

Heavy-mineral sand grains were found in 21 of the 25 crushed sherds, and 14 of these contained more than 10 grains of heavy mineral sand. Garnet is the most frequently occurring mineral (in 18 sherds), along with titanite (14 sherds) and hornblende (11 sherds). The mineral content of all samples with ten or more heavy mineral grains (14 crushed sherds and 4 whole sherds) are listed in Table 1. All garnets (n=48) exhibited a limited composition range in the spessartine-almandine series (Fig. 3), with an average Fe:Mn:Mg:Ca composition of 49:41:8:1. Garnets were well preserved and unabraded, exhibiting crystal forms and surface growth striations (Fig. 4). Cassiterite was found in seven pottery samples, including one in which cassiterite was observed protruding from the surface of the pottery (Fig. 5). A second Sn-bearing mineral of the microlite group ($[Ca,Sn,U]_2[Ta,Nb]_2O_6(OH,F)$) was identified in one ceramic fragment (Fig. 5).

The heavy mineral assemblage from sediments of the Milinska River adjacent to Spasovine is listed in Table 2. Garnets is by far the most abundant component, with the garnet fraction extracted using the Frantz Isodynamic Magnetic Separator at 0.4A comprising 72% of the sample mass. Molar percentages of Fe, Mg, Mn, and Ca calculated from semi-quantitative EDS analysis of 100 garnet grains from the Milinska River sand indicate that they are of the spessartine-almandine series (Fig. 3), with an average Fe:Mn:Mg:Ca composition of 50:41:8:1, essentially the same as that found in the pottery sherds. Based on pXRF analyses of the samples, cassiterite is estimated to comprise up to 0.25% of the sluice output, and 2.3% of the heavy mineral concentrate. Mineral assemblages from the neighbouring Kamenica and Cernica rivers are similar to that of the Milinska River. Garnets from the

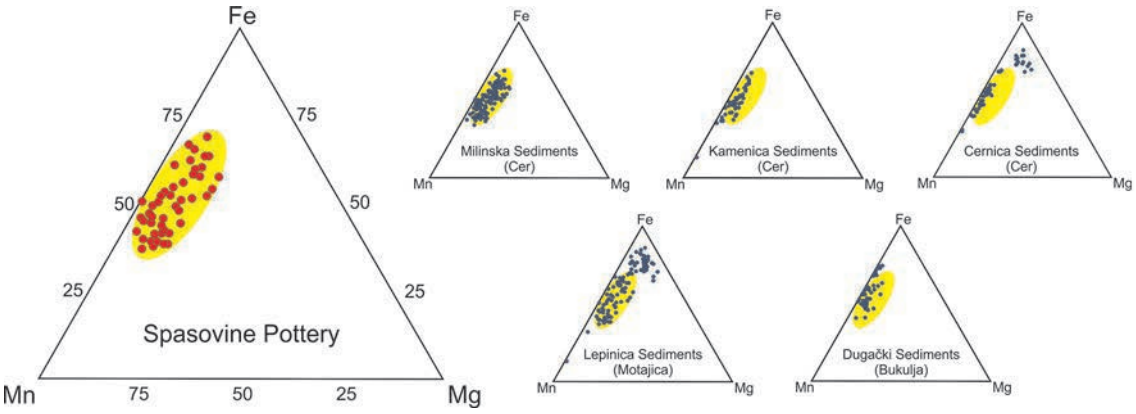

Fig. 3. Composition of garnets found in Spasovine coarse-ware and sands from cassiterite-bearing streams at Mt Cer, Mt Bukulja, and Motajica
(The shaded ellipse denotes the compositional range exhibited by garnets in Spasovine pottery)

Сл. 3. Састав граната откривеног у грубој керамици са локалитета Спасовине и алувијалних песака са каситеритом из токова на Церу, Букуљи и Мотајици (БиХ)
(Осенчена елипса означава састав граната из керамичких фрагмената)

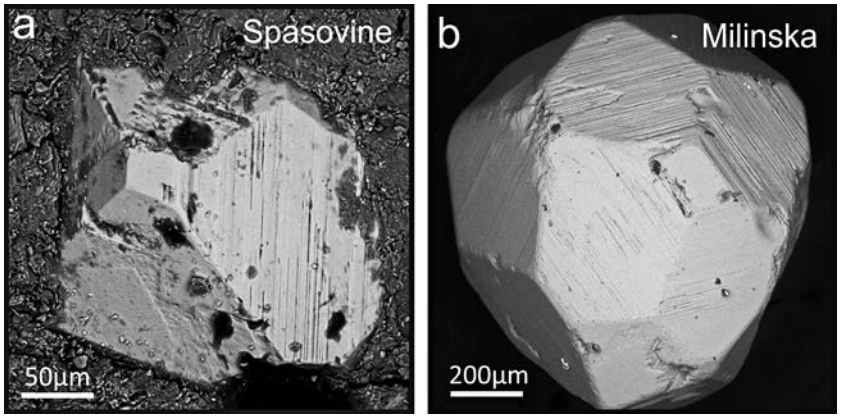

Fig. 4. Backscatter electron images of garnets:
a) embedded in Spasovine pottery;
b) within Milinska sands.

Сл. 4. Снимци граната помоћу повратно расутих електрона:
а) из керамике; b) из алувијалног наноса Милинске реке

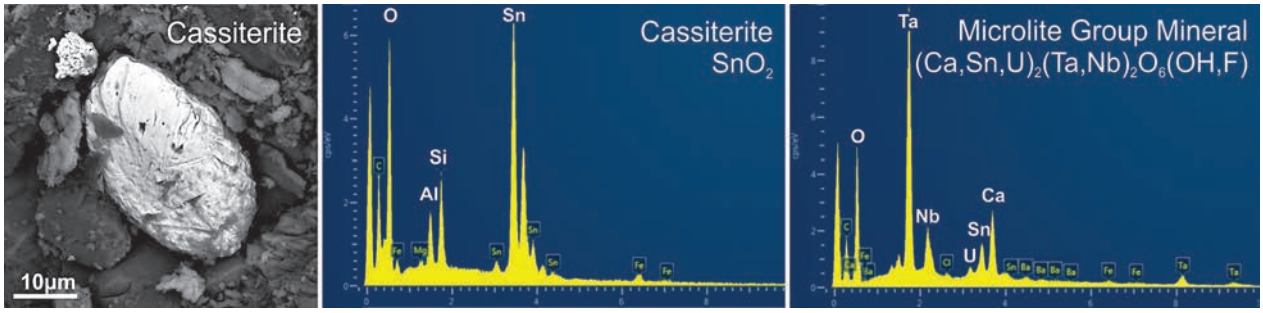

Fig. 5. Backscatter electron image of cassiterite grain embedded in pottery matrix, and EDS analyses of tin minerals found within pottery sherds: a) Cassiterite grain embedded in pottery surface; b) EDS spectrum of cassiterite; c) EDS spectrum of Sn-bearing microlite group mineral

Сл. 5. Снимци каситерита помоћу повратно расутих електрона у саставу керамике и EDS анализа минерала калаја регистрованих у фрагментима керамике: а) Зрно каситерита у саставу керамике; b) EDS спектар каситерита; c) EDS спектар ситних кристала минерала који садрже калај

Mineral	Milinska	Cernica	Kamenica	Bukulja	Motajica
Allanite	11.3	11.4	17.1		Trace
Andalusite		Trace	Trace	2.0	Trace
Anthophyllite			3.9	0.2	
Apatite	0.4	0.3	0.9	0.5	
Augite					Trace
Bastnäsite					Trace
Biotite	0.2	0.3	0.4	0.3	Trace
Bismuth	Trace				
Calcite	Trace	Trace			
Cassiterite	2.3	1.1	Trace	1.0	Trace
Chlorite	Trace	0.1	Trace	Trace	
Columbite	0.1	0.4	Trace	0.1	
Corundum				Trace	
Chromite				0.1	
Dolomite	0.1				
Epidote	0.1	1.1	0.3	1.6	3.0
Euxenite	Trace				
Gahnite	Trace			Trace	
Garnet	72.0	71.56	40.0	31.1	12.9
Hematite	Trace	0.4	0.2	1.6	3.2
Hornblende	4.0	0.9	5.7	0.2	0.9
Ilmenite	Trace	0.1	Trace	53.4	73.9
Ixiolite	Trace				
Jacobsite					
Magnetite	1.9	1.1	1.0	1.2	3.2
Monazite	Trace	Trace		Trace	Trace
Muscovite	0.2	Trace	0.1	0.7	Trace
Orthopyroxene				0.4	
Rutile	0.1		Trace	2.1	1.0
Scheelite					
Staurolite			0.6	0.1	Trace
Tantalite					Trace
Thorite				0.1	
Titanite	8.2	8.2	26.0	Trace	Trace
Tourmaline	0.4	3.3	2.6	1.5	Trace
Wolframite				0.1	
Zircon	0.1	0.1	0.2	0.3	Trace

Table 2. Heavy minerals identified in tin-bearing streams from Mt Cer, Bukulja, and Motajica

Табела 2. Тешки минерали дешекшовани у йошоцима који носе калај са йланина Цер, Букуља и Мошајица

Kamenica River (average Fe:Mn:Mg:Ca 49:45:5:1) are similar to Milinska garnets, but Cernica sands contain two populations of garnets (average Fe:Mn:Mg:Ca 51:45:2:1 and 74:12:12:2).

The heavy mineral assemblage from sediments of Bukulja (Table 2) are distinct from those of the Milinska River. Ilmenite ($FeTiO_3$) is the most abundant phase at 53 wt%, while titanite accounts for only <0.1 wt% of the sample. Spessartine-almandine series garnet is second in abundance (31 wt%). On average, the garnets are more Fe-rich and Mg-poor than those from Cer (Fig. 5), with an average Fe:Mn:Mg:Ca composition of 58:39:3:1. Unlike Milinska sands, those from Bukulja contain high-grade metamorphic minerals such as andalusite and staurolite, and lack allanite. The cassiterite content of the sample is 1 wt%.

The Lepenica sands yielded trace cassiterite (0.01 wt%). Ilmenite is the predominant heavy mineral from this location (73.9 wt%). Garnets from Lepenica have a compositional range similar to those from the Cernica, extending to more Fe- and Mg-enriched compositions (Fig. 3).

Discussion

The Milinska River flows from the southern slope of Mt Cer. The mountain is underlain by a composite pluton consisting of quartz monzodiorite (heavy mineral phases include up to 8 vol% hornblende, with accessory titanite, allanite, epidote, zircon, apatite, rutile, magnetite, and ilmenite) and two-mica granite (accessory garnet, tourmaline, apatite, rutile, zircon) (Fig. 1).[11] Tin mineralisation (cassiterite) in small pegmatites and greisens within the Mt Cer pluton is associated with epidote, scheelite, columbite, rutile, uraninite, monazite, sphalerite, fluorite, and bismuthinite.[12] As noted by Koreoneos et al. (2011), the southern contact of the pluton is in fault contact with the weakly metamorphosed sedimentary rocks of the Jadar block, and so no high-grade contact metamorphic rocks lie within the Milinska's watershed. The five most common heavy minerals comprising the sand at the mouth of the Milinska River are (in descending order) garnet, allanite, titanite, hornblende, and cassiterite (Table 2). Two other Sn-bearing minerals have been documented in the Milinska River by Huska et al. (2014), ixiolite [$(Ta,Nb,Sn,Mn,Fe)_4O_3$] and euxenite [$Y,Ca,Ce,U,Th][Nb,Ta,Sn,Ti]_2O_6$,. The assemblage is consistent with the mineral composition of the granitic rocks upstream, with no additional metamorphic or sedimentary component.

The Kamenica River, 2.5 km west of the Milinska, contains a similar mineral assemblage but with different proportions; titanite and amphibole are more abundant and less garnet is present (Table 2). In addition, cassiterite is present only in trace amounts in the Kamenica, and no other tin-bearing minerals have been documented in this study or by Huska et al. (2014). The Cernica River, 3 km to the east, yields a heavy mineral assemblage almost identical to that of the Milinska, including a low percentage of cassiterite and the presence an additional tin mineral, euxenite (Table 2),[13] reflecting the similarity of the upstream granitic rocks. However, the Cernica River sediments are distinct in having a metamorphic mineral (e.g., andalusite) which accounts for the second population of Fe-Mg-enriched garnets.

The five most common heavy minerals comprising the Spasovine ceramic temper are (in descending order) hornblende, garnet, titanite, allanite, and biotite (Table 1), similar to the Milinska sand assemblage. The almandine-spessartine series garnet that occur in both the pottery and the Milinska sands are identical in their compositional range, and lack a subset of predominantly almandine garnets that are typical of garnets from metamorphic rocks, and which are present at in the sediments from the Cernica and Lepenica rivers (Fig. 3). Cassiterite accounts for 3% of the heavy mineral grains in the sherds by volume, and the Sn-bearing mineral from the microlite group was also found. Although microlite group minerals have not yet been documented in Milinska River sediments, they have been found to contain a variety of other Sn-bearing minerals, including ixiolite and euxenite. Thus, the heavy mineral assemblages within the pottery from Spasovine and the river sands from the Milinska River are strikingly similar, suggesting that the pottery was sourced and produced on, or near, the Spasovine site.

Since cassiterite was observed protruding from the surface of one of the Spasovine sherds, there is no doubt that the temper sand was extracted from a tin-bearing source, the Milinska or Cernica being the most obvious candidates for temper provenance. Being a rare mineral, there are few localities in the region where such sands have been documented. Other than Mt Cer, the two closest cassiterite-bearing stream sediments occur on Mt Bukulja, 90 km to the southeast, and Motajica, 150 km to the northeast. Accordingly, sediments from these two sites were examined to determine if they could have been the sources of temper sand (i.e., ceramics imported from another mining site to Spasovine).

The granite that underlies Mt Bukulja is similar in age (~20 Ma) and origin to that of Mt Cer.[14] However, it is compositionally distinct, being composed predominantly of two-mica granite with an accessory assemblage of titanite, allanite, apatite, zircon, and ilmenite, and with rare garnet and tourmaline.[15] In addition, a 3 km wide metamorphic aureole surrounds the Mt Bukulja pluton.[16] This difference in geological composition is reflected in the heavy mineral assemblage within cassiterite-bearing streams on Mt Bukulja, in which ilmenite is more abundant than garnet, and high-grade metamorphic minerals are present (e.g., andalusite) (Table 2).

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[11] Koroneos *et al.* 2011.
[12] Palinkaš *et al.* 2008.
[13] Huska *et al.* 2014.
[14] Cvetković *et al.* 2007; Koreonos *et al.* 2011.
[15] Cvetković *et al.* 2002.
[16] Cvetković *et al.* 2002.

At 47 Ma, the granitic pluton underlying Motajica is older than those of Cer and Bukulja and intrudes sedimentary and basaltic strata that had experienced Barrovian metamorphism up to the amphibolite facies.[17] The pluton contains a diverse suite of granitoids, including two-mica granite, granodiorite, and monzogranite.[18] The heavy mineral assemblage in the cassiterite-bearing Lepenica River is overwhelmingly dominated by ilmenite (79 wt%) (Table 2). The garnets are varied in composition (Fig. 3) reflecting their having originated from multiple sources, including both granites and metamorphic rocks.

The mineral assemblages from streams at Motajica and Bukulja are markedly different from those flowing from the south slope of Mt Cer, particularly with regards to the abundance of ilmenite relative to garnet, the presence of metamorphic minerals, and the major element composition of garnets – consistent with differences in the associated bedrock geology of these three areas. The mineral composition of stream sediments from Motajica and Bukulja do not correspond to those used as temper at Spasovine. Therefore, these two sites may be excluded as potential sources of the temper found in Spasovine coarse-tempered ceramics. One observation regarding cassiterite in the pottery is that it is far more common than would be expected based on the current ore grade in the river gravels. This suggests that the placer sands of the Milinska River may have been significantly richer in tin in prehistory.

The mineral assemblage of sands from the Milinska River are cassiterite-bearing, but distinct from those of other streams in the Central Balkans where cassiterite has been documented (Bukulja in Serbia; Motajica and Prosara in Bosnia and Herzegovina). This is true in terms of minerals present, relative mineral abundances, and the composition of garnets. Furthermore, the heavy mineral sand grains that form the temper in domestic pottery fragments at Spasovine match those in the sediments of the adjacent Milinska River. This provides conclusive evidence that these ceramics were produced on site from local materials, which demonstrates that the site was inhabited during the Late Bronze Age despite there being no dwelling structures of that age uncovered at Spasovine. The lack of buildings and kilns, but the necessity of producing domestic pottery on-site from locally procured materials would be consistent with the site being inhabited for a short duration seasonally, as would be expected for placer tin mining in the Milinska River. Our experience in sluicing the Milinska River is that it is typically unworkable beyond mid-June, providing a three to four-month window for mining activities each year.

Conclusions

Rare Sn-bearing minerals and garnets with a limited Fe-Mn-rich compositional range occur both in the sand deposits of the Milinska River and the temper within Eneolithic and Bronze Age ceramics from the adjacent prehistoric site of Spasovine. This correlation demonstrates conclusively that the ceramics were produced on site from local materials. Thus, the site must have been inhabited in the Late Bronze Age, despite there being no remains of dwelling structures and kilns. This is consistent with the site being used as a camp for placer mining during spring high-water seasons.

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[17] Ustaszewski *et al*. 2010.

[18] Ustaszewski *et al.* 2010.

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Резиме: ВЕЈН ПАУЕЛ, Одељење за науку о земљи и животној средини, Бруклин колеџ
ЛИНА ПАЋИФИКО, Одељење за науку о земљи и животној средини, Бруклин колеџ
ТЕРЕНС МИЧЕЛ, Одељење за науку о земљи и животној средини, Бруклин колеџ
СТЕФАНИ КРУЗ, Одељење за науку о земљи и животној средини, Бруклин колеџ
АРТУР БАНКОФ, Департман за антропологију и археологију, Бруклин колеџ

ПРОВЕНИЈЕНЦИЈА ПРАИСТОРИЈСКЕ КЕРАМИКЕ СА ЛОКАЛИТЕТА СПАСОВИНЕ – АЛУВИЈАЛНОГ ЛЕЖИШТА КАЛАЈА

Кључне речи. – енеолит, бронзано доба, керамика, провенијенција, састав, Цер

Археолошки налази са локалитета Спасовине, на јужним обронцима планине Цер, у атару села Милина, указују на то да је овај простор био насељен још у време бакарног доба, док је у периоду позног бронзаног доба вероватно сезонски посећиван како би се испирали, калајем богати, алувијални седименти из оближњег потока. Ерозивни процеси донекле су пореметили археолошке слојеве, па најчешће налазе представљају груби фрагменти керамике. Анализа минеролошког састава примеса у структури керамике показује да је песак узиман из суседне Милинске реке. Главни минерали који повезују локалне сировине из керамике са производњом на самом локалитету јесу алмандинско-спесартински гранати ограниченог минералног састава, као и калајни минерали каситерит (SnO_2) и микролит ($[Ca,Sn]_2[Ta,Nb]_2O_6(OH,F)$). Неуобичајено учестала појава каситерита у фрагментима керамике у директној је вези с њиховим присуством у алувијалним наносима Милинске реке, али може, с друге стране, указати и на то да је количина калаја у праисторијским алувијалним наносима била знатно виша него данас.

У погледу окупације локалитета Спасовине може се закључити да први стамбени објекти потичу из енеолитског периода, док за раздобље позног бронзаног доба то за сада не можемо са сигурношћу тврдити. Испирање алувијалног калајног минерала каситерита на овом локалитету имало је, чини се, сезонску активност у познијим периодима, будући да наша истраживања упућују на то да испирање на Милинској реци није било могуће у релативно сушним периодима. С друге стране, с великим степеном вероватноће можемо указати на чињеницу да су популације чију керамику налазимо на терасама ове реке користиле локалне материјале за њену производњу.

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BRONZE AGE SETTLEMENT AND NECROPOLIS OF TRNJANE, NEAR BOR – REVISION AND NEW RESEARCH RESULTS

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Abstract. – In archaeological literature, the site of Trnjane, near Bor in eastern Serbia is known as an urn necropolis, with 43 discovered urn graves. The excavations in Trnjane took place between 1985 and 1987–1989, and continued in 1998. The investigations also included an excavation of a nearby settlement, but the results of this research were never published. In most of the previous studies, Trnjane was assigned to the Middle and Late Bronze Age, while the necropolis was often connected with the spread of the Urnfield Phenomena from Central Europe toward the Balkans. New investigations started in 2017 as cooperation between the Archaeological Institute in Belgrade and the Institute for Oriental and European Archaeology (OREA) of the Austrian Academy of Sciences shed new light on the chronology and cultural assignment of Trnjane and other similar surrounding sites in the region of eastern Serbia. The excavation of the settlement area in 2017 and 2018 yielded numerous finds indicating metallurgical activities connected with copper ore smelting (slag and ores), while pottery finds showed a typological resemblance with an Early and Middle Bronze Age repertoire. The radiocarbon dates from the settlement area and from urn graves of the neighbouring necropolis also point to a much earlier time than previously assumed. The new chronological determination of Trnjane raises a set of new questions, especially regarding the cultural connections between central Europe and the Balkans and transfers of copper ore smelting technology in the Bronze Age.

Key words. – Bronze Age, eastern Serbia, urn necropolis, metallurgy, copper smelting

The site of Trnjane is situated near the village of Banjsko Polje, 7 km to the west of the city of Bor. The settlement and necropolis are located on a gently east-west sloping terrace above the creek depression that leads to the Brestovačka River in the south. The terrace is flanked by several hills, with Čoka Trnjana (544 m) to the north as the highest and two closer hills to the southwest and southeast (both around 450 m), creating a setting of a natural amphitheatre with the settlement and graveyard terrace orientated toward the south.

The discovery of the site goes back to 1984, when agricultural activities brought to light a number of pieces of prehistoric pottery and copper slag, which were collected by employees of the Museum of Mining and Metallurgy in Bor. Since then, Trnjane has been the subject of several excavations and the site has become known as the first investigated Bronze Age necropolis in eastern Serbia.[1] The burial practice

[1] Jovanović, Janković 1990.

The paper represents a result of the ОИ 177020 project (Archaeology of Serbia: Cultural Identity, Integration Factors and the Role of the Mid-Balkans in the Development of European Prehistory) and the projects "Visualizing the unknown Balkans", supported by the Innovation Fond "Research, Science and Society" of the Austrian Academy of Sciences and "New insight in Bronze Age metal producing societies", supported by the Austrian Science Fund (FWF-Project 32096_G25).

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included the building of circular stone constructions of a diameter of between 1.5 and 4 metres with an urn placed, usually in the centre or, more rarely, on the fringe of circular grave monument. Although such constructions had hitherto not been observed among known Bronze Age groups in the central Balkans, the necropolis in Trnjane was initially assigned to the Paraćin group of the Middle and Late Bronze Age, which had a distribution along the middle Morava valley.[2] The main reason for the correlation with the Paraćin group was a certain typological similarity of urn vessels, characterised by four horizontal handles.[3] Later discoveries of necropolises with comparable stone constructions and pottery spectra in Magura[4], Borsko Jezero[5], Hajdučka Česma[6] and Kriveljski Kamen[7] led to an attempt to define a regional group of the Bronze Age in north-eastern Serbia labelled the Timok group of Paraćin culture according to B. Jovanović[8] or Gamzigrad culture according to D. Srejović and M. Lazić.[9]

The uncertainty regarding the cultural assignment and an absence of absolute dates caused differences in terms of the chronological assessment of Trnjane and other similar sites in the region. In his 1996 published paper, B. Jovanović stressed the presence of pottery typical of the so-called Vatin culture of Early and Middle Bronze Age[10], whose occurrence and chronology in the regions south of the Danube has been discussed in numerous studies.[11] In summary, most of these studies assume the "survival" or endurance of Vatin pottery elements (e. g. biconical beakers with two handles) in the central Balkans, especially along the Morava valley, until the later stages of the Middle Bronze Age.[12] In his detailed study on Vatin pottery, C. Ihde described this specific phenomenon as the Morava group of Vatin culture,[13] while A. Bulatović and J. Stankovski appealed for the renaming of the horizon marked by two-handed beakers to the Bubanj Hum IV–Ljuljaci group, in order to make a distinction from the origin area of the Vatin group, north of the Danube.[14]

The occurrence of Vatin or Bubanj Hum IV–Ljuljaci pottery in the necropolis of Trnjane represents, according to B. Jovanović, more evidence of the durability of Early Bronze Age pottery until the start of the Late Bronze Age. This is the reason why, in 1996, he highlighted the possibility that the start of Trnjane could be somewhat older than had been assumed (Bz C – Bz D in terms of central European chronology).[15] Just one year later, B. Jovanović proposed the dating of the necropolises in Trnjane, Magura and Borsko Jezero as being between the 13th and 11th century BC, with a reference to the Late Bronze Age Brnjica group in southern Serbia.[16] In this paper, B. Jovanović argues that both the Brnjica and Paraćin groups are closely connected both chronologically and culturally; in fact, he describes them as "different aspects of the same cultural circle" and cites the comparable funerary rites (cremation in urns with surrounding stone construction) as his main argument. To a certain extent, this statement appears contradictory, since graves of the Paraćin culture in the Morava Valley do not have the same kind of stone construction typical for Trnjane and other sites in the Timok area.

In opposition to B. Jovanović's interpretation, D. Srejović and M. Lazić, who excavated the necropolis of Magura, near Gamzigrad, identified the Bronze Age sites in eastern Serbia, including Trnjane, as a distinct cultural phenomenon described as the Gamzigrad culture.[17] According to D. Srejović and M. Lazić, the emergence of the Gamzigrad culture dates back to the end of the Early Bronze Age with pottery exposing the evident influence of the Vatin culture from the north and the Verbicioara culture from the east.[18] Therefore, both authors proposed the dating of early graves from Trnjane with two-handed beakers into the Early Bronze Age or the early stages of the Gamzigrad culture. Similar pottery with obvious Vatin elements was also recorded in the settlement of Trnjane[19] and in the hill-

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[2] Jovanović, Janković 1996, 185; Jovanović 1999; Vasić 2013.

[3] Гарашанин 1958, 299; Garašanin 1983, 725.

[4] Срејовић, Лазић 1997; Lazić 2016.

[5] Jovanović 1999; Капуран, Миладиновић-Радмиловић 2011.

[6] Срејовић, Лазић 1997.

[7] Капуран, Миладиновић-Радмиловић, Јовановић 2013.

[8] Jovanović 1999.

[9] Срејовић, Лазић 1997; Lazić 2004.

[10] Tasić 1977; 1984; Hänsel, Medović 1991; Falkenstein 1998.

[11] Гарашанин 1973; Богдановић 1986; Stojić 1986; Стојић 1992, 133; Bogdanović 1996; Falkenstein 1998; Stojić 1998; Ihde 2001; Булатовић, Станковски 2012, 337; Ljuština 2012, 153.

[12] See for the latest overview Булатовић, Станковски 2012, 397.

[13] Ihde 2001, 362; Ljuština 2012, 153.

[14] Булатовић, Станковски 2012, 337.

[15] Jovanović 1996,196.

[16] Jovanović 1999, 71. See for recent overview of Brnjica culture Lazić 1996; Bulatović 2011.

[17] Срејовић, Лазић 1997, 241.

[18] Срејовић, Лазић 1997, 242.

[19] Lazić 2004, Fig. 59. The beaker comes from one of the trenches in Trnjane (excavation 1985–1987), not from Kučajna as displayed in the quoted publication.

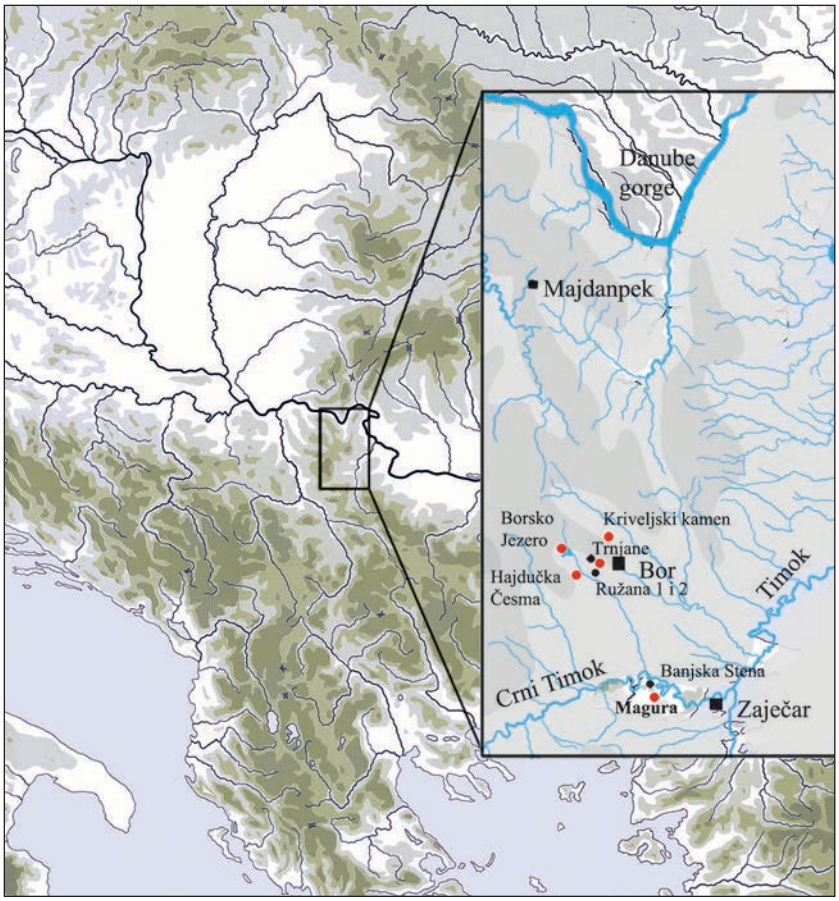

Fig. 1. North Eastern Serbia with the main Bronze Age settlements and necropolises

Сл. 1. Водећи локалитети и некрополе из бронзаног доба у североисточној Србији

top site of Banjska stena, near Gamzigradska Banja, pointing to their occupation during this time. Regarding the relationship between eastern Serbia and the Paraćin group in the Morava Valley, M. Lazić and D. Srejović underline that only few urn types from Trnjane and Magura correlate with vessels from the burial places such as the eponymic Paraćin or Rutevac.[20] Hence, the typological variety of urns from Magura and Trnjane indicates an autochthones development with a small number of elements indicative of the Paraćin culture.[21] Both authors also emphasised the significant differences in the burial practices, with cremation as one of the few common elements between eastern Serbia and the Morava Valley. Complex stone constructions, such as those discovered in Trnjane and Magura, do not appear in the Morava Valley, while the incised and incrusted pottery, as one of the trademarks of the Paraćin group[22], is missing in eastern Serbia. Following this argumentation, in his overview of the Bor region in the Bronze Age, M. Lazić dated most of the graves from Trnjane into the Middle Bronze Age or to the period between 1600 and 1400 BC, whereas the few graves with Vatin vessels belong, according to M. Lazić, in the final stages of the Early Bronze Age.[23]

It is obvious that the chronological and cultural classification of Trnjane remains disputable, despite the fact that the site was discovered more than 35 years ago. Striking differences in the dating (between 1700 and 1300 according to M. Lazić, and 1300 and 1100 BC according to B. Jovanović) clearly demonstrate the limits and uncertainty of chronological classification based on premises and typological comparisons. Moreover, long occupied settlements that could provide a stratigraphic sequence are rare in eastern Serbia, with Banjska stena being the only one that has been archeologically investigated, but unfortunately still unpublished.[24]

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[20] Срејовић, Лазић 1997.
[21] Срејовић, Лазић 1997.
[22] Стојић, Ћађеновић 2006, 298–299.
[23] Lazić 2004, 121.
[24] Срејовић, Лазић 1997, 229.

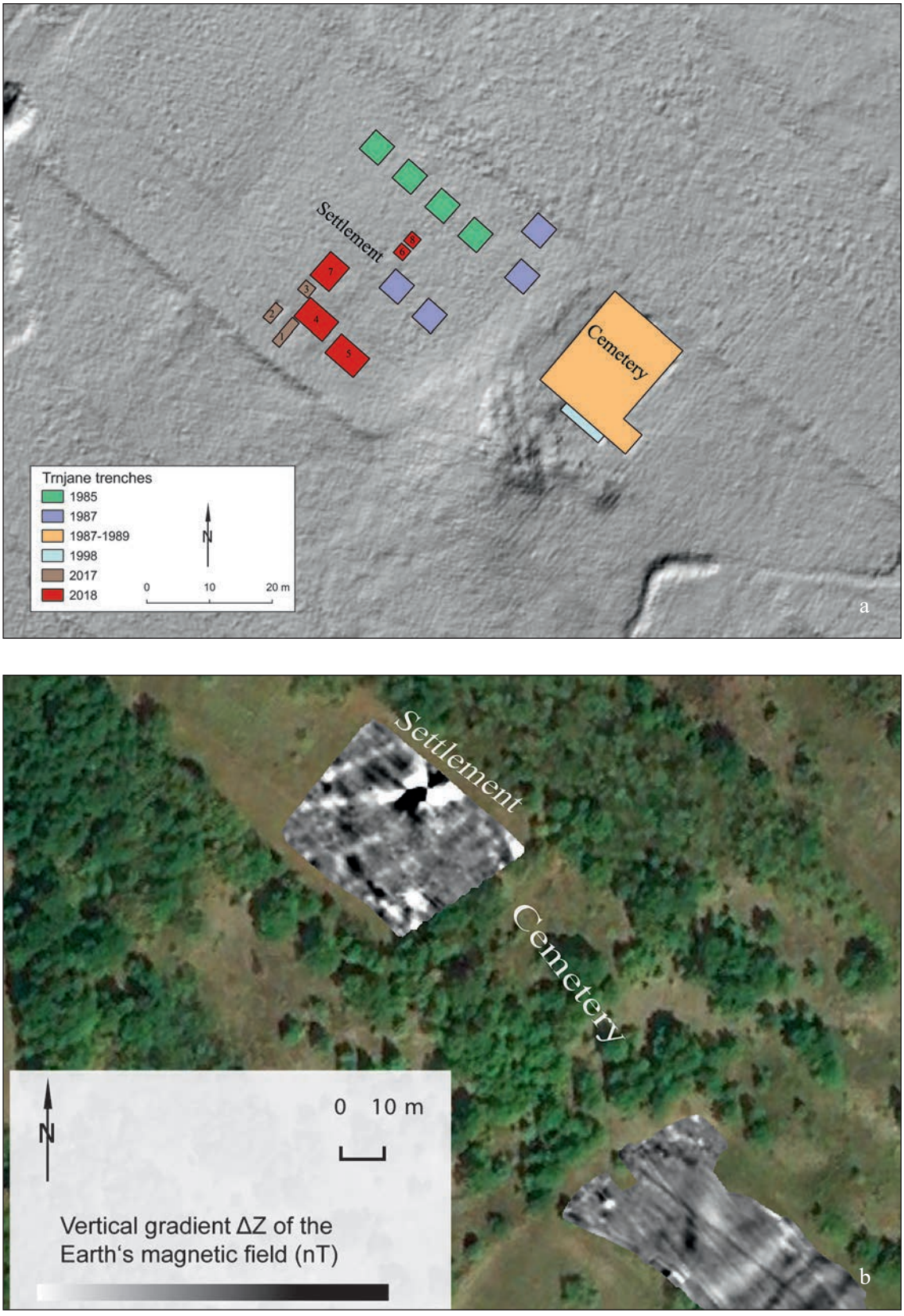

Fig. 2. a) Plane with trenches in settlement and necropolis; b) Results of geophysical prospection

Сл. 2. а) План са сондама на насељу и са некрополом; b) Резултати геофизичке проспекције

Bearing in mind the deficiencies within the current state of the research, the main task of the new investigations started in 2017 is to provide new, much needed analytic data with its focus on chronology, anthropology and archaeometallurgy. Together with the achievements of previous researchers, this step aims to increase the current knowledge regarding the Bronze Age period in eastern Serbia.

History of research

After the first results of the survey in 1984, a systematic excavation at the site Trnjane continued in 1985 within the framework of the scientific project "Exploration of the ancient mining and metallurgy on the territory of the Timok eruptive basin", a cooperation between the Institute of Archaeology, in Belgrade and the Museum of Mining and Metallurgy, in Bor, and led by B. Jovanović and I. Janković.[25] The large amount of surface finds of pottery and metallurgical slag indicated the existence of a settlement involved in metallurgical activities. These assumptions were confirmed by G. A. Wagner who visited Trnjane during the survey in 1984 and estimated approximately 20,000 kg of slag over 2 ha of ploughed field along the terrace.[26] Some of the collected slag from Trnjane was also analysed and published by E. Pernicka and his team in 1993.[27]

The first excavations took place in July 1985 on the property of Čedomir Čorboloković, from the village Brestovac.[28] Altogether, four trenches (4 x 4 m) were opened in 1985, all positioned in a line from southeast to northwest, with 3 m between each (fig. 2a). Finds included pottery, daub, stone tools and slag. The remains of burned features came to light in trenches 1 and 3. According to the diary, the cultural horizon pointed to a single-phase settlement with no stratigraphical distinction. The investigation in Trnjane continued in 1987 with four new trenches (4 x 4 m) and the discovery of the first graves in the immediate vicinity of the settlement to the east. The recovery of the first graves moved the focus of the future investigation.[29] In the following two years (1988–1989), excavations included only the necropolis area, with 41 documented urn graves and circular stone constructions (fig. 4a). Finally, in 1998, M. Lazić carried out small-scale excavations and unearthed two further graves.

B. Jovanović published the first results from Trnjane in three papers, with a focus on the typology of the urns and the funerary rites, and the relationship with the neighbouring Bronze Age groups.[30] Unfortunately, the anthropological analyses of cremation remains from the majority of the urns carried out by M. Roksandić were not included in the first reports (for results see below). In 2004, M. Lazić also discussed the finds from the necropolis in an overview of the Bronze Age in the area of the city of Bor.[31] The first insight into the pottery from the settlement was provided in a monograph on prehistoric sites in the area of the cities of Bor and Majdanpek, from 2014.[32] The results of excavations in the necropolis in Trnjane were also included in several articles on the Bronze Age in eastern Serbia, by A. Kapuran.[33] In 2017, A. Kapuran, N. Miladinović-Radmilović and N. Vuković also presented the results of the anthropological analyses of five graves from Trnjane missed by M. Roksandić from the late '90s.[34]

The next field activities in Trnjane started in 2017, in a joint action between the Institute of Archaeology, in Belgrade, the OREA Institute of the Austrian Academy of the Science, in Vienna, and the Museum of Mining and Metallurgy, in Bor. The first step involved a geomagnetic prospection on the accessible area of the settlement terrace and an area to the east of the necropolis in September 2017 (fig. 2b). In the same year, three trenches (T1, T2 and T3 – total area of 13 m²) were opened in the southern part of the settlement terrace. In 2018, five additional trenches (T4 – T8) were investigated with a total area of 64 m² (fig. 2). Both excavations yielded a large amount of pottery and metallurgical slag, while the remains of one object were uncovered in the southern part of Trench 7 and in the northern part of Trench 3.

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[25] Jovanović, Janković 1990, 1; Jovanović, Janković 1996.

[26] Pernicka et al. 1993, pp. 38, Table 8. The assumption about 20.000 kg of slag appears to be too high judging by the results of investigations.

[27] Pernicka et al. 1993.

[28] All information about the scope of the excavations in Trnjane is provided by the documentation of the Museum of Mining and Metallurgy, in Bor. The authors wish to thank Igor Jovanović, the custodian of the archaeological collection for the opportunity to examine the documentation (diary, drawings).

[29] Jovanović, Janković 1990; Jovanović, Janković 1996.

[30] Jovanović, Janković 1990; Jovanović, Janković 1996; Jovanović 1999.

[31] Lazić 2004.

[32] Капуран, Булатовић, Јовановић 2014, 107, Т. XV–XXIX.

[33] Kapuran 2014; 2014a; Kapuran, Miladinović-Radmilović, Vuković 2017.

[34] Kapuran, Miladinović-Radmilović, Vuković 2017, 138–139.

The investigations in 2017 and 2018 confirmed previous assumptions about the Bronze Age settlement activity on the terrace that apparently also included cooper ore smelting. However, the recorded cultural layer was relatively thin (15–25 cm) and disturbed by recent agricultural activities. A number of organic finds (animal bones and charcoal) provided an opportunity for radiocarbon dating, while more detailed metallurgical analyses enabled new insights into Bronze Age copper extraction technologies.

Settlement

The results of the older and more recent excavations in the settlement area indicate that there is no distinct vertical stratigraphy in Trnjane, which is to be expected in the case of long-term occupation. At this point, it is difficult to estimate the extent of the settlement beyond the terrace next to the graveyard. Surface finds suggest it extends to the west and north of the investigated terrace, yet the spatial range of the settlement activities has not been assessed at this point.

Excavation diaries from previous investigations in 1985 and 1987 point to the existence of burned house floors with a significant amount of finds, including mostly course pottery (fragments of pots, pyraunoi, and bowls), a few examples of cups and beakers, stone tools and slag.[35] On the floor of one of the uncovered objects, two bronze sewing needle were found. No further information or documentational data is available.

New investigations in the settlement started with geophysical prospection in October 2017. The company Eastern Atlas, from Berlin, Germany, carried out the geophysical prospection and C. Meyer and W. Hypiak wrote the subsequent report.[36] The results of the prospection were biased by the inhomogeneous distribution of magnetic minerals in the bedrock. The visible anomalies with high magnetic amplitudes (black features) are mostly attributed to near surface formations of magnetic bedrock (fig. 2b). The extremely high amplitude of a star-shaped pattern at the north-eastern edge of the settlement terrace was probably caused by a lightning strike.[37] Other, weaker anomalies are probably signalizing concentrations of pottery and daub, but objects or features with clear borders have not been detected. A small zone of dipole anomalies of high amplitudes (whitish spots in the southeast) could indicate slag concentrations. Clearly visible in the geomagnetic picture is the outline of the trench (4 x 4 m) excavated in 1987.

Taking into account the results of geomagnetic prospection with no distinct features pointing to prehistoric objects and the fact that previous actions spanned over the northern part of the terrace, the excavations in 2017 and 2018 focussed on the south-eastern part of the terrace. Particularly in the area with indications of slag concentrations, the objective was to confirm or reject the existence of potential metallurgical installations or copper smelting spots.

The distribution of layers/stratigraphic units from the excavations in 2017 and 2018 revealed the following sequence:

Surface – 0.10 cm

SU1 – Dark brown, relatively loose humus surface layer with sods and a number of finds in a secondary position. Recorded in all trenches, thickness between 10 and 15 cm.

0.15–0,25 cm

SU2 – very hard, brownish layer of vertisol soil (high content of clay minerals) with stone inclusions from the bedrock and a number of archaeological finds in a secondary position. Also disturbed by ploughing and the vineyard, thickness between 5 and 10 cm. Recorded in all trenches.

0.25–0.40 cm

SU4 – slightly looser and darker soil (vertisol), less destroyed by agricultural activities. No recognisable structures/features (pits, floors or post holes). Thickness 10–15 cm, laying mostly on whitish bedrock (except in T7 with SU5). In T4 there is a noticeable concentration of metallurgical slag in SU4 (fig. 6). Other finds from SU4 included pottery, stone tools and animal bones. It is to assume that parts of SU4 represent the original Bronze Age horizon, probably partly disturbed by erosion and agriculture.

0.40–0.65 cm

SU5 – dark brown, filling in the southern part of T7, dug in into whitish bedrock in several steps. Larger concentration of burnt daub and pottery, though no coherent structure. Small amount of animal bones and slag. Clear border to bedrock in the north of the trench.

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[35] Јовановић 2013, 4.

[36] Meyer, Hypiak 2018.

[37] Meyer, Hypiak 2018, 18.

0.35–0.65 cm

SU3 – Whitish bedrock, mixture of sand and rock.

Altogether, the cultural layer in the investigated part of the settlement terrace in Trnjane averages between 20 and 30 cm (SU2 and SU4), with one object (SU5) reaching a depth of 65 cm. Despite the obvious slag concentrations in trench 4, traces of smelting installations were not observed. Agriculture activities in the last 50 years and the position on a gentle slope (erosion) contributed to the bad preservation of the objects.

However, the repertoire of finds with fragments of storage vessels (Pl. I–II), animal bones and remains of metallurgical activity (fig. 7) clearly confirms the sedentary character of the site.

Fig. 3. Trench 7: a) western section with SU; b) plane with SU5

Сл. 3. Сонда 7: а) зайадни ӣрофил са сӣраӣиӣрафским јединицама; b) ӣлан са SJ5

Necropolis

The necropolis in Trnjane was unearthed in four excavation campaigns. In the first three years from 1987 to 1989, 41 graves were discovered (10 graves in 1987, 19 graves in 1988, 12 graves in 1989). The smaller excavation in 1998 revealed two further graves on the southern fringe of a previous trench. In total, the investigated space of the necropolis covered an area of 280 m². The framework and size of the burial place are not clearly defined. The eastern edge of the necropolis is marked by the immediately neighbouring settlement terrace. The results of the geophysical prospection in 2017 indicate the expansion of the graveyard to the west. The rectangular and oval shaped structures with positive magnetization on the edge of the woodland may indicate further grave constructions, which, at the same time, mark the western limit of the necropolis (fig. 2a). Still unknown is the extent of the necropolis to the south and to the north.

One of the main characteristics of the Trnjane necropolis was the cremation of the deceased with their urns placed within circular stone rings made of crushed stones and large pebbles. The outer ring of the grave constructions was made of bigger stones, while the inner space consisted of smaller stones. The size of the circular stone tombs varies between 1.5 and 4 m in diameter (fig. 4a). All graves were discovered immediately under today's surface with no traces of mound building upon them. Densely arranged stones covered and protected the urns. In grave 12, fragments of an urn with cremated remains were found on the fringe of the stone circle construction, which was, unlike the other graves, empty and without any inner filling (fig. 4a). In general, each stone tomb contained only one urn. In some cases (graves 9, 20, 31 and 32) the surrounding stone construction was lacking, although an outer ring made of large stone pebbles appeared to be partly in place (fig. 4a). Most of the constructions in Trnjane were erected next to each other without significant traces of the interruption of existing monuments. This situation would indicate a horizontal stratigraphy and chronological development of the graveyard. Nevertheless, one should also consider the possibility that the grouping of graves reflects burial places of family/clan members and not only a chronological sequence.

In his paper from 1996, B. Jovanović presented a typological distinction of urns from Trnjane, with six different types.[38] Variations of biconical vessels with four horizontal handles on the belly and slight differences in the shape and length of the neck section characterise types A, C and D. Type B includes biconical vessels with a cylindrical neck and a combination of two horizontal and two vertical handles placed on the belly. Urns of type E are cups with an S-shaped body, high handle and flat base. Finally, as a special type, B. Jovanović described "vessels of the Vatina type", represented by a few distinct shapes as are a two-handed beaker, a bowl with triangular extensions on the rim and an S-shaped cup handle above the rim. The closest analogies for the urns of types A–E are found in necropolises in eastern Serbia, assigned to the Timočka group of the Paraćin culture, according to B. Jovanović, or the Gamzigrad culture according to M. Lazić, such as Magura (graves 51 and 59)[39], Kriveljski Kamen,[40] Bor Lake[41] and Hajdučka Česma.[42] Further parallels for biconical urns from Trnjane come from the necropolises of Gložđar and Obrež and in Morava Valley, assigned to the Paraćin culture, and from site of Ostra near Čačak in western Serbia.[43] Regarding vessels of the Vatina type from Trnjane, according to the typological analysis of Vatin pottery by C. Ihde, they belong to types F3e (a bowl), M7c (a cup) and O6h (a beaker-kantharos) and date to the start of the Middle Bronze Age.[44] In terms of distribution, vessels from Trnjane represent, in all three cases, the south-eastern fringe.[45] According to A. Bulatović and J. Stankovski, the three vessels from Trnjane are indicative of the early stage of the Middle Bronze Age in central Balkans, characterised as the Bubanj–Hum IV–Ljuljaci group, which preceded the Paraćin group.[46] The same authors included a beaker from Trnjane in beakers of the Ljuljaci type that they emphasise as one of the most illustrative forms of the Bubanj–Hum IV–Ljuljaci group. Thus, from the typological point, the three vessels provide a reasonable argument for the start of the necropolis in Trnjane at the onset of the Middle Bronze Age.

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[38] Jovanović, Janković 1996, 187–188.

[39] Срејовић, Лазић 1997, 228, сл. 28–29; Lazić 2016, Fig. 2.

[40] Капуран, Миладиновић-Радмиловић, Јовановић 2013, 146, сл. 2.

[41] Капуран, Булатовић, Јовановић 2014, 100–102, 212–214.

[42] Капуран, Булатовић, Јовановић 2014, 112–113, 216–217.

[43] Стојић 2000, 18–19, T. III/1; Стојић, Ћаћеновић 2006, 298.

[44] Ihde 2001, 129, 133, 136, Maps 9, 18 and 40.

[45] Ihde 2001, Maps 9, 18, 40.

[46] Булатовић, Станковски 2012, 363.

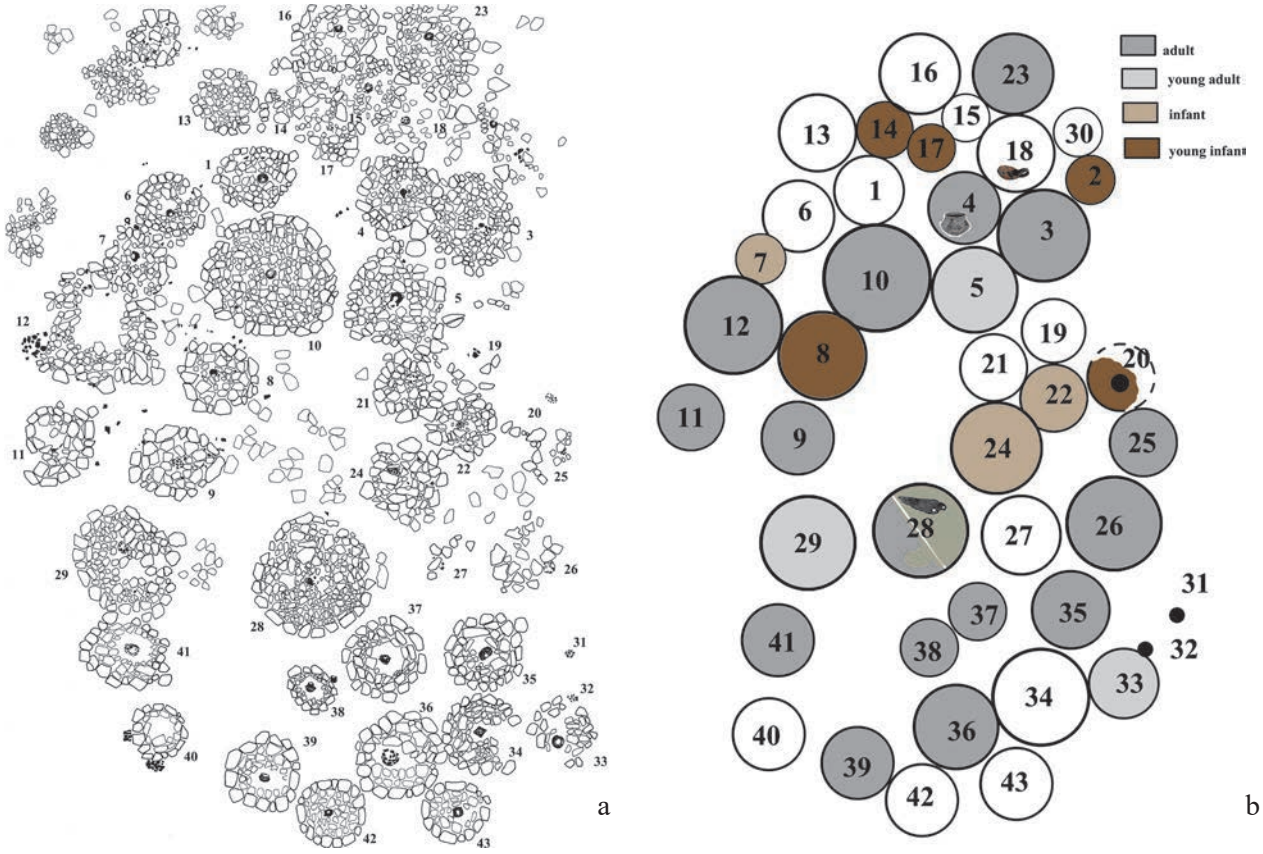

Fig. 4. Plane of the necropolis: a) with stone constructions; b) schematic plane with age groups

Сл. 4. План некрополе: а) са каменим конструкцијама; b) шематски приказ са старосним групама покојника

Characteristic of Trnjane and all other surrounding necropolises in the Timok region of eastern Serbia is a small amount of grave goods. Within 43 discovered graves in Trnjane, only five grave offerings were found: a bronze knife from the urn of grave 28,[47] a fragmented bronze tin sheet and a spindle whorl found beside an urn in grave 11,[48] a ceramic lamp/ladle found in a charcoal layer beside the urn of grave 18 and a tong shaped stone axe found beside the urn of grave 33.[49] In addition, in some of the grave constructions, few pottery fragments also occurred in the layer above the graves. An example of this is grave 41, with three spindle whorls and two fragmented beakers/bowls; however, the assignment of these finds to the actual burial is questionable.[50] Finds of copper slag in the area of the necropolis and around the stone grave constructions were, in some of the papers by B. Jovanović[51] and A. Kapuran[52], regarded as remains of burial activities connected with offerings and cult. Yet, after the recent investigations and surveys in the last two years in Trnjane it is almost certain that finds of copper slag in the necropolis area are a result of the erosion process and agricultural disturbances that led to the relocation of finds from the higher parts of the settlement. Based on the few burial gifts, it would be more than premature to draw conclusions about the possible social fragmentation of the Bronze Age population in the Timok region and any presumable reflection of the social status of the deceased in the burials. At the present state of research, graves in eastern Serbia do not point strong social stratification of the Bronze Age societies in the region.

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47 Jovanović, Janković 1990, 9; Паровић-Пешикан 1995, 16.
48 Јовановић, Николић, Јовчић 2018, 25.
49 Капуран, Булатовић, Јовановић 2014, 211.
50 Јовановић 2013, 24–25.
51 Jovanović, Janković 1996, 195.
52 Капуран, Миладиновић-Радмиловић 2011, 150.

Grave	1 person	2nd person	inside construction	outside of construction	diametar of construction	burial gifts	absolut date
1					1,5 m		
2	younger infant		•		1,5 m		
3	adult		•		2,25 m		
4	adult		•		2 m	bowl	
5	younger adult		•		2,3 m		
6	?		•		2 m		
7	infant		•		1,5 m		
8	younger infant		•		1,8 m		
9	adult		•		1,8 m		
10	adult		•		3,2 m		1981–1876 (84,7%)
11	adult		•		2 m	spindle whorls, bronze sheet	
12	adult ?		•		3 m		
13	?		•		1,5 m		
14	younger infant		•		1,5 m		
15	adult		•		1,7 m		
16	?		•		2 m		
17	younger infant		•		1,7 m		
18			•			lamp	
19			•		2 m		
20	younger infant		•		?		
21			•		1,8 m		
22	infant		•		1,75 m		
23	adult		•		1,5 m		
24	infant		•		2 m		
25	adult		•		1,2 m		
26	adult		•		1,7 m		
27			•		0,8 m		
28	adult	infant	•		2,6 m	knife	1762–1627 (95,4%)
29	younger adult		•		2 m	stone axe	
30			•				
31				•			
32				•	destroyed		
33	younger adult		•		destroyed	stone axe	
34			•		2,7 m		
35	adult		•		1,7 m		
36	adult		•		1,7 m		
37	adult		•		2,1 m		
38	adult	fetus	•		2 m	oker	
39	adult		•		2,1 m		
40			•		2,7 m		
41	adult		•		2,6 m		
42			•				
43			•				

Table 1. Graves on the Trnjane necropolis

Табела 1. Гробови на некройоли Трњане

a b

Fig. 5. a) Grave 10; b) Grave 28

Сл. 5. а) Гроб 10; b) Гроб 28

What are of note are the different dimensions of the grave constructions and, consequently, the different amount of invested labour for the erection of the grave monuments. The anthropological analyses of cremation remains from Trnjane carried out by M. Roksandić[53] and N. Miladinović-Radmilović[54] suggest that the size of the stone grave construction and the age of the deceased are not correlated. Represented among 43 graves in Trnjane are all age groups (fig. 4b), including newborns and a pregnant female (Table 1). Only one urn (grave 28) contained the remains of two individuals, one female and an infant. Noticeable is a relatively high rate of infants and juveniles in Trnjane, which is also observed in the preliminary analyses of cremation remains from the necropolis of the same type in Hajdučka Česma, situated in the river valley, about 1.5 km southwest of Trnjane. The first two urns from Hajdučka Česma came to light in the early 1990s, during construction works.[55] One of them contained the remains of a juvenile and the other one the cremated remains of three individuals (a juvenile, an infant and a foetus). In the excavations in 2018, four further urn graves in Hajdučka Česma were unearthed.[56] Three of them belong to juvenile individuals, while the fourth grave contained the cremated remains of a younger female and a newborn child. Interestingly, the available anthropological results from other neighbouring urn necropolises revealed contrasting results, with three graves in Krivaljski Kamen[57] and eleven in Borsko Jezero[58] all assigned to adults or juvenile/adults.

Based on the last publication by B. Jovanović,[59] the principal investigator of previous excavations, the necropolis in Trnjane was primarily considered as a Bronze Age burial site, often connected with groups of the Urnfield culture from the southern part of the Carpathian Basin.[60] In contrast, M. Lazić refers to Trnjane as a site of the Gamzigrad culture and proposed an earlier date based on typological criteria.[61] The here presented radiocarbon dates from graves 10 and 28 point to the occupation of the cemetery in Trnjane during the Early Bronze Age and the beginning of the Middle Bronze Age, in terms of Central European chronology (fig. 9).

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[53] The anthropological report was found in the documentation of B. Jovanović and was never published. We would like to take this opportunity to thank M. Roksandić for the possibility to present her results within this paper.

[54] Kapuran, Miladinović-Radmilović, Vuković 2017, 138.

[55] Kapuran, Miladinović-Radmilović, Vuković 2017.

[56] The archeological and anthropological results from Hajdučka Česma are currently in the process of publishing. Lukas Waltenberg (Institute OREA, Austrian Academy of Sciences) carried out the mentioned anthropological analyses of cremation remains from the graves discovered in 2018.

[57] Kapuran, Miladinović-Radmilović, Vuković 2017, 133.

[58] Kapuran, Miladinović-Radmilović, Vuković 2017, 137.

[59] Jovanović 1999.

[60] Капуран, Миладиновић-Радмиловић, Јовановић 2013.

[61] Lazić 2004.

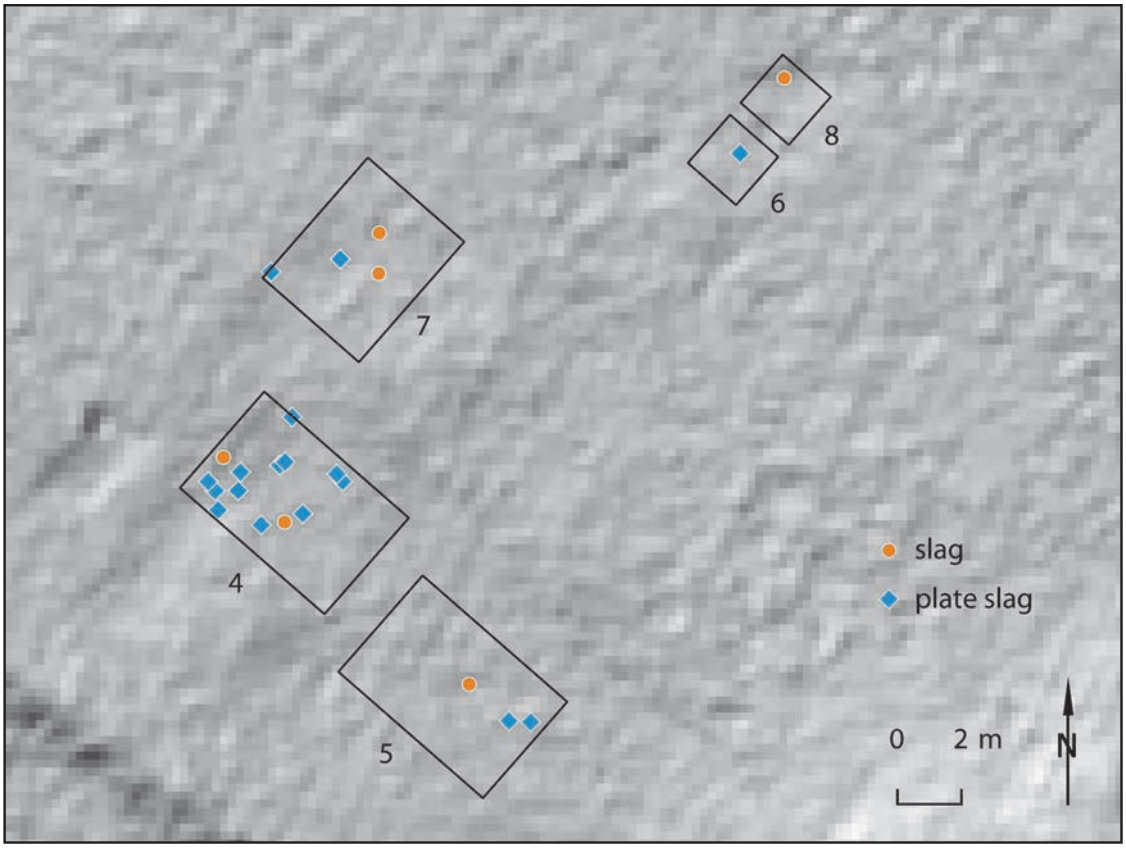

Fig. 6. Distribution of the different slag types in the trenches 4–8 from 2018

Сл. 6. Дистрибуција различитих типова шљаке у сондама 4–8 из 2018. године

Fig. 7. Examples of massive slag with a step (arrows) at the underside (a) and plate slag (b) from Trnjane settlement

Сл. 7. Изглед шљаке у грумену (а) равна шљака (b) са локалитета Трњане

Metallurgy

The excavations in the urn cemetery and in the settlement revealed numerous slag fragments and metallurgical remains, which allowed for a detailed reconstruction of the conducted smelting processes. This is of high importance as, to date, our knowledge regarding Bronze Age metal production in the Balkans is very limited. Besides the earlier dated metallurgical remains of the 5th and 4th millennium BC,[62] one can only list comparable Bronze Age sites and contexts which are located in the Alpine or the Mediterranean region, while copper producing sites for the Balkans are lacking thus far.[63] Therefore, the results of the ongoing research project are a significant step further toward closing this obvious research gap.

During the various campaigns in the necropolis of Trnjane, a total amount of 18.1 kg of slag was excavated.[64] It was distributed above or outside the urns. In the nearby settlement the excavations yielded an additional 10.3 kg of slag (fig. 6). Based on its morphological characteristics and microstructure, it can be concluded that it represents the waste product of three separate smelting steps (fig. 7) to produce copper. Group 1 (first step) consists of coarse/blocky slag with an irregular surface and shape, a blackish to dark grey colour and a thickness up to 10–12 cm. No flow features are visible, which leads to the conclusion that tapping was not performed. In the cross section, bubbles and/or charcoal are visible. Also detectable are small matte inclusions (1–5 mm) and processed remains of gangue. The highly viscous slag prevented good gravity separation of the matte, which was more or less evenly dispersed.

These characteristics separate the coarse/blocky slag from the second type of slag, which was formed in a small bowl-shaped smelting installation during the second smelting step. These finds have a circular shape, a flat upper surface and a dense microstructure with fewer bubbles than in the coarse/blocky slag. Their thickness varies between 0.5 cm and 3.5 cm. In the cross section, one can recognise larger matte inclusions (> 1 cm) and, more rarely, small copper droplets. On the lower surface, the imprint of the bottom of the furnace and a step,[65] which evolved during the smelting process as the slag was still hot and (semi)liquid, are visible.

The plate slag is the remains of the third smelting step (fig. 7). It, again, has a circular shape with a thickness of 1.5–3 mm, a flat upper and lower surface and the typical rim, which is bent down. Both (group 2 and 3) floated on a layer of matte or copper metal during the smelting process. The nearby situated smelting site of Ružana revealed slag of a comparable size and shape which, from a technological point of view, links the two smelting sites together.[66]

The chemical and mineralogical analyses of the Trnjane slag makes it possible to conclude that it represents rare evidence of early dated sulfidic copper ore smelting. The mineralogical composition of the copper ore (covellite) found in the area of the settlement corresponds very well with the copper deposits in the Bor ore district. This correlation is corroborated by the results of the lead isotope ratios of the slag and ores.[67] During the geological surveys in 2018, in the settlement's surrounding, no nearby mines were detected. In 2019, however, the research included an inspection of several copper deposits and mines[68] in the wider area around Trnjane.[69] At this point, it is hypothesised that the ore sources were reachable to a maximum distance of 1–2 day's walk.

Finds/Material culture

During all undertaken campaigns in the area of the settlement at Trnjane, ceramics and metallurgical slag represented the most numerous categories. Other finds included stone tools, a small amount of animal bones and rare metal objects.

In the trenches excavated in 2018, a total of 7,320 pottery fragments were recorded, 1,048 or 13% of which belonged to diagnostic fragments. The proportion of diagnostic fragments in excavated layers shows a comparable value, with a slightly higher percentage in SU4 (fig. 8a). The diagnostic fragments included rims, handles, bases, decorated sherds and fragments of pyraunoi with typical perforations or a lower stand. In all stratigraphic units, rims represent a leading category,

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[62] Jovanović 1980; Pernicka et al. 1993; Begemann, Schmitt-Stecker 2005; Radivojević et al. 2010.

[63] Jovanović 1980; Eibner 1982; Shennan 1995; Pernicka et al. 1997; Gale et al. 1997; Stöllner 2003; Cierny 2008; Pernicka, Lutz, Stöllner 2016.

[64] Pernicka et al. 1993, 38.

[65] This technological feature can also be observed on slag from Aqua Fredda cf. Herdits 2017, 187.

[66] Kapuran, Jovanović 2013.

[67] Pernicka et al. 1993, 41.

[68] The observed mining activities can be dated to the last 200 years.

[69] Jelenković et al. 2016, 145, Fig. 2.

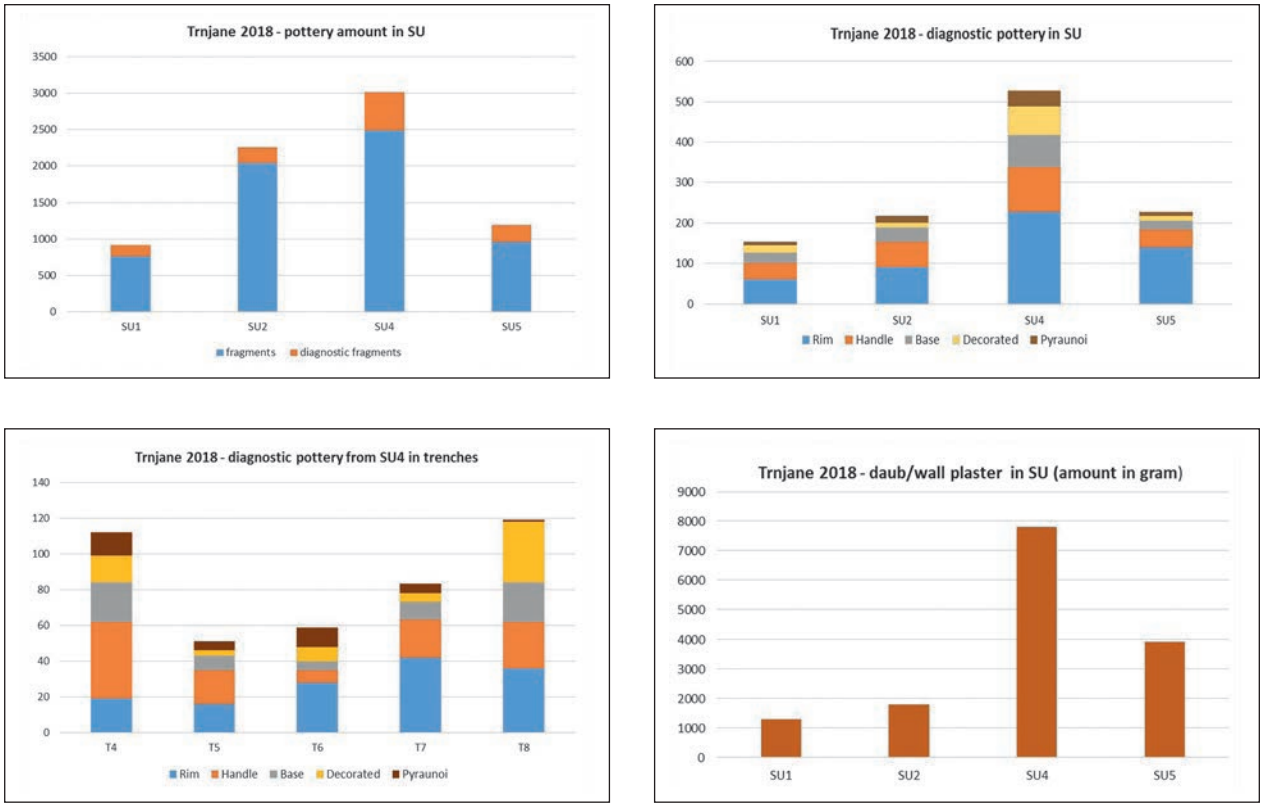

Fig. 8. Statistic evaluation of pottery finds from the excavation in 2018

Сл. 8. Статистички приказ налаза керамике са истраживања из 2018. године

followed by handles, bases, decorated pieces and pyraunoi (fig. 8b). A minor exception is again observed in SU4, with a higher ratio of decorated sherds and pyraouni (fig. 8b). The spatial distribution of diagnostic pottery in SU4, which occurred in all investigated trenches, indicates minor deviations (fig. 8c). Noticeable is the ratio in trench 8, with more decorated pottery and smaller number of pyraunoi fragments than in other investigated areas of the settlement (fig. 8c). The distribution of handles (cups or beakers) points to a certain concentration in trench 4, yet at this stage of the research (due to a lack of clear settlement structures), it is difficult to estimate the significance of this frequency. The fragments of wall plaster, some of them with a traces of wooden beams in negative, occurred in all layers, but a clear prevalence is observed in SU4 (fig. 8d). This is one further indication that SU4 partly represents the Bronze Age horizon. Several larger concentrations of fragmented wall plaster and pottery suggest the existence of houses, yet, due to the slope of the terrain, erosion and intensive agriculture, traces of the objects were not recognisable. Similar accumulations of wall plaster and pottery also appeared in older excavations, especially in trenches 1 from 1985 and 9 from 1987.[70]

Regarding the ceramic typology, the spectrum of identified vessel forms from Trnjane includes pots, bowls, beakers, cups, pyraunoi and small lamps/ladles. Also made of ceramic are spindle whorls, found both in the settlement and in the necropolis.

Pots

Pots are the most numerous pottery forms in all Bronze Age sites in north-eastern Serbia.[71] The limited variety of shapes and decorations makes it difficult to determine significant types with specific cultural and chronological affiliation. Important to underline for Trnjane is the stylistic and typological distinction

[70] Information from the diary of B. Jovanović.

[71] Капуран, Булатовић, Јовановић 2014.

between pots from the settlement and urns from cemetery. Most of the pot fragments from the settlement were too small for complete reconstruction. Erosion and modern activities led to the fragmentation of bigger storage vessels with just a few remaining diagnostic sherds. Furthermore, due to fragmentation, it was not easy to differentiate between pot and pyraunoi fragments, since both groups include coarse ware with thick walls and simple profiles/sections.

Within the material from Trnjane, three general pot types occur: pots with an S-profile (Pl. I/1–11), slightly curved or "bell shaped" pots (Pl. I/12–15) and pots of a semi-spherical shape (Pl. I/17–18). All types are made of clay with the addition of ground calcite stone chunks, added most probably to make the vessels more resistant to fire/heat. With very few exceptions (Pl. I/20), pots have vertical strap handles. The rims are flat or sharply profiled and slightly everted. The most common decorations are short parallel incisions on the rim (Pl. I/6, 13, 15, 17) and modelled plastic ribbons with fingerprints (Pl. I/2–4) that sometimes extend with vertical ribbons along the neck of the vessel (Pl. I/9). Decorations below the rim with plastic ribs (Pl. I/20) and channels (Pl. I/21) are, thus far, singular. The same also applies to a fragment with incised ornaments in the shape of a pine branch (Pl. I/22).

Bowls

Based on results of numerous studies on Bronze Age pottery from Serbia and the surrounding regions,[72] the bowls discovered at the site of Trnjane consist of two major stylistic and typological groups, which are also of importance for the chronological determination and tracking of different cultural influences on the territory of north-eastern Serbia. The first group includes vessels with attributes of the pottery assigned to the Vatin culture, while the second group represents bowls that are common in the material culture of the Bronze Age groups in the central Balkans.

Bowls associated with the pottery repertoire of the Vatin culture are of a semi-spherical shape with a rim that has a cross section in the shape of the letter "T" (Pl. II/1–5) or shallow, conical bowls with the very similar rim section (Pl. II/6–12). Very often, the decoration of the rim includes triangular „wing" shape extensions. The bowls of this group usually have a ribbon shaped handle just below the rim. Generally, besides rare examples with a buckle decoration (Pl. II/3), other ornamental techniques are not observed among vessels of this group.

The second group of the bowls from Trnjane are biconical shapes with an everted rim and without decoration (Pl. II/17–20). One bowl of this group was also found in the necropolis, in grave 33, as the lid of an urn.[73] Other close analogies can be find in the nearby sites of Ružana 1 and 2.[74] Assigned to the bowls is also one wall fragment with incised ornaments typical of the Early Bronze Age Verbicioara culture in neighbouring Oltenia.[75]

Beakers

Beakers represent a rare but, for the analogies, significant group among pottery from Trnjane. Characteristic is the biconical shape with two handles extending beyond the height of the rim. For that reason, some of the authors described them also as kantahroi.[76] The two main handle shapes are ansa lunata with a slight depression in the middle axis (Pl. III/1, 3) or with round section (Pl. III/2). In terms of the vessel shape, there are two groups to distinguish. The first group are beakers with a sharp biconical profile (Pl. III/1, 7–9), while beakers with a slightly curved shape (Pl. III/2, 6) represent another group. One or two triangular extensions on the rim are very common for all beakers from Trnjane (Pl. III/1–2, 4–5). Other decoration includes buckle ornaments, incised parallel lines and impressed circular ornaments (Pl. III/8–9).

With regard to cultural affiliation, beakers from Trnjane are typical representatives of the Bubanj-Hum IV Ljuljaci group or the Morava-Timok variation of the Vatin group, as described by A. Bulatović and J. Stankovski.[77] Both authors proposed the dating of this phenomenon to the transition between the Early and Middle Bronze Age, without explicitly naming an absolute period. The same dating is also assumed for one beaker of this type from the hilltop site of Banjska Stena, which D. Srejović and M. Lazić claimed represented an import object from the area of Vatin culture north of the Danube.[78] Similar beakers also appear,

[72] Богдановић 1986; Стојић 1992, 133; Bogdanović 1996; Falkenstein 1998; Ihde 2001; Булатовић, Станковски 2012; Ljuština 2012.

[73] Jovanović, Janković 1996, Abb. 9/4.

[74] Kapuran, Živković, Štrbac 2016, T. 2/1–3, T. 5/4,5.

[75] Crăcuinescu 2004.

[76] Ihde 2001, 136.

[77] Булатовић, Станковски 2012, Табела 14, 363.

[78] Срејовић, Лазић 1997, 237, fig. 69.

however, in a number of sites south of the Danube, including Ružana 1 and 2 next to Trnjane[79], Ostra–Sokolica in western Serbia,[80] Bubanj and Velika Humska Čuka near Niš,[81] Ljuljaci[82] and Dobrača near Kragujevac[83] pointing to the fact that they are an element of domestic repertoire rather than imports.

Cups

Fragments of vessels with a semi-spherical shape and one handle below the rim or at the same height as the rim are associated with cups. Due to the small number of finds, a detailed typological classification is still lacking for the Bronze Age in this region. The handles, as an important typological marker, are usually missing (Pl. IV). Assigned to this category is also a double (or binocle) vessel, discovered in the previous excavations in the settlement area in Trnjane (Pl. IV/7).

Pyraunoi

Relatively common among pottery finds from Trnjane are fragments of pyraunoi (fig. 8b–c). The pyraunoi is a type of double vessel whose upper part has the function of a recipient (wide open with handles), while the lower part served for fire keeping with large or small openings on it.[84] In the Carpathian Basin, pyraunoi started to appear more frequently from the beginning of Middle Bronze Age, i.e. in the same period as they also occur in north-eastern Serbia.[85]

Among the finds from the Trnjane site two basic types of pyraunoi can be distinguished: those that have a base with perforations (sieve-like) and those that do not have a perforated base. The pyraunoi without perforations on the bottom are common for the sites assigned to the Verbicioara and Vatin cultures.[86] Comparable pyraunoi shapes are also known from the Early and Middle Bronze Age settlement layers of the site of Feudvar in Vojvodina.[87] In Feudvar, the pyraouni were a part of house inventory and it is assumed that they had a function of a portable hearth used for heating and/or cooking. Since in Trnjane no preserved house objects have been found, the numerous finds of pyraunoi fragments were, in the interpretation of the authors of the first excavation B. Jovanović and I. Janković, associated with the process of copper ore roasting.[88] The main argument for this theory was the significant amount of metallurgical slag from the settlement and the first results of residual chemical analyses that confirmed the presence of metallic remains in the pyraouni fragments.[89] However, the use of pyraonoi in the metallurgical process remains disputable, simply because the possible use for ore roasting does not appear to be functionally adequate.

Regarding the typological classification of the finds from Trnjane, the forms of the upper part varies between S-shape (Pl. V/1, 4–6) and cylindrical (Pl. V/1–9)[90], while the lower half with the perforation, which served as a flame keeper, differs only by the presence or absence of edge decoration (strips with fingerprints or ornaments impressed with an instrument). In the nearby site of Ružana, some of the pyraunoi also had buckle decoration in the middle part of the upper vessel.[91]A massive vertical ribbon handle below the rim also appears on some of the better-preserved pieces. Well recognisable on the surface of the pyraunoi from Trnjane is a high content of quartzite in the clay as well as traces of long-term exposure to an open fire that eventually led to fragmentation and damage.

The relatively large number of pyraunoi findings from the Bronze Age sites in north-eastern Serbia indicates their massive production, but their usage has still not been clarified. It is hoped that future investigations in the area will contribute toward a better explanation for the frequent occurrence of pyranoi in sites like Trnjane, Ružana or Čoka Njica.[92]

Lamps/ladles

Currently, this group includes only three finds, one was found in grave 18 in the necropolis, while the other two originate from the excavation in the settlement area in 2018. The reason for determining their

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[79] Kapuran, Živković, Štrbac 2016, T. 2/6, T. 5/6–7.

[80] Стојић 2000, Сл. 1.

[81] Булатовић, Станковски 2012, T. XI.

[82] Tasić 1986, 60, Taf. XII/1,3.

[83] Гарашанин, Гарашанин 1958, Y17a, 5.

[84] Crăciunescu 2004, Pl. LXI/1.

[85] Jovanović, Janković 1990, 1; Fishel, Kiss, Kulcsár 2001, 127, Abb. 3.

[86] Fishel, Kiss, Kulcsár 2001, 127.

[87] Ihde 2001, 177, Abb. 99/U1d; Falkenstein, Hänsel, Medović 2016, 143.

[88] Jovanović, Janković 1990, 1.

[89] Janković, Bugarski, Janjić 1987–1990, 13. The Institute for Mining and Metallurgy, in Bor conducted the analyses.

[90] Ihde 2001, 177, Abb. 99/U1d.

[91] Kapuran, Živković, Štrbac 2016, T. 4/3.

[92] The first excavations in the settlement of Čoka Njica in 2019, situated about 3 km to the east of Trnjane also yielded a number of pyraunoi finds. The results of the first campaign in Čoka Njica are currently being processed.

function as a lamp rather than a cup or ladle is the fact that the volume of the recipient is too small, and the massive handle probably served to balance the horizontal position. Furthermore, half of the recipient's interior is burnt more than the other one. Comparable lamps are also known from nearby contemporary necropolises in Borsko jezero[93] and Hajdučka Česma.[94]

Other finds

Included in ceramic findings are also one spoon (Pl. VI/6) and spindle whorls (Pl. VI/1–5, 7). It is interesting to highlight that the ceramic spoon has a hollow handle and recipient. The function of the spoon with the drilling between the recipient and handle is not quite clear. Spindle whorls occur in conical (Pl. VII/1–4) and discoid (Pl. VII/7–8) shapes. The cross section of the latter is either flat (Pl. VII/7) or almond shaped (Pl. VII/8). Among other ceramic objects is one piece of a conical shape with a hollow, but not drilled, middle part (Pl. VII/5). This kind of tool could have been applied in a drilling process with the function to protect the palm of the hand.

Stone finds

The stone finds from Trnjane include three parts of artefacts: stone axe, core remains from stone axe drilling process, and grinding tools. The tong shaped axe found within the stone constructions of grave 33 (Pl. VII/2) shows the typological characteristics of Neolithic axes from the central Balkans.[95] This object stands out in the context of the Bronze Age burial customs in north-eastern Serbia and is, thus far, a unique find. Found in the area of the necropolis, but not assignable to any of the burials, was an axe fragment with a curved body (Pl. VII/3). The hammer-axe from the settlement layers has a round, hollow middle part and one sharp edge (Pl. VII/1). The stone core remains from the excavations in 2018 demonstrate the production of stone axes in the settlement (Pl. VII/4–5). The purpose of grinding stones is still unknown (Pl. VII/6–8).[96] Grain remains (burned) have, thus far not been recovered from the settlement layers. The stones could also have been used for the grinding of temper for pottery.

Metal finds

Despite the fact that the Trnjane site was obviously involved in copper production, so far only four metal artefacts have been uncovered in all the excavations. The absence of copper based objects is typical also for other Bronze Age sites in the area with remains clearly indicating metallurgical or, rather, smelting activities.[97] This phenomenon is even more curious, considering that Bronze Age graves from the neighbouring regions usually do not lack metal finds.[98]

In the Trnjane necropolis two bronze finds were discovered. The first one is a small, slightly curved knife with two rivet holes, found in the urn of grave 28 (Pl. VI/12). The handle of the knife is also curved and very short. According to M. Parović-Pešikan, the knife from Trnjane has certain typological similarities with Early and Middle Bronze Age finds from Troy, Epirus and the Aegean islands.[99] Within the typological classification of Early and Middle Bronze Age knives from western and central Balkan presented by B. Hänsel and B. Teržan, the find from Trnjane was assigned to type IIb, which appears at the beginning of the Middle Bronze Age.[100] In this paper, the Aegean background of the knives from the Balkans is also assumed with references to studies by N. Sandars and K Branigan.[101] Comparable, to a certain extent, with the knife from Trnjane, are finds from Radonice and Pšov in Bohemia.[102] Distant analogies have also been observed in later periods, e.g. in the Early Iron Age Villanova culture, in northern Italy.[103] Due to the remote position of the Trnjane site in relation to possible provenance regions, the question of the origin for the knife from grave 28 remains open.

The second bronze find from the Trnjane necropolis was discovered within the stone constructions around grave 1. It is part of a fragmented bronze sheet[104] that maybe represents a fragment of another knife (Pl. VI/13). However, the bronze fragment is covered with a thick corrosion layer that cannot be removed without seriously damaging the object, which makes is difficult to determine the original shape.

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[93] Капуран, Булатовић, Јовановић 2014, 214, Fig. 96/F.

[94] In the excavations from 2019 in Hajdučka Česma, several lamps were found both in the urns as well as directly beside urns.

[95] Antonović 2003, 53, fig. 31.

[96] Antonović 2003, 61.

[97] Капуран, Булатовић, Јовановић 2014, 31.

[98] Булатовић, Станковски 2012, 255–256; Dmitrović 2016; 161; Булатовић, Филиповић, Глигорић 2017, 53.

[99] Паровић-Пешикан 1995, 16.

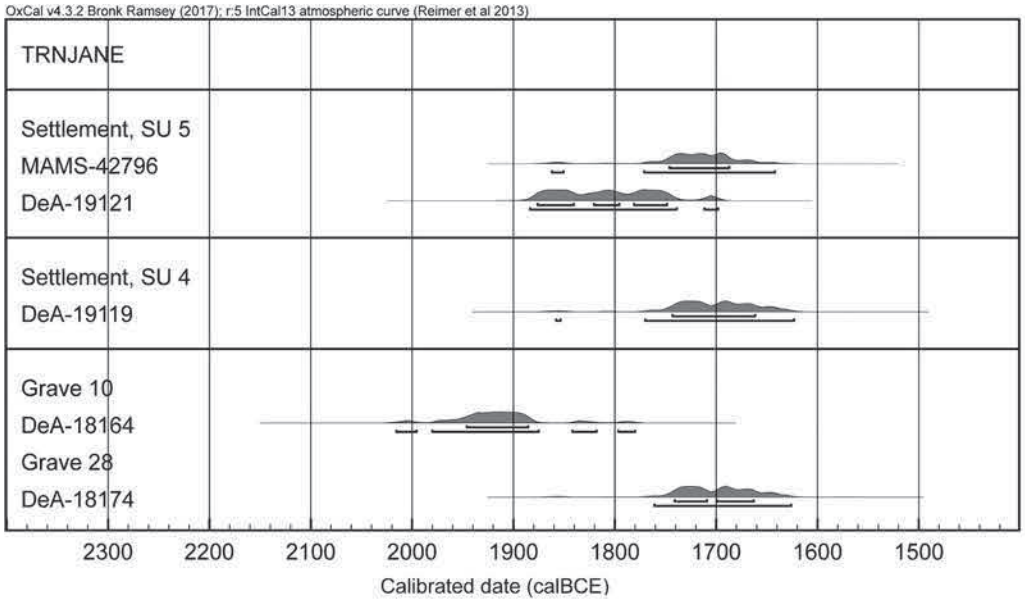
[100] Hänsel, Teržan 2000, 180–181.

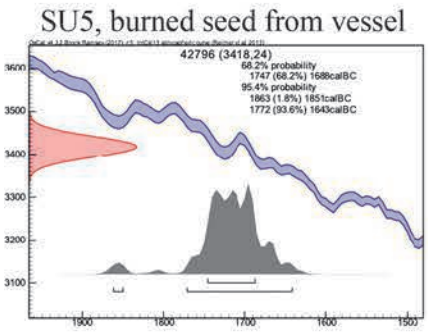
[101] Hänsel, Teržan 2000, 172, Type 6 after Sandars (1955, 183) or Types II or V after Braning (1974, 27).

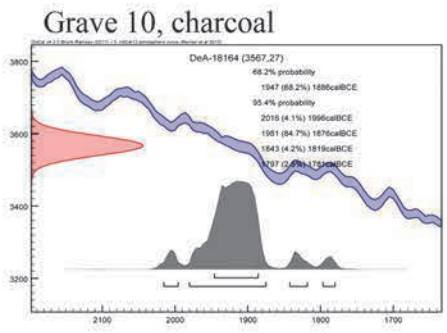
[102] Jiráň 2002, 64, Taf. 21/229, 230.

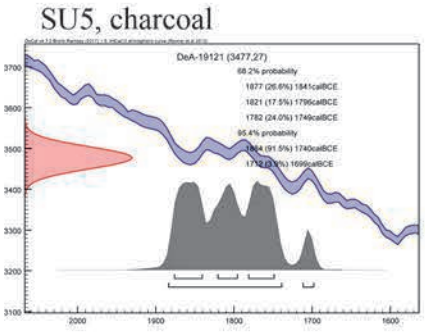
[103] Bianco-Peroni 1976, 83, Taf. 47/433, 95, Taf. 59/553.

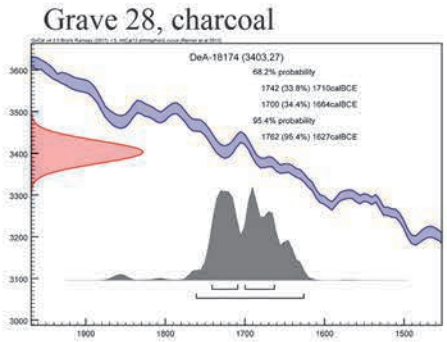
[104] Јовановић, Николић, Јовчић 2018, 25.











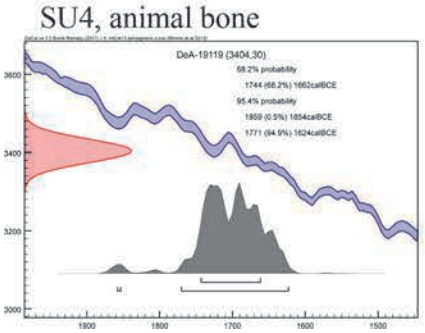


Fig. 9. Radiocarbon dates from the Trnjane settlement and necropolis

Сл. 9. Радиокарбон датуми из насеља и са некрополе Трњане

Two sewing needles from the settlement area complete the spectrum of bronze artefacts from Trnjane. One of them was destroyed during physical-chemical analyses in the Institute for Mining and Metallurgy, in Bor.[105] The second one is preserved and provides evidence of cloth making in the Bronze Age settlement. In his excavation diary, B. Jovanović highlighted that the sewing needle was found on a small part of the preserved house floor, together with one Vatin type beaker, one huge grinding stone and a concentration of pottery. In his studies on Bronze Age pins from the central Balkans, R. Vasić associated the needle from Trnjane to his "Gruppe I der Nähnadel, characterised by the oval shaped head.[106]

Chronology

The limited number of characteristic and chronologically significant metal objects led to different chronological assessments of the finds from Trnjane in previous studies. The dating of Trnjane into the Late Bronze Age or a time between the 13th and 11th century BC by the principal investigator of the first excavations, B. Jovanović, relied on the alleged connections with the Paraćin culture in the middle Morava Valley and on the fact that necropolises with urn graves are indicative of the Urnfield Period or the Late Bronze Age in Central Europe.[107] The relationship between the Paraćin culture and the Urnfield period has drawn attention ever since the discovery of cremation cemeteries in the Morava Valley.[108] The chronological precedence of the Paraćin culture in relation to the start of the Urnfield period in Central Europe served, in most of the papers, as an argument to disclaim the penetration of the Urnfield culture, indicating migration from the north to the central Balkans.[109] In this context, it is important to underline that until now the absolute dates for sites of the Paraćin culture in the Morava Valley are also lacking. Thus, the chronological classification of the Paraćin culture itself remains uncertain, although most authors adhere to its division into two phases, as proposed by M. Garašanin[110]. According to this author, the older phase with less ornamented pottery corresponds with the end of the Middle Bronze Age (Bz C), while the appearance of channelled pottery characterises a Late Bronze Age phase (Bz D).

Contrary to B. Jovanović, the investigators of the necropolis of Magura, near Zaječar, D. Srejović and M. Lazić, argued for a much older dating of urn necropolises and their associated settlements in north-eastern Serbia.[111] Based on a typological comparison, they pointed out the resemblance with Early and Middle Bronze Age material from surrounding regions and dated Magura and Trnjane between 1700 and 1300 BC, assuming the long lasting use and occupation of the cemeteries.[112] Particularly important in this argumentation is the chronological assessment of the Vatin culture in Vojvodina and the central Balkans, since many of the ceramic vessels from both Magura and Trnjane have their best analogies among material attributed to this culture. The absolute dates for the Vatin culture are available from several sites along the Danube and Morava, including some of the key settlements with a stratigraphical sequence, like Ljuljaci in central Serbia or Feudvar in Vojvodina.[113] As pointed out by several studies dealing with this absolute and relative chronology of the Vatin culture, the time span of this manifestation is between 2000 and 1500 BC, with most dates concentrating between 1900 and 1600 BC.[114] This would correspond with the dates that Srejović and Lazić anticipated for the start of the cemeteries in Trnjane and Magura (ca. 1700 BC), yet the arguments for the estimated end of the necropolises around 1300 BC remains somewhat unclear.

The radiocarbon dates obtained in the new investigations in Trnjane provide the first absolute dates for Bronze Age cemeteries in north-eastern Serbia. The samples from the settlement and from urn graves set out a period between 1900 and 1600 BC as the most probable dating (Fig. 9). Two animal bones from SU4 and SU5 in Trench 7 and two bigger charcoal pieces found in the urns of graves 28 and 10[115] were sampled and eventually analysed in the Istoptech Lab in Debrecen. Additionally, one burned seed found in the wall of a characteristic bowl (Pl. II/9) was extracted and dated in the Curt-Engelhorn Centre, in Mannheim. This is a particularly important date since seeds

[105] Капуран, Булатовић, Јовановић 2014, 208.
[106] Vasić 2003, 130.
[107] Jovanović 1999.
[108] Гарашанин 1958, 299.
[109] Гарашанин 1958, 308.
[110] Garašanin 1983.
[111] Срејовић, Лазић 1997.
[112] Срејовић, Лазић 1997; Lazić 2004; Lazić 2016.
[113] Богдановић 1986; Görsdorf 1992; Hänsel, Medović 1992.
[114] Forenbaher 1993; Gogăltan 1999; Gogăltan 2004; Ljuština 2012.
[115] Cremation remains from the urns were not available for radiocarbon dating.

generally represent a short life, a more reliable sample. The fact that the seed was found within the wall of a characteristic pottery type associated with the so-called Vatin pottery (bowls with a triangular, wing shaped extension on the rim, see. Pl. II/1–9) underlines the importance of this sample and provides an undisputed chronological anchor.

Regarding the sampled charcoal pieces from the urn contents, it is assumed that they originate from a pyre. With the possibility that the charcoal sample results are biased by the old wood effect, the dates from the necropolis should be accepted with caution. The overlapping of the dates signifies, however, that the deviation between the animal bones, charcoal and burned seed, if any, is not substantial. The animal bone from SU4 (Lab. Nr: DeA 19119), burned seed from the bowl (Lab. Nr: MAMS 42796) and charcoal from grave 28 (Lab Nr: DeA 18174) are almost completely matching and, therefore, give a strong indication of contemporary settlement occupation and burial activities in the second half of the 18th and early 17th centuries BC (fig. 9). Consequently, the same dating is assumed for the bronze knife, found in the urn of grave 28 together with cremated bones and remains of the pyre. The charcoal sample from grave 10 (Lab. Nr. DeA 18164) provided an absolute date between 1950 and 1900 BC. If this result is not significantly affected by the old wood effect, grave 10 could represent an older phase of the burial ground that was used for at least 200 years (the difference between grave 10 and grave 28). The stratigraphical position of the relatively large stone construction of grave 10 with the cremated remains of an adult individual supports the assumption about a possible earlier date (Fig. 4a). Situated in the central part and not disturbed by other constructions, grave 10 may be interpreted as one of the first and, thus, one of the oldest graves in this part of the necropolis, with subsequent, younger burial monuments built around. The partial tangency of the date from grave 10 and the bone sample from SU5 (Lab Nr. De A 10121) in the settlement area is another hint that activities at the Trnjane site took place already in the late 20th and early 19th centuries BC.

The results of the typo-chronological analyses of the archaeological material and particularly the radiocarbon dates from the settlement and necropolis clearly refute any assertion regarding a Late Bronze Age date for Trnjane and the alleged connection with the Urnfield period, as presumed by B. Jovanović. Even the proposed older date of Trnjane by D. Srejović and M. Lazić appears to be too young, since the available radiocarbon dates do not indicate any kind of activity at the site after 1600 BC. This hypothesis needs to be verified by further dates from settlements and necropolises from other sites in the surrounding area, which are also currently being processed by radiocarbon dating (Hajdučka Česma,[116] Magura and Ružana).

Summary

The significantly older than previously assumed dating of Trnjane prompts a re-evaluation of the perception of Bronze Age sites in north-eastern Serbia and their relationship with the neighbouring regions. The congruence between the dates from Trnjane and available dates for the Vatin culture clearly suggests a level of contemporaneity. The assignment of Trnjane and other similar necropolises in north-eastern Serbia to an autochthonous phenomena defined as the Gamzigrad culture[117] is partly justifiable in terms of the specific burial custom (urns and circular stone constructions), but the current amount of presented material appears insufficient for a substantial regional assessment. Our current knowledge regarding the level of organisation and mutual relationship between single Bronze Age communities and their burial grounds in north-eastern Serbia is too fragmented and far from providing the complete picture about the inner dynamics and development of this particular society.

Considering the alleged association between the Trnjane site and the Paraćin culture, the new dates largely contradict this connection, assuming that the dating of the Paraćin sites in the Morava Valley between 1500 and 1200 BC is accurate. The youngest dates from Trnjane and from neighbouring sites of Ružana[118] and Hajdučka Česma all do not exceed the end of the period of the late 17th century BC. Consequently, there are two possibilities. Either there was no interaction between the Paraćin culture and north-eastern Serbia, because of chronological disparity, which is, however, hard to accept due to the resemblance of certain specific pottery elements, or the chronological position of the Paraćin group needs to be thoroughly revisited. Furthermore, the present

[116] The first radiocarbon dates from the urn graves in Hajdučka Česma suggest a comparable time between the late 20th and early 18th centuries BC.

[117] Lazić 2004.

[118] Bulatović, Gavranović, Kapuran 2020.

chronology of Bronze Age groups in the central Balkans during the second millennium (Belegiš I, Paraćin and Brnjica)[119] seems disputable; at least when it comes to the presumed simultaneity of the named phenomena, all characterised by an exclusive cremation rite but with distinct differences in the form of the grave construction and urn shapes/decorations.

The new results from Trnjane and upcoming data from Hajdučka Česma and Čoka Njica have confirmed the existence of contemporary settlements, involved in copper smelting, and associated cemeteries with urn graves and circular stone monuments from the period between the late 20th and late 17th centuries BC. As pointed out already by D. Garašanin in 1958, it seems apparent that the exclusive cremation and arrangement of burial grounds as urn cemeteries were, among certain societies in the central Balkans, established long before the start of the Urnfield period in Central Europe. As new dates from the Trnjane and Hajdučka Česma suggest, the prevalence of burial rites and communal urn cemeteries for all age groups and with no significant stratification, started in north-eastern Serbia during the final stage of the Early Bronze Age, i.e. centuries before what has, thus far, been estimated. In the context of the new absolute dates, it is important to note the necropolis of Ranutovac, near Vranje, in southern Serbia, with comparable stone circular constructions, but with scattered cremation remains covered with sets of smaller vessels.[120] Both the radiocarbon results and the pottery spectrum from Ranutovac indicate the Early Bronze Age or the period between 2100 and 1800 BC as the most probable period of use.[121] Further analogies in the form of similar grave architecture, cemetery organisation and exclusive cremations are known even further to the south, in the Early Bronze Age site of Kriartision on the Halkidiki Peninsula.[122] With the new dates from Trnjane and Hajdučka Česma, the cremation cemetery in Ranutovac[123] appears not to be so isolated among finds from the central Balkans. The modified burials custom with the deposition of cremation remains in urns instead of scattering like in Ranutovac, seems to have been established in north-eastern Serbia in the 19th century BC.

The new absolute dates from Trnjane are not less important in the contexts of the attested smelting activities of sulfidic copper ores in the settlement layer. The dating between the 18th and early 17th centuries BC corresponds with the beginning of more intensive metallurgical activities in the Alpine region from the 18th century BC onwards.[124] Earlier metallurgical activities in connection with copper smelting and the production of raw material for bronze alloy have been observed only in a few sites, such as Milland, in Italy.[125] Therefore, the planned research in the coming years will also focus on a detailed archaeometallurgical examination of the slag and metallurgical remains found in Trnjane and in the neighbouring sites of Ružana and Čoka Njica. These results will be considered in relation to existing and forthcoming analytic dates of artefacts and ingots from the wider area of the central and western Balkans, with the aim to reveal the exchange and distribution of the produced copper metal.

Together, the new results will help to elucidate the role of Bronze Age communities from north-eastern Serbia in the overall communication networks during the first half of the second millennia BC.

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[119] Vasić 2013, 175.
[120] Bulatović, Bizjak,Vitezović 2016, 75–76.
[121] Bulatović, Gori, Vander Linden 2020.
[122] Asouhidou 2011, 383.
[123] Bulatović 2014, 66.
[124] Pernicka, Lutz, Stöllner 2016, 2.
[125] Artioli et al. 2015.

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Bronze Age Settlement and Necropolis of Trnjane, near Bor – Revision and New Research Results (51–84)

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НАСЕЉЕ И НЕКРОПОЛА ИЗ БРОНЗАНОГ ДОБА У ТРЊАНУ КОД БОРА – РЕВИЗИЈА СТАРИХ РЕЗУЛТАТА И РЕЗУЛТАТИ НОВИХ ИСТРАЖИВАЊА

Кључне речи. – бронзано доба, Источна Србија, некропола спаљених покојника, металургија бакра

Локалитет Трњане код Бора откривен је 1984. године, а прва систематска истраживања насеља и некрополе започета су 1985. и трајала су до 1989. године. Археолошка ископавања спровођена су у оквиру пројекта „Истраживање старог рударства и металургије у широј зони тимочког еруптивног басена" који је реализован сарадњом Музеја рударства и металургије у Бору и Археолошког института у Београду. Истраживања на Трњану била су у иницијалној фази фокусирана на насеље, првенствено због великих количина шљаке што се налазила на површини као и у археолошким слојевима, а касније су се оријентисала на суседну некрополу са спаљеним покојницима. Након паузе од три деценије истраживања су настављена 2017. године, и то у оквиру новог пројекта „Бронзано доба у североисточној Србији – металургија, насеља и некрополе", у којем сада, осим претходно наведених институција, учествује и Институт за оријенталну и европску археологију из Беча. Након извршене геофизичке проспекције 2018. године настављена су систематска истраживања насеља, а добијени су и апсолутни датуми за два гроба са некрополе и из три узорка са насеља.

Некропола на Трњану представљала је средином осамдесетих година прошлог века неочекивано откриће, будући да је била прва у низу некропола које су касније констатоване на подручју Бора и Зајечара. Некрополу је чинила већа група кружних камених конструкција (1,5–4 m у пречнику) у чијем се центру налазе урне са остацима спаљених покојника. На овој некрополи их је констатовано 43, а антрополошки су обрађени само они гробови у којима се налазила референтна количина антрополошких остатака. Покојнике су представљали сви узрасти, међу којима и једна трудна жена. Погребни прилози су изузетно ретки, а представљају их керамички пехари, пршљенци, керамичке лампе и један бронзани нож.

Обједињени резултати старих и ових истраживања насеља на локалитету Трњане указују на то да се издвајају пет стратиграфски различитих контекста, означених од SU1 до SU5. Надземне куће су с временом нестале, услед интензивне земљорадње и утицаја ерозије, те су само у две сонде из 1985. и 1987. године откривене зоне са очуваним подним лепом и кућним инвентаром. Такође, постоји могућност да су полуукопане стамбене објекте могли да представљају већи укопи који у испуни садрже већу количину керамике и лепа, као што је био случај у сонди 7/2018. Налазе материјалне културе чине керамика и камене алатке, док је због киселости земље откривен изузетно мали број животињских костију. Керамичку продукцију представљају лонци, зделе, пехари, шоље и пирауноси. Посебну пажњу привлачи велики број пирауноса и лампи мањих димензија (раније идентификованих као кашике), као и пршљенака различитих облика. Керамичка продукција показује два стилско-типолошка карактера – један са утицајима Ватина и други са карактеристикама Параћинске културе. Од осталих налаза материјалне културе издвајамо бројне фрагментоване камене жрвњеве и растираче као и камене секире, а занимљива су и два налаза језгра од камена што су настала као нуспродукт обушења секира за уметање држаље. Предмети од бронзе изузетно су ретки, а представљају их две шиваће игле, један једносекли нож и, вероватно, још један предмет сличан ножу али прекривен корозијом.

Веома битне налазе у постојећим контекстима на локалитету Трњане представљају металичне шљаке (на некрополи је откривено укупно 18,1 kg, а на насељу 10,3 kg). Морфолошке карактеристике ових шљака указују на то да су настајале током три различите фазе топљења сулфидних руда, највероватније ковелита. Прву групу чине комади већих димензија и неправилног облика, са траговима угља, балончићима ваздуха и крупнијим зрнима бакра, који карактеришу прву фазу топљења сулфидних руда. Другу групу (уједно и другу фазу топљења) представљају шљаке мањих дебљина и у облику полулопте, а садрже мању количину балончића у структури и мање бакарних зрнаца у себи. Трећа врста шљака јесу оне што припадају финалном процесу добијања ингота и имају изузетно танку профилацију, при чему су равне, металичног сјаја и компактне структуре, тако да највише личе на обојено стакло. Претпостављамо да су могући извори руде бакра били удаљени највише 1–2 дана хода од локалитета Трњане, што би требало да потврде будућа рекогносцирања.

Културно-хронолошка опредељења заједница које су живеле на простору Тимочке Крајине мењала су се током времена под утицајима како нових открића тако и аутора који су се овом проблематиком бавили. Тако су Б. Јовановић и И. Јанковић у првој интерпретацији некрополу Трњане одредили као *Тимочку групу* и датовали је у период средњег бронзаног доба, а касније су променили мишљење и преместили је у касно бронзано доба, односно Параћинску културу. За разлику од њих, Д. Срејовић и М. Лазић су, према налазима са некрополе Магура и насеља на Бањској стени код Гамзиграда, целу културу назвали *гамзиградска група* и

определили је у средње и касно бронзано доба (1700–1300. пре н. е.). А. Булатовић и Ј. Станковски исту културу ипак опредељују као Тимочку групу, која је везана за фазу Бубањ – Хум IV развијеног бронзаног доба у Поморављу.

Наше је мишљење да је за идентификовање културног утицаја на развој група насеља и некропола у Тимочкој Крајини кључни моменат био утицај Ватинске културе, чије се карактеристике јасно препознају на бројним налазима керамике не само на Трњану већ и на некрополи Хајдучка чесма и локалитетима Ружана 1 и 2 у Бањском Пољу код Бора.

Да би се добио прецизнији хронолошки оквир у коме се одвијао живот на локалитету Трњане, урађени су два апсолутна датума из гробова са некрополе као и апсолутни датуми из животињске кости, једне семенке сачуване у профилу керамичке посуде и гарежи из најстаријих културних слојева у насељу. Апсолутни датум из гроба 10 показује старост из 1950–1900. године пре н. е., док узорак из гроба 28 (у коме се као прилог налазио бронзани нож) припада периоду 1762–1627. године пре н. е. Апсолутни датуми из различитих контекста у насељу указују на временски оквир који обухвата раздобље од друге половине 18. па све до раног 17. века пре н. е., што је готово идентичан датум са оним добијеним у гробу 28.

Представљени датуми указују на то да су насеље и некропола на локалитету Трњане, и поред тога што је одређена количина керамике имала сличности са параћинском културом, највероватније представљали једну варијанту ватинске културе која се развијала у залеђу Ђердапа у раздобљу између 19. и 17. века пре н. е. У приближно истом периоду забележена је повећана металуршка активност и у алпској регији и на територији северне Италије. Насеље на Трњану показује да су заједнице средњег бронзаног доба на простору североисточне Србије имале важну улогу у успостављању производње и дистрибуције бакра у југоисточној Европи с почетка II миленијума пре н. е.

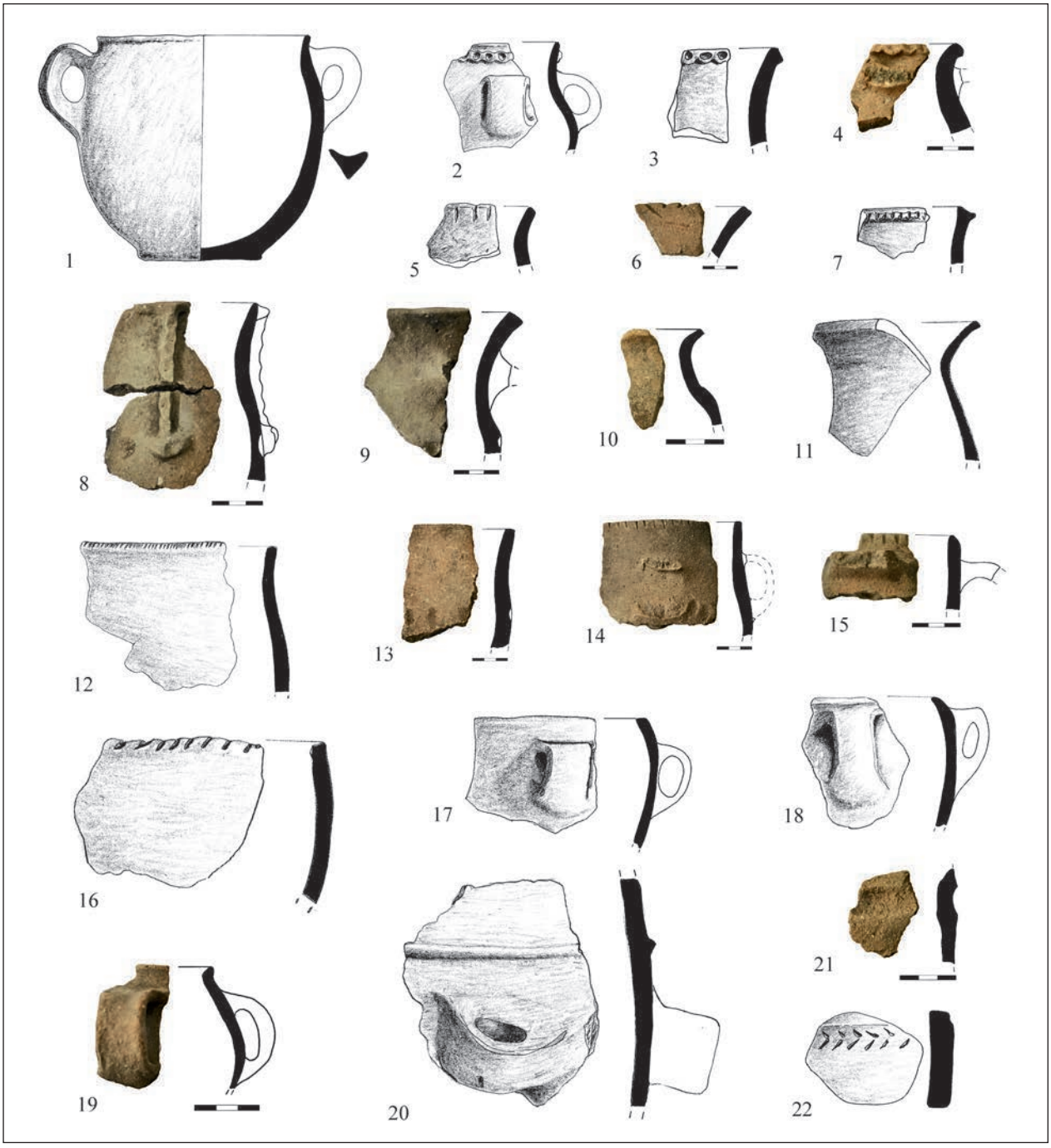

Plate I – 1) Tr. 1/2017, 3rd e.l.; 2) Tr. 3/2017, 1st e.l.; 3) Tr. 3/2017, 3rd e.l.; 4) Tr. 6/2018, S.U.2; 5) Tr. 1/2017 2nd e.l.; 6) Tr. 4/2018, S.U.2; 7) Tr. 3/2017, 1st e.l.; 8) Tr. 8/2018, S.U.4; 9) Tr. 6/2018, S.U.4; 10) Tr. 6/2018, S.U.2; 11) 1985–1987 excavations; 12) 1985–1987 excavations; 13) Tr. 8/2018, S.U.4; 14) Tr. 8/2018, S.U.4; 15) Tr. 4/2017, S.U.4; 16) 1985–1987 excavations; 17) 1985–1987 excavations; 18) 1985–1987 excavations; 19) Tr. 4/2018, S.U.1; 20) 1985–1987 excavations; 21) Tr. 2/2018, S.U.2; 22) Tr. 3/2017, 2nd e.l.

Табла I – 1) S. 1/2017, 3 o.s.; 2) S. 3/2017, 1 o.s. ; 3) S. 3/2017, 3 o.s.; 4) S. 6/2018, S.J.2; 5) S. 1/2017 2 o.s.; 6) S. 4/2018, S.J.2; 7) S. 3/2017, 1 o.s.; 8) S. 8/2018, S.J.4; 9) S. 6/2018, S.J.4; 10) S. 6/2018, S.J. 2; 11) ископавања 1985–1987; 12) ископавања 1985–1987; 13) S. 8/2018, S.J.4; 14) S. 8/2018, S.J.4; 15) S. 4/2017, S.J.4; 16) ископавања 1985–1987; 17) ископавања 1985–1987; 18) ископавања 1985–1987; 19) S. 4/2018, S.J.1; 20) ископавања 1985–1987; 21) Tr. 2/2018, S.J.2; 22). S. 3/2017, 2 o.s.

Plate II – 1) Tr. 7/2108, S.U.5; 2) Tr. 3/2107, e.l.; 3) Tr. 4/2018, S.U.4; 4) Tr. 7/2018, S.U.4; 5) Tr. 3/2017, 3rd e.l.; 6) Tr. 4/2018, S.U.4; 7) Tr. 3/2017, 2nd e.l.; 8) Tr. 3/2017, 2nd e.l.; 9) Tr. 4/2018, S.U.5; 10) Tr. 4/2018, S.U.4; 11) Tr. 4/2018, S.U.4; 12) Tr. 4/2018, S.U.5; 13) Tr. 4/2018, S.U.4; 14) Tr. 4/2018, S.U.4; 15) Tr. 4/2018, S.U.4; 16) Tr. 4/2018, S.U.1; 17) Tr. 3/2017, 1st e.l.; 18) 1985–1987 excavations; 19) Tr. 3/2017, 3rd e.l.; 20) Tr. 7/2018, S.U.1; 21) Grave 33

Табла II – 1) S. 7/2108, S.J.5; 2) S. 3/2107, o.s.; 3) S. 4/2018, S.J.4; 4) S. 7/2018, S.J.4; 5) S. 3/2017, 3o.s.; 6) S. 4/2018, S.J.4; 7) S. 3/2017, 2 o.s.; 8) S. 3/2017, 2 o.s.; 9) S.4/2018, S.J.5; 10) S. 4/2018, S.J.4; 11) S. 4/2018, S.J.4; 12) S. 4/2018, S.J.5; 13) S. 4/2018, S.J.4; 14) S. 4/2018, S.J.4; 15). S. 4/2018, S.J.4; 16) S. 4/2018, S.J.1; 17) S. 3/2017, 1 o.s.; 18) ископавања 1985–1987; 19) S. 3/2017, 3 o.s.; 20) S. 7/2018, S.J. 1; 21) Гроб 33

Plate III – 1) Tr. 4/2018, S.U.2; 2) Tr. 3/2017, 3rd e.l.; 3) Tr. 1/2017, 2nd e.l.; 4) 1985–1987 excavations; 5) Tr. 6/2018, S.U.2; 6) Tr. 7/2108, S.U.4; 7) Tr. 3/2017, 1st e.l.; 8. 1985–1987 excavations; 9) Tr. 7/2108, S.U.4; 10) Tr. 6/2018, S.U.4; 11) 1985–1987 excavations; 12) Tr. 3/2017, 3rd e.l.; 13) Tr. 1/2017, 4th e.l.; 14) Tr. 7/2017, S.U.5

Табла III – 1) S. 4/2018, S.J.2; 2) S. 3/2017, 3 о.s.; 3) S. 1/2017, 2 о.s.; 4) ископавања 1985–1987; 5) S. 6/2018, S.J.2; 6) S. 7/2108, S.J.4; 7) S. 3/2017, 1 о.s.; 8) ископавања 1985–1987; 9) S. 7/2108, S.J.4; 10) S. 6/2018, S.J.4; 11) ископавања 1985–1987; 12) S. 3/2017, 3 о.s.; 13) S. 1/2017, 4 о.s.; 14) S. 7/2017, S.J.5

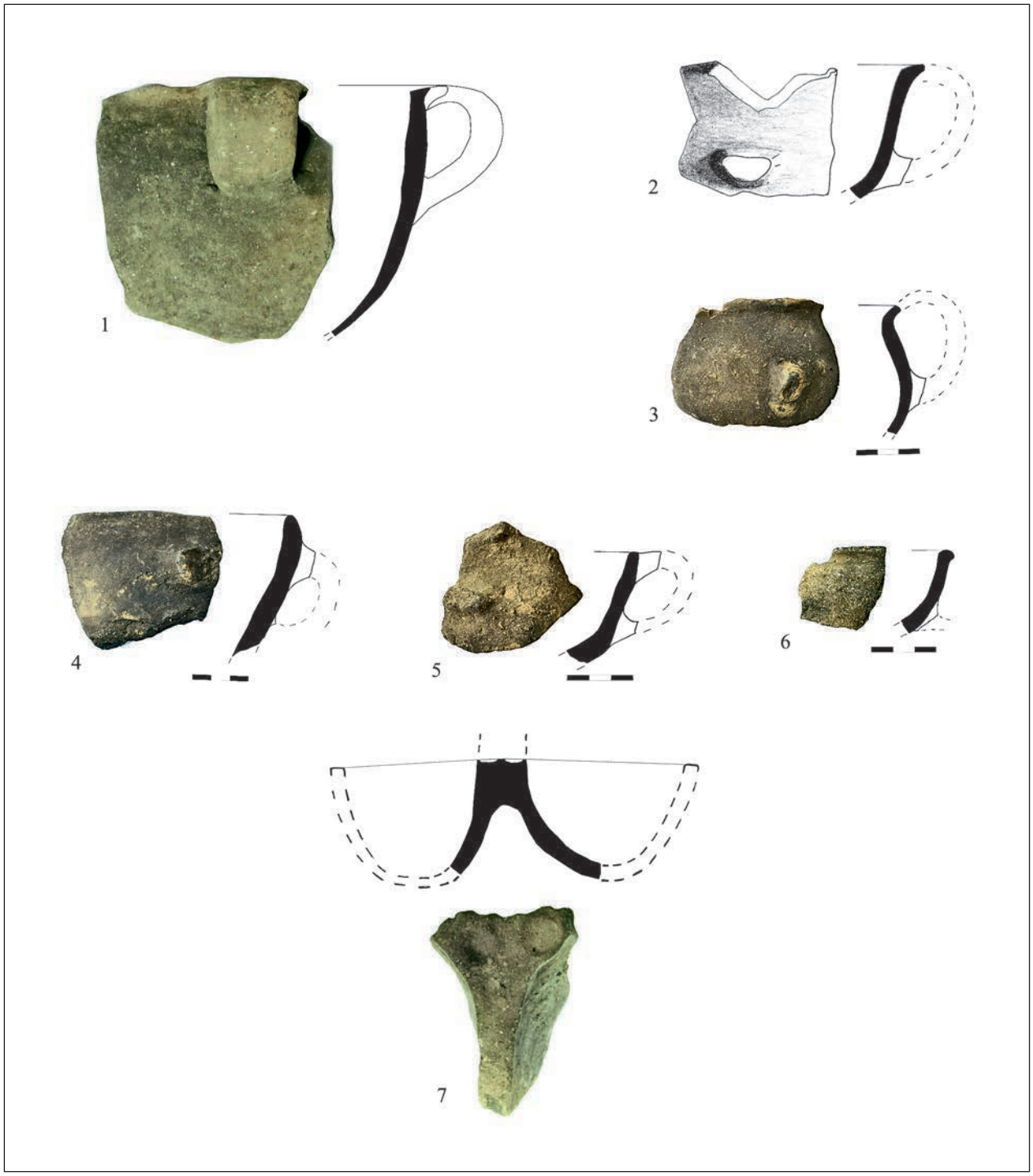

Plate IV – 1) 1985–1987 excavations; 2) Tr. 2/2017, 4/5th e.l.; 3) Tr. 7/2017, S.U.5; 4) Tr. 7/2017, S.U.5; 5) Tr. 4/2018, S.U.4; 6) Tr.4/2018, S.U.2; 7) Tr. 7/2017, S.U.5

Табла IV – 1) ископавања 1985–1987; 2) S. 2/2017, 4/5 o.s.; 3) S. 7/2017, S.J.5; 4) S. 7/2017, S.J.5; 5) S. 4/2018, S.J.4; 6) S.4/2018, S.J.2; 7) S. 7/2017, S.J.5

Plate V – 1) 1985–1987 excavations; 2) Tr. 4/2018, S.U.4; 3) Tr. 4/2018, S.U.4; 4) Tr. 4/2018, S.U.4; 5) Tr. 7/2018, S.U.4; 6) Tr. 7/2018, S.U.2; 7) Tr. 4/2018, S.U.2; 8) Tr. 3/2017, 2nd e.l.; 9) Tr. 3/2017, 3rd e.l.; 10) 1985–1987 excavations; 11) Tr. 7/2018, S.U.5; 12) Tr. 4/2018, S.U.4

Табла V – 1) ископавања 1985–1987; 2) S. 4/2018, S.J.4; 3) S. 4/2018, S.J.4; 4) S. 4/2018, S.J.4; 5) S. 7/2018, S.J.4; 6) S. 7/2018, S.J.2; 7) S. 4/2018, S.J.2; 8) S. 3/2017, 2 o.s.; 9) S. 3/2017, 3 o.s.; 10) ископавања 1985–1987; 11) S. 7/2018, S.J.5; 12) S. 4/2018, S.J.4

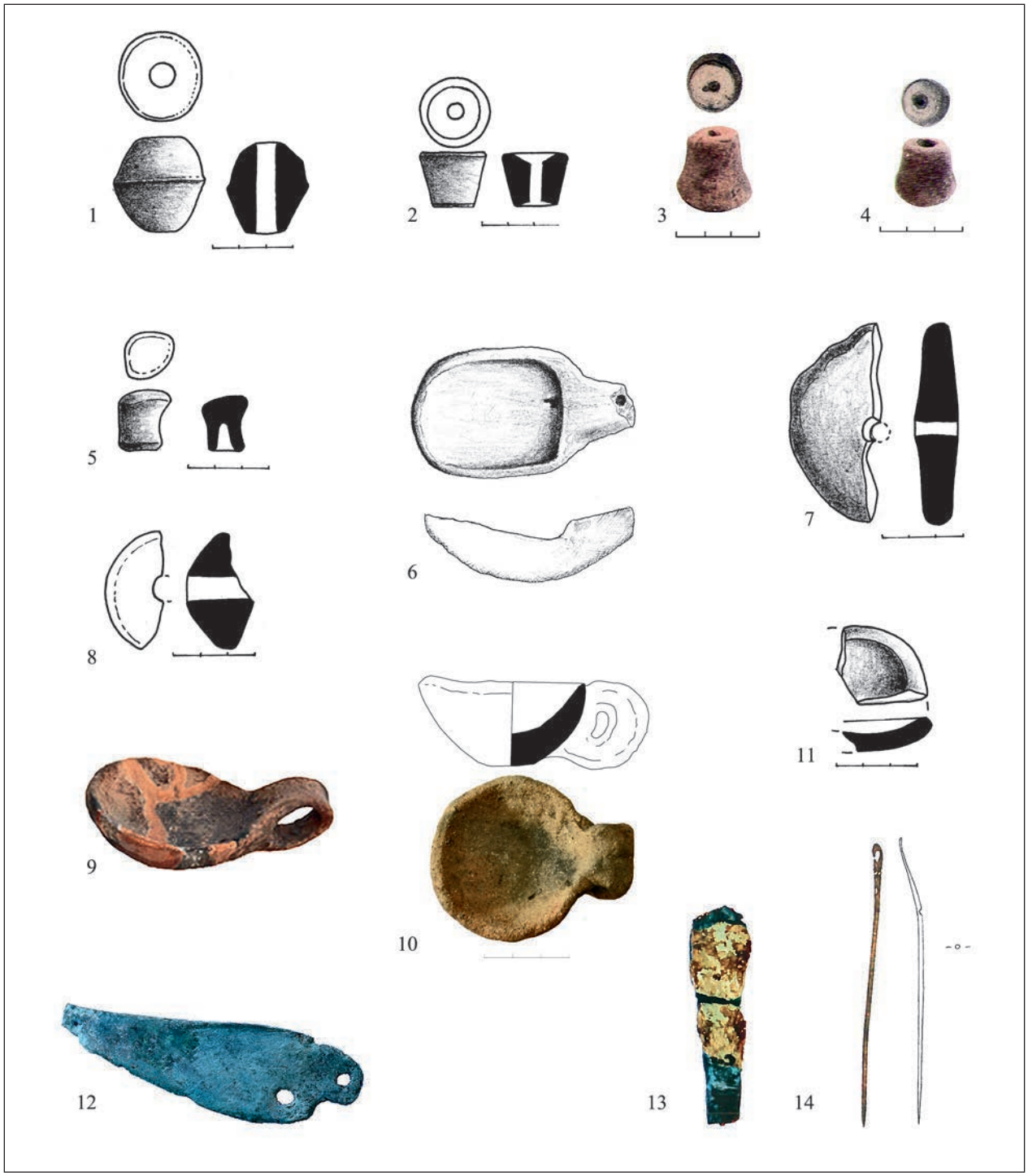

Plate VI – 1) Tr. 4/2018, S.U.2; 2) Tr. 4/2018, S.U.4; 3) Tr. 3/2017, 2nd e.l.; 4) Tr. 3/2017, 2nd e.l.; 5). Tr. 4/2018, S.U.4; 6) 1985–1987 necropolis; 7) Tr. 4/2018, S.U.4; 8) Tr. 4/2018, S.U.4; 9) 1985–1987 necropolis; 10) Tr. 6/2018, S.U.4; 11) 7/2018, S.U.4; 12) 1985–1987 Grave 28; 13) 1985–1987 excavations

Табла VI – 1) S. 4/2018, S.J.2; 2) S. 4/2018, S.J.4; 3) S. 3/2017, 2 o.s.; 4) S. 3/2017, 2 o.s.; 5) S. 4/2018, S.J.4; 6) ископавања 1985–1987; 7) S. 4/2018, S.J.4; 8) S. 4/2018, S.J.4; 9) ископавања 1985–1987; 10) S. 6/2018, S.J.4; 11) 7/2018, S.J.4; 12) ископавања 1985–1987 Гроб 28; 13) ископавања 1985–1987

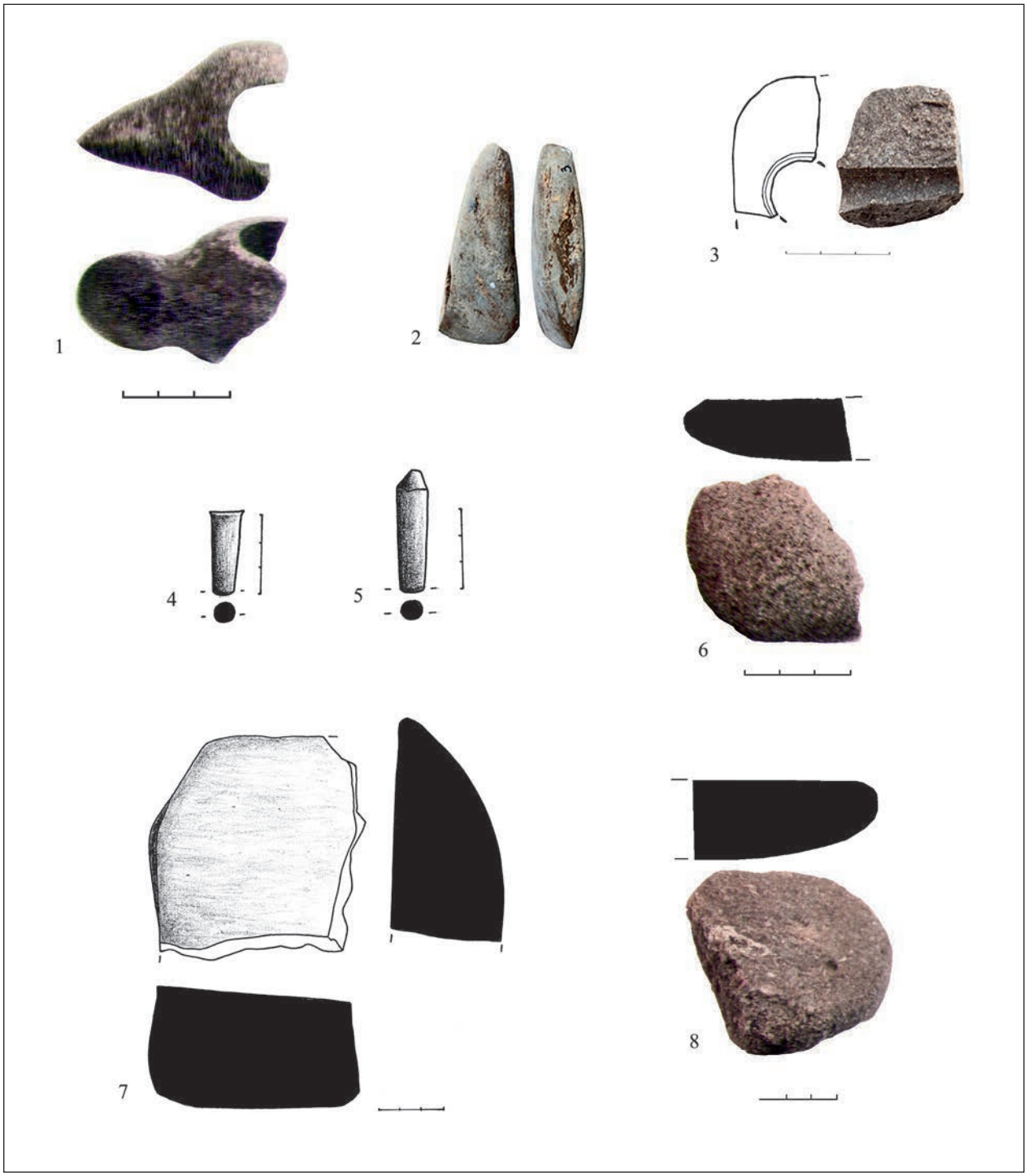

Plate VII – 1) Tr. 3/2017, 4th e.l.; 2) 1987–1989 Grave 33; 3) 1987–1989 Grave 29; 4) Tr. 6/2018, S.U.2/4; 5) Tr. 5/2018, S.U.2; 6) Tr. 3/2017, 1st e.l.; 7) Tr. 5/2018, S.U.2; 8) Tr. 3/2107, 2nd e.l.

Табла VII – 1) S. 3/2017, 4 о.s.; 2) ископавања 1987–1989 Гроб 33; 3) ископавања 1987–1989 Гроб 29; 4) S. 6/2018, S.J.2/4; 5) S. 5/2018, S.J.2; 6) S. 3/2017, 1 о.s.; 7) S. 5/2018, S.J.2; 8) S. 3/2107, 2 о.s.

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REVISITING "TIN IN SOUTH-EASTERN EUROPE?"

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Abstract. – The important role of the Balkans in the origin and development of metallurgy is well established with respect to copper. In addition, Aleksandar Durman, in his 1997 paper "*Tin in South-eastern Europe?*", essentially initiated studies into the role of the Balkans in Europe's Bronze Age tin economy. He identified six geologically favourable sites for tin mineralisation and associated fluvial placer deposits in the former Yugoslavian republics, and suggested that these may have added to the tin supply of the region. The viability of two of these sites has been confirmed (Mt Cer and Bukulja, Serbia) but the exploitation potential for the other locations has remained untested. River gravels from these four sites (Motajica and Prosara in Bosnia and Herzegovina; Bujanovac in Serbia; Ogražden in North Macedonia) were obtained by stream sluicing and panning. The sites of Prosara and Bujanovac were found to be barren with respect to cassiterite (SnO_2). Streams flowing from Motajica and Ogražden were both found to contain cassiterite, but in amounts several orders of magnitude less than at Mt Cer and Bukulja. Although it is possible that minor tin recovery occurred at Motajica and Ogražden, it is unlikely that they could have contributed meaningfully to regional tin trade. This is supported by the fact that the isotopic signature ($\delta^{124}Sn$) of cassiterite from Motajica is highly enriched in light isotopes of tin compared to that associated with Late Bronze Age artefacts of the region.

Key words. – Cassiterite, Placer, Tin, Bronze Age, Balkans, Sn Isotopes

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The quest for the origin of the earliest metallurgy in southeast Europe dates to the first half of the 20th century when O. Davies published descriptions of the remains of two mining shafts in Jarmovac in south-western Serbia.[1] The period after the Second World War was marked by papers that discussed the prehistoric mining in the context of geology and possible exploitation.[2] The discovery and excavations of the prehistoric copper mines of Rudna Glava in eastern Serbia and Ai Bunar in Bulgaria in the late '60s, and Mali Šturac in the '80s,[3] resulted in several publications that addressed various aspects of prehistoric copper mining, such as the material culture, chronological positioning, and technological processes[4], primarily based on stylistic and typological analyses of archaeological material (e.g. potsherds, crucibles, copper beads and malachite remains) from Neolithic and Eneolithic sites.[5] Papers focused on physical-chemical analyses followed in the '90s.[6] While the

[1] Davies 1937.

[2] Simić 1951; Simić 1969.

[3] The excavations at the site of Mali Šturac are still ongoing. For previous results refer to: Antonović, Vukadinović 2012, with cited literature; Antonović 2018, with cited literature.

[4] The most complete overview of the history of research and current data and progress is provided in Богосављевић-Петровић 2005 and Antonović 2018.

[5] *cf.* Jovanović 1971; Черних, Радунчева 1972; Јовановић 1974; Jovanović, Ottaway 1976; Јовановић 1978; Černych 1978; Черньх 1978; Jovanović 1985.

[6] Pernicka et al. 1993; Begeman et al. 1995.

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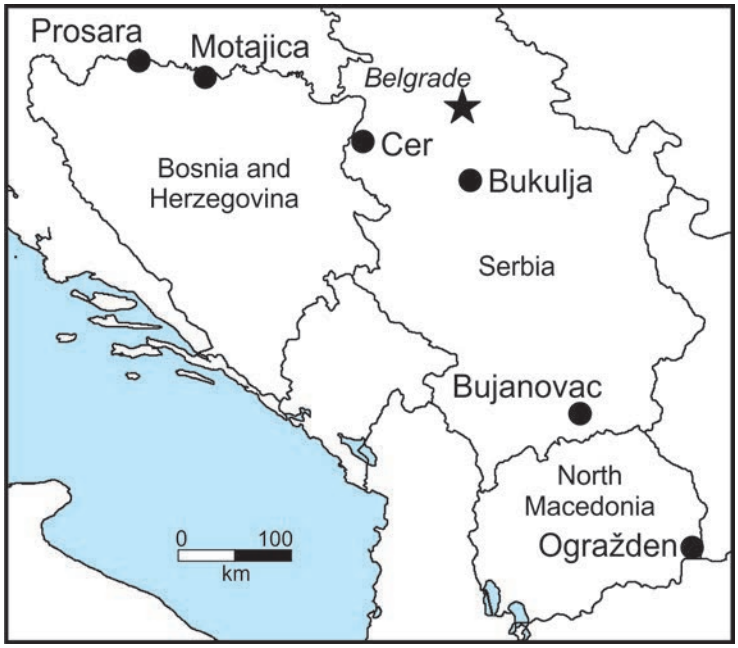

Fig. 1. Potential tin sources identified by A. Durman (1997)

Сл. 1. Потенцијални извори калаја према А. Дурману (1997)

search for the source of tin, necessary for the production of tin-bronze, was ongoing in western Europe throughout the 20th century, it was essentially neglected by local authors in south-eastern Europe.

In 1997, Aleksandar Durman published the article "*Tin in South-eastern Europe?*". This breakthrough paper proposed that the long-sought source of tin during the Bronze Age of south-eastern Europe need not have been the large Variscan deposits of the Erzgebirge or Cornwall, nor an exotic source in Central Asia. Rather, he suggested small placer cassiterite (SnO_2) deposits in the Balkans may have provided tin for regional bronze production. Based on communications with Serbian geologist Dr. Antonije Antonović, he identified two Serbian sites as the most likely sources for prehistoric exploitation, Mt Cer[7] (20 km east-northeast of Loznica) and Bukulja[8] (8 km west-southwest of Aranđelovac) (Fig. 1).

Mining companies and national geological surveys have conducted feasibility studies of these two placer deposits. As reported by Durman (1997), Mihajlović (1978) estimated the gravels associated with Bukulja's Cigankulja stream contain sufficient cassiterite to produce approximately 225 tons of tin metal. Tin placer deposits of Mt Cer were found to be significantly larger than those of Bukulja, and this was confirmed by Tomić (1991), who projected that the alluvial deposits of the Lešnica and Cernica rivers contain sufficient cassiterite to produce 2,700 tonnes of tin. Thus, only 0.1% of Cer's current ore reserves could have produced 30 tonnes of bronze, sufficient to supply the entire central Balkan bronze production of the Late Bronze Age.

Subsequently, highly disturbed archaeological sites yielding predominantly fragments of Late Eneolithic and Bronze Age pottery were documented adjacent to the richest tin gravels at Mt Cer, and these include rare fragments of technical pottery with tin-bearing vitreous surfaces.[9] The Sn isotopic composition of Late Bronze Age Serbian artefacts defines a regional cluster south of the Danube River and west of the Morava River (coincident with the location of Mt Cer) that is consistent with those of the ores of Cer's Milinska, Cernica, and Lešnic rivers.[10] Accordingly, Mason et al. (2020) concluded that mining activities at Mt Cer likely contributed significantly to tin metal production of the region at that time.

In addition to Mt Cer and Bukulja, Durman (1997) identified four other locations of interest.[11] He reported an unpublished account of detrital cassiterite in rivers at Bujanovac in Serbia, and a report by Tućan

[7] Durman, 1997, 10.
[8] Durman, 1997, 8.
[9] Huska et al., 2014, 487–488.
[10] Mason et al., 2020.
[11] Durman, 1997, 9–10.

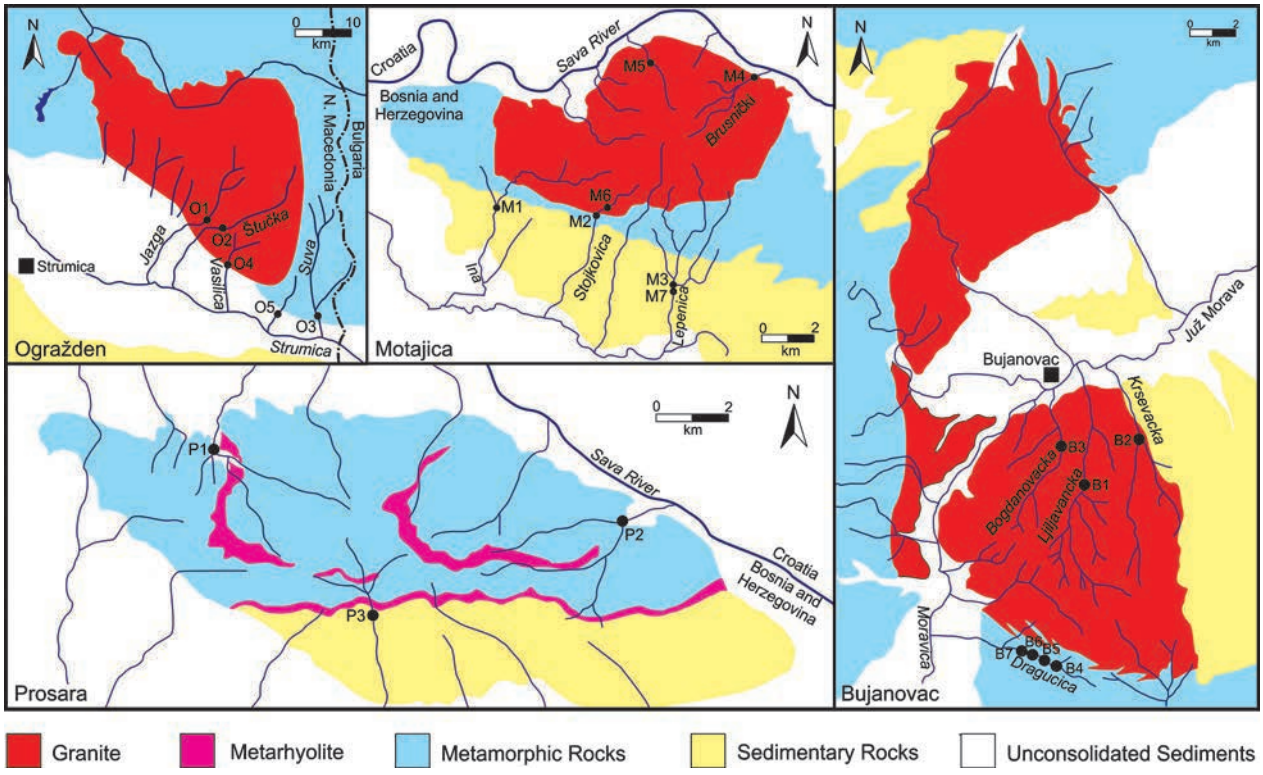

Fig. 2. Sample Location Maps
(Geology of Ogražden is based on Boev et al. 2002; Geology of Motajica and Prosara is based on Ustaszewski et al. 2010; Geology of Bujanovac is based on geological map of Vranje K34–56)

Сл. 2. Локације на којима је вршено узорковање
(Геолошке подлоге засноване су: Огражден – на Boev et al. 2002; Мошајице и Просаре – на: Ustaszewski et al. 2010; Бујановца – на геолошкој карши Врања, исечак K34–56)

(1957) of cassiterite in streams that flow from the Ogražden granite near Strumica in North Macedonia (Fig. 1). In addition, he noted that the granites that lie beneath Motajica and Prosara in northern Bosnia are similar in composition to those of Mt Cer and Bukulja, and so could potentially host similar mineralisation. However, none of these four sites had been investigated in detail to confirm whether detrital cassiterite is present, and if so, whether sufficient quantities would have allowed for production of a significant mass of tin. The purpose of this study was to examine each of these sites and evaluate their viability as potential prehistoric placer tin mining sites.

Sampling and Methods

The bedrock geology and river drainage pattern of each site was examined to identify the most likely sites for placer tin accumulations (i.e., confluences of rivers with larger watersheds that cross-cut granite bodies). For each stream that had sufficient water flow to allow a sluice to operate, river gravels were sieved (<2 mm) to produce approximately 30 litres of sand, which was then fed through a portable sluice box. The sluice output was panned on site to a "black-sand" concentrate. An Olympus Delta portable x-ray fluorescence device (pXRF) was used to determine the tin content of the "black-sand" concentrate on site.

Initial sampling was undertaken at Motajica (M1 through M3) and Prosara (P1 through P3) in June 2017, and reported on by Cruse et al. (2017). The remaining samples, including a resampling of Motajica, were collected in May 2018 when streamflow was more conducive to sluicing. A total of 22 samples were taken from 17 streams at the four study locations (Fig. 2): four streams at Bujanovac (Bogdanovačka, Dragučica, Krševačka and Ljiljanovačka rivers), five at Ogražden

(Jazga, Štučka, Suva, Vasilica, unnamed stream), five at Motajica (Brusnički, Ina, Lepenica, Stojkovica, unnamed stream), and three at Prosara (Busovača, Gasnica, Jablanica). In addition, one sample was taken from both Mt Cer (Milinska) and Bukulja (Dugačko) for comparison. At each sample site one bulk sample was taken.

Samples were subsequently dried and the heavy mineral concentrate was further purified by extracting light minerals (<2.9 g/cm³) using flotation separation with a solution of sodium polytungstate ($3Na_2WO_4 \bullet 9WO_3 \bullet H_2O$). The tin content of this concentrate was determined by pXRF. The heavy mineral assemblages were then fed through a Frantz Isodynamic Magnetic Separator after magnetite was removed using a hand magnet. Subsamples were taken at 0.5A, 0.7A, 1.0A, 1.75A, and the remaining non-magnetic fraction, the non-magnetic fraction being that into which cassiterite accumulates. The Sn content of the non-magnetic fraction was determined by pXRF and then mounted on adhesive carbon stubs for SEM examination and mineral identification.

A Hitachi TM3030Plus scanning electron microscope operating at 15kV and an Oxford Instruments AZtec energy dispersive spectrometer with the AZtec One software platform were used to identify all heavy mineral grains mounted on each stub. These quantitative analyses were used to define the major element components of each mineral grain so that mineral formulae/identities could be deduced stoichiometrically, in conjunction with the physical features observable under the SEM (form and cleavage) and binocular microscope (colour, lustre). Emphasis was placed on the identification of cassiterite and other Sn-bearing minerals.

Isotopic analyses of cassiterite from Cer and Bukulja were presented recently in Mason et al. (2020), and, so, analyses were not repeated in this study. Of the samples from the four remaining sites, only sample M6 from the Lepenica at Motajica contained a sufficient mass of cassiterite to allow for the separation of a cassiterite concentrate that could be used for isotopic analysis. Grains of cassiterite (0.3–0.5 mm) were identified by SEM-EDS analysis and then handpicked to form a cassiterite separate of >100 grains. The cassiterite sample was digested following the procedure of Mathur et al. (2017, p17): 0.1 g of -100 mesh cassiterite powder was mixed with 0.5 g of KCN and heated at 850°C for one hour in graphite crucibles contained within capped alumina crucibles. The resulting reduced Sn metal beads were dissolved in heated ultrapure 11N HCl overnight. A small aliquot of this solution was removed and dried and redigested in ultrapure 1M HCl. This solution was purified using the ion exchange chromatography described in Balliana et al. (2013, 2981–2982) and employed by Mason et al. (2016) and Mathur et al. (2017).

Analysis was conducted on the Neptune MC-ICPMS at Rutgers University. Solutions were measured at 50ppb Sn with 50ppb Sb ICP-MS standard, as described in Mathur et al. (2017). Mass bias was corrected for using Sb doped solutions and an exponential mass bias correction defined in Mathur et al. (2017). The corrected values were then bracketed with the NIST 3161A Sn standard (Lot# 07033). One block of 30 ratios was collected. Data is presented relative to the NIST 3161A Sn standard (Lot# 07033) in per mil notation defined as:

$$\delta^{1xx}\text{Sn‰} = \left(\frac{\left(\frac{1xx_{Sn}}{116_{Sn}}\right)sample}{\left(\frac{1xx_{Sn}}{116_{Sn}}\right)NIST\ 3161} - 1 \right) * 1000$$

Instrumentation 2σ error for δ^{124}Sn is 0.02%. Whole procedural 1σ errors for analysis (ample variability, reduction, dissolution, purification, and analysis) are δ^{120}Sn= 0.08‰ and δ^{124}Sn= 0.16‰. Note that the δ^{124}Sn and δ^{120}Sn are reported relative to ^{116}Sn, with a difference of 8 amu and 4 amu, respectively.

Results

The results are summarised in Table 1. In the panned black sand concentrates, tin was detectable in only the Milinska at Mt Cer (1.4 wt%) and the Dugačko at Bukulja (0.9 wt%). Tin was detected in post-flotation heavy mineral separates at Cer (2.6 wt%), Bukulja (1.2 wt%), two streams at Motajica (Brusnički and an unnamed stream, each with 0.33 wt%), and two streams at Ogražden (Jazga 0.31 wt% and Vasilica 0.24 wt%). In the non-magnetic mineral fractions tin was detected in samples from two additional sites, the Lepenica at Motajica and an unnamed stream at Ogražden. No tin was detected in samples from either Prosara or Bujanovac

In addition to Cer and Bukulja, cassiterite was identified in the non-magnetic fraction of one sample from Motajica (M6 Lepenica) which contained 0.47 wt% Sn, and two samples from Ograzden (O3 Suva, O5 unnamed stream), with 0.05 and 0.12 wt% Sn, re-

Sample	Stream	Panned	Heavy Liquid	Non Magnetic	Minerals of Interest
B1	Ljiljavancka	nd	nd	nd	
B2	Krsevacka	nd	nd	nd	
B3	Bogdanovacka	nd	nd	nd	
B4	Dragucica	nd	nd	nd	
B5	Dragucica	nd	nd	nd	
B6	Dragucica	nd	nd	nd	
B7	Dragucica	nd	nd	nd	
M1	Ina	nd	nd	nd	Sn-bearing rutile, euxenite, bastnaisite
M2	Stojkovica	nd	nd	nd	Thorite, scheelite, euxenite, bismuth, brookite
M3	Lepenica	nd	nd	nd	Bastnaisite
M4	Brusnički	nd	0.03		
M5	Unnamed	nd	0.03		
M6	Lepenica	nd	nd	0.47	Cassiterite, ixiolite, euxenite
M7	Stojkovica	nd	nd	nd	
O1	Jazga	nd	0.03	0.04	
O2	Štučka	nd	nd	nd	
O3	Suva	nd	nd	0.05	Cassiterite, euxenite, scheelite
O4	Vasilica	nd	0.02	nd	
O5	Unnamed	nd	nd	0.12	Cassiterite, thorite, scheelite
P1	Busovaca	nd	nd	nd	Scheelite, wolframite
P2	Gasnica	nd	nd	nd	Scheelite, wolframite
P3	Jablanica	nd	nd	nd	Scheelite, wolframite
Cer	Milinska	1.4	2.6	18.7	Cassiterite, euxenite, microlite
Bukulja	Dugačko	0.9	1.2	11.6	Cassiterite, wolframite, thorite

Table 1. Tin concentrations in various sample fractions in percent, as determined by pXRF, along with key minerals identified through SEM-EDS analysis

Табела 1. Концентрације калаја у узорцима различитих фракција, изражени у процентима, концентрације су утврђене путем pXRF анализе, а главни минерали путем SEM-EDS анализе

spectively. Although these are the most Sn-rich samples found in this study, their tin concentration is two to three orders of magnitude less that that found at Mt Cer and Bukulja.

Although several other samples from Motajica and Ogražden (M4, M5 and O4) had detectable Sn based on pXRF analysis, no cassiterite was found. This suggests that the Sn occurs as a component in other minerals. This has been documented at Mt Cer, where Sn is present within a microlite-series mineral ($[Ca,Sn,U]_2[Ta,Nb]_2O_6(OH,F)$)[12] and within rutile $[(Ti,Sn)O_2]$ in sample M1 from the Ina at Motajica. All samples from Bujanovac and Prosara were found to be barren with respect to tin in any form.

The cassiterite concentrate from sample M6 from the Lepenica at Motajica yielded mass-dependent isotopic compositions of $\delta^{120}Sn$=-0.44‰ and $\delta^{124}Sn$=-0.83‰, relative to NIST 3161A. This contrasts with the more heavy isotope weak to moderate heavy isotope

[12] Powell et al., in press.

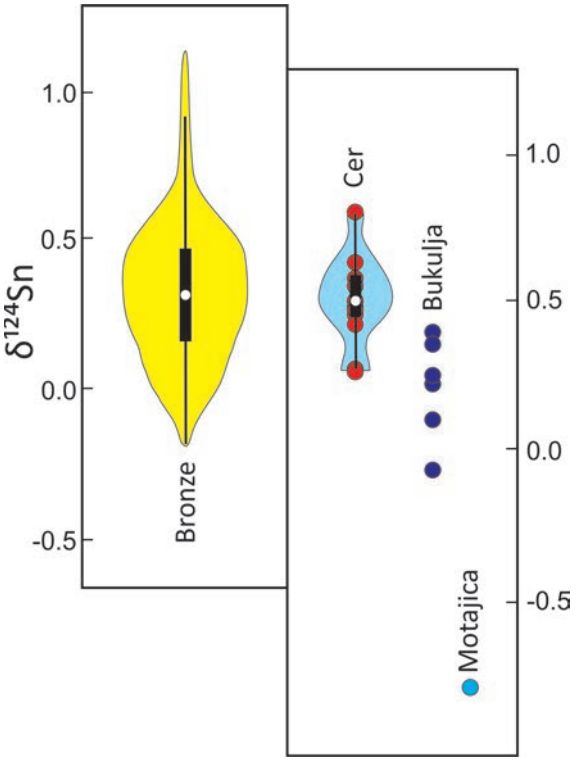

Fig. 3. $\delta^{124}Sn$ values for Late Bronze Age bronze artefacts from Serbia and Bosnia and Herzegovina, as reported in Huska et al. (in press) after a -0.2‰ shift to correct for smelt induced fractionation, as compared to cassiterite from Mt Cer, Bukulja, and Motajica. (Cassiterite data for Mt Cer from Huska et al., in press; Bukulja data from Huska et al., in press; Berger et al., 2019)

Сл. 3. Вредности $\delta^{124}Sn$ за предмете позног бронзаног доба из Србије и БиХ (Huska et al., in press), кориговане са -0.2‰ како би се одстранили ефекти фракционације проузроковане топљењем, у поређењу са вредностима добијеним за каситерит са Цера, Букуље и Моташице. (Вредности за каситерит преузете су из: за Цер – Huska et al., in press; за Букуљу – Huska et al., in press; Berger et al. 2019)

enrichment displayed by similar multi-grain placer samples from Mt Cer and Bukulja ($\delta^{124}Sn$ of 0.3 to 0.8‰ at Cer; $\delta^{124}Sn$ of -0.1 to 0.4‰ at Bukulja).[13]

Conclusions

Of the six potential tin placer deposits identified by Durman, Mt Cer and Bukulja are by far the richest, with both yielding percent-level concentrations of tin in the panned black-sand concentrate. In addition, cassiterite was documented to occur in stream sediments at Ogražden and Motajica, but at concentrations several orders of magnitude lower than Cer and Bukulja. Although containing other rare elements, including tungsten, Prosara appears to be barren with respect to tin. The Vranje geological map (K34–56) notes the presence of Sn in the Dragučica River, along the south contact of the Bujanovac pluton. However, four separate samples taken along the same stretch of this river failed to yield any trace of tin, as was the case for the other three rivers samples at Bujanovac. This may indicate that Bujanovac hosts very minor tin mineralisation, certainly less than would have been necessary for the development of a mineable placer deposit.

Mason et al. (2020) demonstrated through isotopic composition and geographic correlation that ore from Mt Cer likely supplied much of the tin economy of Late Bronze Age Serbia south of the Danube. Although Bukulja is a viable source of tin ore, there remains no archaeological evidence that these deposits were exploited in prehistory. Nor is there a clear correlation between the Sn isotopic composition of Bukulja ores and local artefacts, particularly when the 0.2‰ correction associated with smelt-related enrichment of heavy isotopes in metal products is taken into account, as recommended by Berger et al. (2019), Powell et al. (2019) and Mason et al. (2020) (Fig. 3).[14] Thus, it appears that Bukulja either was not mined in the Late Bronze Age, or was a minor contributor to the tin economy of Serbia relative to Mt Cer and the Erzgebirge at that time.

The Sn istotopic composition of the multi-crystal composite sample of cassiterite from Motajica is far more enriched in light isotopes of Sn than that of Late Bronze Age metal artefacts from the region (Fig. 3). The full range of Sn isotopic composition of cassiterite from Motajica cannot be determined from a single analysis. However, the placer sample was composed of at least a hundred individual sand- to silt-sized detrital

[13] Mason et al. 2020

[14] Mason et al., 2020.

mineral grains. Thus, the composition of this sample represents a multi-crystal average and, as such, is likely to approach the central tendency of the deposit’s isotopic composition. To support this assertion, the mean and standard deviation of the set of nine placer samples from the Erzgebirge reported by Haustein et al. (2010) is 0.56±0.12‰, as compared to 0.59±0.38‰ for the total of 43 samples. Accordingly, it is reasonable to conclude that the Motajica mineralisation is highly enriched in light isotopes of Sn. Given that none of the 336 artefacts analysed by Mason et al. (2020) yielded δ^{124}Sn values < -0.04 (Fig. 3), Late Bronze Age artefacts with light isotope enrichment appear to be absent from the region. Therefore, if the low-grade placers from Motajica were exploited at all at that time, they did not contribute to the regional tin economy.

Based on the results of on-site sluice- and pan-based sampling, of the six potential Balkan tin ore sources identified by Durman, only Cer, Bukulja and Motajica appear to have sufficient cassiterite concentration to have allowed for the potential exploitation of placer gravels. Furthermore, based on the isotopic composition of Sn from these sources compared to Late Bronze Age artefacts, Cer is the only site that appears to have likely contributed substantially to the regional tin economy at that time

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ЈОШ ЈЕДНОМ О „КАЛАЈУ У ЈУГОИСТОЧНОЈ ЕВРОПИ?”

Кључне речи. – сводови, цеви за сводове, керамичке цеви, *tubi fittili*, *Timacum Minus*, технике грађења, римска архитектура, касноантичка архитектура, северијански период, југоисточна Европа

Обновом археолошких ископавања античког кастела Тимакум Минус 2019. године створиле су се нове могућности за тумачења његових грађевина које су истраживане пре више деценија. Међу остацима грађевина око античког кастела *Timacum Minus*-а посебну пажњу привлачи делимично истражен „објекат са хипокаустом”, нарочито у погледу његових конструктивних карактеристика. Поред иначе честих античких конструкција хипокауста и зидног грејања, међу остацима ове грађевине уочена је и посебна врста грађевинских елемената – керамичке цеви за сводове. Велика количина откривених цеви указала је на то да је ова грађевина заиста имала сводове израђене од њих.

Иако је појава цеви за сводове приликом истраживања античких локалитета на тлу југоисточне Европе регистрована, она није довољно документована, као што ни сама функција цеви често није препозната. Један од разлога за то јесте недовољна упућеност истраживача у специфичне карактеристике цеви за сводове и њихову функцију, услед чега се оне мешају са водоводним цевима, тубулусима или калемовима везаним за зидно грејање – будући да сваки од тих елемената припада керамичким производима који су намењени грађевинарству.

У раду су разматране карактеристике цеви за сводове на Тимакум Минусу, као и контекст у коме су пронађене унутар „објекта са хипокаустом”. На основу налаза печата кохорте Аурелије II Дараданорум одређено је да „објекат са хипокаустом” и конструкција сводова од керамичких цеви потичу из III века – у коме је и иначе појава тих сводова широм Римског царства била честа.

Приликом систематизације врста керамичких цеви на Тимакум Минусу посебно је издвојена она које је било највише у „објекту са хипокаустом”. У склопу ње је препознат и сасвим специфичан централни елемент који је омогућавао да се два низа цеви на истом правцу, али из супротних смерова, међусобно споје. Тај елемент је дефинисао облик свода којим су биле покривене просторије чију је реконструкцију основе било могуће извршити.

Архитектонске анализе „објекта са хипокаустом”, као и карактеристике уочене на самим цевима указале су на то да су просторије биле покривене полуобличастим сводом, изграђеним од лучних вертикалних низова цеви које су у темену биле „закључане” централним елементом. Реконструкција изгледа цеви и начина њиховог ређања уклапа се у хронологију извођења објекта и свода током III века. Даљим статичким анализама дошло се до још неколико сазнања. Показало се да је преко свода морао бити нанесен одређен слој малтерне масе да би дебљина свода досегла оптималну вредност у опсегу 20–30 cm. На основу пропорција објекта које су одређене у његовој основи испитана је висина објекта, где је група случајева такође дефинисана пропорционално. Према нашим анализама, зидови просторија „објекта са хипокаустом” у којима су цеви регистроване могли су досезати висину до 3,08 m, док је висина просторија у темену свода могла бити 6,16 m.

Овим истраживањем покушали смо да укажемо на велики значај појединачних архитектонско-грађевинских елемената, а међу њима и керамичких цеви за сводове, којима се често не придаје довољна пажња. Налази керамичких цеви за сводове у Тимакум Минусу, уз извршене архитектонске анализе, употпуњују слику откривеног „објекта са хипокаустом” из више аспеката. Посебно је значајно дефинисање његове висине, које је веома тешко за античке грађевине профане архитектуре на нашем тлу будући да су најчешће сачуване у приземној или темељној зони. Значај налаза керамичких цеви за сводове у Тимакум Минусу велики је стога што је он омогућио како конкретно дефинисање контекста њиховог налаза тако и реконструкцију облика одређених делова грађевине помоћу тог елемента, што до сада није истраживано приликом анализа античке архитектуре на тлу југоисточне Европе.

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MONUMENTAL ALTAR FROM SINGIDUNUM WITH SCENES OF A SACRIFICIAL PROCESSION – *POMPA ET IMMOLATIO*

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Abstract. – A monumental altar was found in the very centre of Belgrade, ancient Singidunum, in 1932, with iconographic scenes of the sacrificial procession for a ritual animal sacrifice – immolatio. The scenes depict the procession of sacrificial animals to the altar known as pompa, by the victimarii, but also represent priests of a lower rank (flamines minores), with ritual utensils like a wine-pitcher, patera and acerra, used for the ritus of purification which precedes the sacrifice and for ritual acts during the sacrifice. The altar from Singidunum represents a unique monument with the described iconography in the territory of Moesia Superior and it has only been published in catalogue form to date, never fully analysed or interpreted. Through the analysis of its iconography, typology, function, geographically closest analogies and possible context of its finding, new conclusions regarding the praxis of public ritual sacrifice are brought to light related to the period from the second half of the 2nd century to the first decades of the 3rd century in Singidunum, one of the main centres of Moesia Superior.

Key words. – Monumental altar, Singidunum, sacrificial procession, animal sacrifice, tutulati

History and topography of the find

In 1932, during construction works in the centre of Belgrade,[1] which was also the centre of antique Singidunum, an imposing Roman monument was found (Fig. 1, 7).[2] The exact place of its finding was very near the presumed Roman forum, where votive monuments dedicated mostly to the supreme Roman god Jupiter, were found. It was immediately transferred to the National Museum in Belgrade and, today, it is situated in the *lapidarium* of the museum.[3]

Architectural scheme of the monument

The altar is cuboid and its dimensions are: height 1.20 m, width 1.18 m and depth 0.73 m. Originally, it probably had a base and crowning elements on the top. On three sides of the altar, scenes with different iconography are presented, while the fourth side is badly damaged. However, it can be recognised that there was an inscription on it, since there are traces of an inscription frame and ornaments. The monument is made of a white coarse-grained marble and the upper and lower parts of the altar's sides are damaged in such a way that in some areas small parts of the altar are even missing. The upper surface of the monument

[1] The monument was found on the corner of Uskočka and Delijska Street (on the depth of 2 m), where other Roman monuments have also been found. It can be presumed, judging by the find spot of the altar, that a temple dedicated to a specific Roman deity (in our opinion most probably to god Jupiter or Capitoline triad) was built there or in the vicinity, Вулић 1933, 5–8, no. 3; Петровић 1933, 313–317, fig. 1–6; Гарашанин 1954, 73–74, fig. 51, 51a, 51b; Нинковић 2018, 4; Нинковић 2019, 161, n. 146, Pl. XLVII, 146a–c.

[2] In the previous bibliography, the altar was defined also just simply as a monument in the shape of a cube. However, it is very clear that not only by the dimensions, which are typical for an altar, but also by the typology of the monument, the monument found on the corner of Uskočka and Delijska Street is an altar, Вулић 1933, 5–8, no. 3; Петровић 1933, 313–317, fig. 1–6.

[3] The altar is today situated in the *lapidarium* of the National Museum in Belgrade, inv. no. 22_128.

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Figs. 1 and 2. Roman funerary altar from Singidunum (photo documentation of the National Museum in Belgrade)

Сл. 1 и 2. Римски фунерарни олтар из Синтидунума (фото-документација Народног музеја у Београду)

is intact and without any holes or sockets.[4] Unfortunately, the inscription of the altar is unrecognisable, so we cannot even presume its content and there are no other elements on which we could judge with any certainty the function of the monument (whether it was of a votive or funerary nature).[5]

Iconography: description

The most interesting iconographical scenes presented on three sides of the monument show very important and significant elements of the sacrificial procession and the *ritus* of animal sacrifice in Roman Singidunum. The iconographical scenes (presented in fields 1.13 m high) on three sides of the monument have a double frame (its height is 7 cm), made of a narrow fillet and kyma. On the fourth side of the monument, where the inscription was, the surface of the inscription field, the inscription itself and its frame with vegetal decoration are damaged to the point of being unrecognisable (at the bottom of this side of the monument, a part of the frame for the inscription is visible).

The side of the monument where the inscription was represents one of the two wider sides. The rear of the monument contains a figural scene with two male standing figures (0.75 m high). Both figures are standing on rectangular bases, facing the viewer frontally (Fig. 2).[6] There are two laurel garlands above the head of each man bound with a ribbon in the middle and on the corners of the interior of the frame of the scene. Both men are wearing a belted tunic with sandals on their feet and ribbons for lacing caps around their necks. The male figure on the left is holding a jug in his right hand and a *patera* in his left hand and there is a cloth like object over his left shoulder. The male fig-

[4] Kleiner 1987, 31. Votive and funerary altars can be mutually distinguished by the fact that the surface of funerary monuments is usually without any holes or sockets. They can also be distinguished by their size, because in the Imperial period funerary altars were usually between 1 m and 1.2 m high while votive altars were about 0.8 m high. Also, this monument may have had crowning elements with cornices, Maršić 2013, 394–395.

[5] My sincere thankfulness goes to dr Gabrielle Kremer, prof. dr Martin Henig and prof. dr Bojan Đurić, for their valuable and constructive suggestions regarding the monument

[6] I would like to express my sincere gratitude to dear colleague museum counsellor Veselinka Ninković from the National Museum in Belgrade, and to the colleagues from the same institution, for allowing me to use the photographs from the photo documentation of the National Museum in Belgrade.

[7] J. Petrović thinks that perhaps the she-wolf suckling the two brothers, Romulus and Remus, is presented on *acerra* from the Singidunum monument, Петровић 1933, 315–316. Since the presentation is barely recognisable (it can be presumed that some large, four footed animal, with two figures beside and under it are presented), it can be presumed that analogous to other known figural presentations from *acerrae*, the scene could also depict a bull led by a *victimarius* and a *togatus*, Torelli 1992, 45.

ure to the right is holding in both of his hands an open *acerra* (a box for incense), with a figural composition representing a she-wolf with Romulus and Remus,[7] It looks as though both figures are wearing caps on their heads. Unfortunately, the details of the faces of both figures are not recognisable.

On the right, narrower side, a double frame made of a narrow fillet with an ivy tendril with leaves and clusters of berries encloses a representation of a male figure with a bull (Fig. 3). The man is standing behind the bull on a rectangular base. He is dressed in a short belted tunic, with sandals on his feet. He is leading the bull by a rope with his left hand, he has a cape over his left shoulder and in his right hand he is holding a long upraised axe. The details of the man's face are preserved and it can be seen that his face was very carefully modelled. He has short curly hair, oval eyes, a straight nose and small lips. Over the bull's back there is a ritual ribbon known as a *dorsuale.* It seems as if there is a rope around the bull's neck (?), which was used for guiding him during the procession towards the sacrificial place. The head of the bull is turned to the viewer, while his body is presented in profile and, although his horns are not so clearly visible, there is an adornment represented between his horns. The same ornament in the shape of two laurel garlands, bound with ribbons in the middle and in the corners of the interior frame of the scene, can be seen above the whole scene.

On the left, narrower side, inside a double frame filled with vegetal ornaments as the ones in the previously described side of the cuboid, there is a scene of a man and a ram (Fig. 4). The inner frame of this side of the altar is filled with acanthus leaves. In the middle of this side of the altar, a male figure is standing behind a ram with his left hand on its left horn, while

Figs. 3 and 4. Roman funerary altar from Singidunum, left and right lateral side of the monument (photo documentation of the National Museum in Belgrade)

Сл. 3 и 4. Римски фунерарни олтар из Синтидунума, лева и десна бочна страна споменика (фото-документација Народног музеја у Београду)

in his right hand he holds a sacrificial knife. The man is standing on a rectangular base, he is dressed in a short tunic and, unfortunately, his face is badly damaged and unrecognisable. The central part of the ram's back is decorated with the ritual *dorsuale* ribbon. Above the man with the ram, there is the same ornament in the shape of two laurel garlands bound with ribbons in the middle and in the corners of the interior frame of the scene.

Interpretation

It is quite clear that the figural scenes shown on three sides of this significant monument present scenes of the sacrificial procession, known as *pompa,* which would precede an animal sacrifice*,* known as the *immolatio*. Animal sacrifice and its offering to the gods represented the central part of a Roman ritual. Although, in this monument, only some of the scenes from the sacrificial procession are presented, we are able to fully reconstruct and visualize what this sacrificial procession and the *ritus* of animal sacrificing looked like. However, it is first necessary to clearly identify the persons presented on the three sides of the Singidunum monument. We will begin with two male figures represented leading a bull and a ram on the two narrower sides of the altar. Both male figures were clearly sacrificial attendants, known as *victimarii*, who, during the animal sacrifice, had the task of leading the animal to the altar where it was killed, burnt and sacrificed. They were also responsible for controlling the sacrificial animals and their behaviour, and for the slaughter and post-sacrificial dissection of the animals.[8] On both sides of the monument, the sacrificial attendants are dressed in a short girded tunic, rather than in their usual dress, known as a *limus*, a kind of a kiltlike cloth, which covered only the lower part of their body, leaving them stripped to the waist (because of the practical reasons of not soiling their clothes with the animal's blood while killing the animal).[9] The *victimarius* who is leading the bull is presented with one of the main sacrificial weapons of the *victimarii* – the axe.[10] It was a sacrificial weapon for a large animal, like a bull or oxen, since it took not only a lot of physical strength to kill such a forceful animal, but also a very sharp weapon. There are around 17 scenes showing the moment of killing the bull, in which a *victimarius* is presented standing beside the animal holding the axe, ready to hit the bull on the head, while kneeling beside the animal's head there is another person shown, a *cultrarius,* who was a sacrificial assistant who held the knife (*culter*), ready to slit the bull's throat once the animal received the axe blow.[11] Because of the danger and dirtiness of their task, *victimarii* were usually people of very low social status, most often slaves or freedmen.[12] However, their role was a very important one, since they performed their sacrificial duties in three areas: on behalf of the state, on behalf of the Roman emperor and within the army. Also, their life was in constant danger, since they were responsible for controlling the animal, which could demonstrate different behaviour during the procession towards the sacrificial place or during the moments just before the sacrifice: the animal could either stumble or escape during the procession or even hurt the *victimarius,* as a result of being agitated.[13] Of course, on the relief and statuary representations of animal sacrifices from the Roman period, nothing of that can be seen, because the relief represents an ideal depiction of the sacrificial *ritus* and not the real situation during the sacrificial procession.

On the back of the bull who is led by *victimarius* on the Singidunum monument, there is a ritual ribbon known as a *dorsuale.*[14] This ritual ornament was usu-

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[8] Lennon 2015, 65 (with further bibliography).

[9] I. S. Ryberg's definition of *limus* is that it was "an apron-like loincloth girt about the waist which regularly distinguished the attendants of sacrificial animals", Ryberg 1955, 21.

[10] Usual sacrificial weapons used by *victimarii* were an axe and a hammer. From around 56 sculptural reliefs and scenes of animal sacrifices on which a hammer or an axe are presented (dated from the 7th century BC to the 4th century A. D.), on 41 reliefs an axe is presented, while on 15 reliefs a hammer is depicted. On three monuments (Trajan's Column, the Arch of Beneventum and the Ince Blundell Hall relief), both sacrificial weapons are represented, but not in the same scene, Aldrete 2014, 32–33.

[11] Ibid, 33; Lennon 2015, 68. The sacrificial knife – *culter*, was a knife with one edge, curved back and was pointed. It was used mainly for killing animals, slaughtering or dismembering them, a typical butcher device. It was frequently represented on the funerary monuments as a sign that deceased was a butcher, but represented with *patera* and *gutus,* it was connected to the sacrificial and ritual practices, Siebert 1999, 88.

[12] However, although the *victimarii* were people who were regarded as people of lower status and a social class condemned by the elite, they were organized in a *collegium* – an inscription found in Rome (dated in 129. year) confirms the existence of the *collegium victimariorum*, *CIL* 6, 971.

[13] It is well known that how the sacrificial animal behaved during the preparations for its sacrifice, was very important, because the animal was expected to consent to her or his sacrifice. If something different would happen (if the animal would show signs of fear or panic), it was considered an unfavourable omen, Lennon 2015, 69; Aldrete 2014, 30–31.

ally made of wool and often presented in the way it is presented on the Singidunum monument: as a band strapped around the back and the belly of the bull. Otherwise, it can be presented draped over the animal's back, hanging down on both sides. It is not only presented in reliefs and statuary compositions of sacrificial animals, but it can also be frequently seen in the iconography of Jupiter Dolichenus and in Mithraic reliefs, again as an adornment on the bull's back.[15] The ritual *dorsuale* ribbon represents a sign of the consecration of the animal in question and it emphasises its ritual and sacrificial role. Besides the presence of the *dorsuale* on a bull's back, there is a visible rope around the bull's neck, by which the *victimarius* could lead the animal, but he could also pull it, to bring the animal's head down to the floor at the moment of its killing (to ensure the precision of the blow to the animal's head). Unlike the figural scenes on other two sides of the monument, this figural scene is the most preserved and it allows us to perceive the detail and excellent knowledge of perspective and anatomy with which the artisan presented the bull's head (eyes, nostrils, horns, etc.) and the bull's body. There is also an ornament between the horns of the animal in the form of ribbons (*infula, tainia*) which was a frequent ornament on the sacrificial bull.[16] The face of the *victimarius* leading the bull is the only preserved face of all four male figures' faces on the altar and the attention and skilfulness with which it was modelled confirms the high quality of the Singidunum monument.

On the opposite side of the monument, there is a similar presentation of a male figure leading a ram. The male figure is also a sacrificial attendant, but since he is carrying a sacrificial knife (*culter*), we can conclude that he was a *cultrarius.* The task of the *cultrarius* was to kneel beside the sacrificial animal and to hold its head, while the *victimarius* would hit the animal in the head with a sacrificial weapon. This means that the *cultrarius*' own head was very close to the head of the animal and a poorly aimed blow by the *victimarius* could endanger the life of the *cultrarius*.[17] After the sacrificial animal received the fatal blow to the head, the *cultrarius* would slit the animal's throat with the sacrificial knife and, later on, dismember its body. The *cultrarius* on the Singidunum monument is dressed in a short tunic, which is, as we said previously, in the context of the *victimarius* leading a bull from the opposite side of the altar, quite unusual. While unfortunately the details of the *victimarius*' face leading the ram are completely erased, the figure of the ram is preserved and beautifully modelled, with carefully carved details of its head (eyes, mouth, horns, etc.) and body. Again, we see the ritual band or *dorsuale* over the ram's back, as a sign of the animal's consecration.

On the third side of the monument, there is an iconographical representation of two male figures, standing on rectangular bases and holding different objects in their hands. Both figures are dressed in short, above the knee *tunicae* girded at the waist. The identification of the objects that the figures carry in their hands and their posture and images, would make us, at first look, presume that they were the assistants to the main priest and sacrificers in a ritual sacrifice, known as *camilli.*[18] By the terms of *camillus* or *camilla,* Romans presumed a youth of a certain age, up to seventeen years of age, from a noble family, of pleasant appearance and of chaste and pure character.[19] As acolytes of a priest, *camilli* carried *acerra* (incense box) and other sacrificial vessels and are usually presented standing beside the sacrificer and/or the altar.[20]

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[14] As R. Mowat states, the term *dorsuale* was mentioned in the excerpt of Trebellius Pollion, in his description of ritual celebrations by emperor Gallienus. *Dorsuale* was a wide band which was more or less decorated and put over the back of sacrificial animal, which was led to the place of sacrifice, Mowat 1892, 387.

[15] Beside on the presentations of ritual animal sacrifice, *dorsuale* is presented on Mithraic reliefs depicting *tauroctony*, like on reliefs from Bologna, CIMRM 693, Sarmizegetusa CIMRM 2063 and 2084, Oltenia in Dacia, CIMRM 2180 and Transdierna CIMRM 2223, Mastrocinque 2017, 38. Also, in the cult of Isis and Sarapis, some Pompeian depicts Apis' bull with the *dorsuale* on his back, Ibid 163.

[16] The animal victim was washed and dressed with ribbons and bands of wool (in white or scarlet color), like the horns of the animal victims were sometimes gilded and decorated with a disc, Scheid 2007, 264.

[17] The life of *cultrarius* was even more endangered than the safety of *victimarius*, because if *victimarius* would make a mistake, he could hit the head, neck or back of the *cultrarius*, Aldrete 2014, 37.

[18] *Camillus* or *camilla* was a boy or a girl, from a decent family, who was mentioned in historical sources (by Festus, Plutarch, Macrobius, Servius etc.), as an acolyte of a priest or even an assistant of a god. The earliest representation of a *camillus* is known from a bronze *cista* from Praeneste, dated to the 3rd century B. C., Spaulding 1911, 3–8; Mantle 2002, 91.

[19] Ancient writers as Dionysius state that a boy must be "of the age to serve in the temples", while a girl must be unmarried. Servius used the term *adulescens* to suggest an older boy over seventeen years old, Spaulding 1911, 8–9.

[20] Besides *acerra*, *camilli* usually carried a dish, tray or basket of fruit (*lanx*), a jug with wine for the libation (*guttus*), a ladle, a *patera*, an *aspergillum* for sprinkling water and sacred ribbons (*infulaae*), Mantle 2002, 94.

However, if we look carefully at the images of the two male figures from the Singidunum altar, we will notice a kind of conical cap that they are both wearing on their heads, which is usually tied under the chin with narrow strings made of leather known as *offendices*.[21] This kind of cap, known as *tutulus,* was worn by an inferior priest known as a *flamen minor* or *tutulatus.*[22] According to Roman writers, like Servius and Varro, inferior priests wore close-fitting spike-less caps (unlike the tall, conical cap known as a *pileus, galerus* or *albogalerus* with an apex made of a spike of olivewood, worn by the *flamen dialis*),[23] which were a unique insignia of those priests of a lower order. Besides helping the principal priest in religious rituals, judging by Festus, *tutulati* were also in charge (together with bakers) of baking the cakes for sacred rituals.[24] Inferior priests wearing this particular kind of headgear (presented among priestly emblems on the third side of the Minerva altar in the Capitoline) tied under the chin with *offendices,* are known from monuments such as the Ara Pacis Augustae (representations of *flamines*), the marble head in Madrid, the Payne Knight head in the British Museum and from The Louvre (portrait of a flamen).[25]

On the monument from Singidunum, the first *tutulatus* is helping the *flamen maior* by holding a jug for the wine and a *patera*. Wine was poured from the wine-pitcher into the *patera* or the offerings for the altar were placed in it.[26] In this case, since the inferior priest *tutulatus* is carrying the wine jug, the *patera* was used to receive the liquid from the jug and to pour wine onto the altar during the sacrifice. The *patera* is presented in the simplest way, as an *umbilicate patera* turned toward the spectator, as on the frieze of the Arch of Susa.[27] Representations of the *tutulatus* holding a *patera* and a jug for wine are quite common. For example, on the Louvre relief a veiled priest is presented holding a *patera,* into which an inferior priest pours wine from the jug, while on a fragmented relief from the National Museum in Rome, two priest's attendants carry a wine pitcher in one hand and a *patera* in other hand. In that context, the scene from the Singidunum monument is no different, apart from one detail that is sometimes present in this kind of presentation of *tutulatus* who is holding a wine jug and a *patera*. On the left shoulder of the inferior priest from the Singidunum altar, there is a cloth like object with fringes, which falls over his shoulder. This cloth-like object actually represents a towel called a *mantele* (when it is used in a sacrificial context) or a *mappa* (when used in domestic context), which was carried by the main priest's attendant who stood close to the priest and gave it to him to wipe his hands.[28] The other *flamen minor* holds with both hands an open *acerra*, a box for the incense. *Acerrae* could be of different shapes and sizes, without ornaments or ornamented and, if ornamented with figural scenes, they would sometimes allude to the relationship between the incense (the content of the *acerra*) and the sacrificial animal.[29] This *acerra* contains a figural scene which is not, unfortunately, well preserved, but it can be presumed that a she-wolf with Romulus and Remus was probably presented on it. The *acerra* is actually a typical attribute of a *camillus*, *camilla* or *tutulatus* and it appears in their hands in many sacrificial scenes on Roman reliefs and sculptural compositions.[30]

However, the principal priest's helpers aren't always shown holding the *acerra* with both hands – sometimes, they are shown holding it in their left hand, while spreading incense with their right hand.[31] In ancient times, the term *acerra* could also refer to the altar where one would burn incense for the dead,

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[21] Esdaile 1911, 213.

[22] Ibid, 218; Ryberg 1955, 45.

[23] A high conical cap, known as *pileus* or *galerus*, was made from the skins of victims slain in animal sacrifices. At the top of this cap there was a spike of olivewood bound to it by a woollen thread, *apiculum*, which was made from the slain animal's fleece. This kind of cap was worn by the principal famines, priests of the colleges and by the Salii, Ibid, 212–213.

[24] Glinister 2014, 222–223.

[25] Esdaile 1911, 213–225; Portrait of a *flamen Martialis* (previously wrongly identified as a charioteer, inv. num. MA 341) from Louvre, dated from 250–265. and iconographically very similar to the portrait of a *flamen Martialis* now in Plasencia, for more see Bell 2008, 398–400, fig. 7.

[26] Spaulding 1911, 28.

[27] Ryberg 1955, 171.

[28] As L. C. Spaulding notices, judging by the relief on a sarcophagus in the Lateran, where one of the *camilli* carried over his shoulder a narrow object similar to a towel, it can be concluded that it was a towel which served for the priest to whip his fingers during the sacrificial ritual, Ibid.

[29] The two *acerrae* shown on the north frieze of the Ara Pacis Augustae show different scenes – on the first *acerra* there is a representation of two male figures leading a cow and holding a plate, while on the other *acerra* a person dressed in a tunic with a plate is presented on the short side and on the longer side there is person in a toga playing an instrument beside a burning fire, Huet 2017, 11–12.

[30] Ibid, 28–29.

[31] Huet 2017, 13.

Fig 5. A relief presentation on a slab of the quindecimviri *of Ara Pacis Augustae (source: https://romegreeceart.tumblr.com/post/125410499046/ara-pacis-augustae-slab-of-the-quindecimviri)*
Fig. 6. Right lateral side of the Asseria altar, representation of a victimarius *leading a bull to a sacrifice (after: Giunio 2003, fig. 5)*

Сл. 5. Рељефна представа на плочи quindecimviri *Аре Пацис Аугустае (извор: https://romegreeceart.tumblr.com/post/125410499046/ara-pacis-augustae-slab-of-the-quindecimviri)*
Сл. 6. Десна бочна страна олтара из Асерије, представа victimarius-*а који води бика на жртвовање (према: Giunio 2003, fig. 5)*

according to Festus.[32] The hair of the second *tutulatus* is long, falling on his shoulders under the *tutulus,* which is not tied under the chin and with *offendices* falling freely. On Roman reliefs with scenes of sacrifices it is not so unusual that the *tutulatus* is shown long-haired or with a conical cap or *tutulus.* For example, on the slab of the *quindecimviri* of Ara Pacis Augustae, a main priest's attendant is shown with a veil on his head, holding an *acerra* (Fig. 5).

It can be noticed that two *tutulati,* as two *victimarii* presented on the Singidunum monument, stand on rectangular bases, suggesting the ground on which they stand, in a similar way to the figures in the scenes from the lower friezes on the south side of the western pier of the Arch of the Argentarii in Forum Boarum.[33] We can possibly presume that the presentation of the *tutulati* and *victimarii* on rectangular bases on the Singidunum monument could underline the sacrificial context of the scene, while garlands and ribbons presented above the heads of the sacrificial attendants imply the exterior of the temple,[34] in front of which the sacrifice was made and, furthermore, the divine sphere where the gods received the sacrifice that was to be offered in their honour. It is well known that sacrifices were performed in an open space, usually in front of a temple near an altar in a sacral space, if they were of civic importance.[35]

The *ritus* of Roman public sacrifice can be relatively accurately imagined and visualised with the reconstruction completed by J. Scheid. It consisted of six stages, beginning with the procession of the sacrificial

[32] Festus says: "*Acerra: ara, quae ante mortuum poni solebat, in qua odores incedebant. Alii dicunt arculam esse thurariam, scilicet ubi tus reponebant*" (that the *acerra* was a small flaming vessel, an *ara* actually, used for burning incense before the dead), Festus, *De verborum significatu quae supersunt cum Pauli epitome;* Rushforth 1915, 149.

[33] The scenes on the lower frieze on the south side of the western pier and of the eastern side of the western pier of the Arch of the Argentarii in Rome, depict details of sacrificial processions with a *victimarius*, a *popa* (*victimarius* with a hammer) and a bull, Elsner 2005, 89, fig. 4 and fig. 5.

[34] Ryberg 1955, 57

[35] Scheid 2007, 263.

animal (called *hostia* or *victima*)[36] to the altar, with that kind of a procession known as a *pompa*. The sacrificial procession was followed by a preliminary offering of prayers by the main official at the sacrifice, flute music and an offering of wine and incense – *praefatio*.[37] Then followed the *immolatio,* the phase before killing the animal, when a meal known as the *mola salsa* (a mixture of coarse-ground flour and salt) was sprinkled over the head of the animal, along with wine, which was also poured over the animal's head by the main sacrificer and then the animal was killed by a *victimarius*. After the killing of a sacrificial animal, an inspection of the animal's entrails, or *litatio,* followed,[38] after which parts of the sacrificed animal were burned at the altar and consumed during a ritual banquet by the participants.[39] To correctly perform the sacrificial ritual meant to satisfy the gods and to communicate with them, ensuring their good will regarding the sacrifice and their acceptance of it.

Representations of sacrificial processions of animal sacrifices appear on Roman altars and reliefs from the Ara Pacis Augustae monument onwards and the majority of them date to the 1st and 2nd century. However, from the 3rd and into the 4th century (definitely after the period of the Severan dynasty), they became very rare.[40] This was certainly due to the prevailing philosophical attitudes (like Neoplatonistic ones for example), by which pure thoughts accompanied by prayers, hymns, incense, fruit and vegetable offerings were considered much more appropriate to be offered to the gods than a blood sacrifice.[41] As J. Elsner notices, the corpus of votive and funerary altars with images of animal sacrifices are not so frequent, but "are persistent" until the end of the 2nd century, after which they are very rare.[42] On sarcophagi, however, presentations of *pompa* form a part of the marriage ritual,[43] while images of sacrifice are frequently seen on Dionysiac sarcophagi from about 150 to 250.[44]

Although it is believed that only in Rome and other parts of Italy, scenes of the first part of the sacrificial ritual, the *pompa,* are the most frequent ones to be presented, it seems that it is a similar situation in Roman provinces as well,. In Gaul, for example, only scenes of libation are more numerous, followed in number by scenes of the *pompa.*[45]

The monument from Singidunum is of significant importance because in the territory of Moesia Superior there is no other monument with the same or even similar iconography, depicting the sacrificial procession preceding the ritual of animal sacrifice. A far echo can be seen on votive and funerary monuments from the localities of Jezdina, Skelani (*Municipium Malvesatium*), Vranjani, Seča Reka, Karan, Požega, Ustikolina and Rogatica, where a set of different vessels used in sacrificial rituals, like a jug and *patera,* are represented or solitary figures of male and female servants who hold the mentioned vessels in their hands.[46]

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[36] The term *hostia* encompasses all sacrificial animals, while under the term *victima* one refers primarily to bovids. A very precise terminology was used for the types of sacrifices of different animals on different occasions. Accordingly, we know about *hostia caviaris, medialis, piacularis, praecidanea, pridiguae, propudialis*, Prescendi, Siebert, Huet 2004, 199–200.

[37] Public sacrifices usually began at dawn, with a procession in which a sacrificial animal (or animals) was led by a *victimarius* to the altar, accompanied by flute music, sometimes the lyre. *Mola salsa*, salted flour, was sprinkled on the back of the sacrificial animal, while some wine was poured on its head, indicating that the animal was purified for the sacrifice, Ekroth 2014, 328–329.

[38] After the sacrificial animal was killed and opened up, a *haruspex* inspected its internal organs (*exta*) to ensure that everything was in order and that the gods had accepted the sacrifice. If, however, some abnormalities of the sacrificial animal were detected, it meant that gods were displeased and it represented a bad omen, Weddle 2017, 110–111.

[39] Scheid 2005, 44–57; Scheid 2007, 263–271; Scheid 2012, 84–95; Beard, North, Price 1998, 148. There was one important difference between the Greek and Roman ritual of sacrifice, concerning the treatment of the entrails of the sacrificed animal (so called *exta*). Cicero enumerates that exta were: the gall bladder, liver, heart and lungs. While the Greeks inspected, cooked and ate the *exta*, the Romans would cut out the *exta,* sometimes examine it and place it on the altar, together with the animal's blood, as an offering to the gods. All other parts of the sacrificed animal (*viscera*) besides the *exta* were prepared and eaten in a communal meal, Dillon 2017, 223.

[40] There are only several examples from public official art dated from the 3rd century on, Elsner 2012, 126.

[41] Exploring the main reasons for unsuccessful revival of public blood sacrifices by emperor Julian, S. Bradbury emphasizes that they represented most resented part of religious ritual not only in the eyes of Neoplatonists, but Christians as well. In the centre of opposing to blood sacrifices of all religious groups who taught a higher pagan spirituality, was the idea that spiritual sacrifice was superior to material sacrifice, Bradbury 1995, 331–356.

[42] Elsner 2012, 139.

[43] Lawrence 1965, 69.

[44] Elsner 2012, 138–139.

[45] Huet 2008, 45, 53.

[46] On the left lateral side of the monument from the locality Jezdina, a jug for the wine is presented, while on the right lateral side of the monument, there is a type of a patera with a handle known as *malluvinum*, Јеремић 2007, 37; On the monuments from Skelani (Municipium Malvesatium) and Vranjani, in the scenes of funeral banquet, servants hold a jug and a *patera* and servants are also shown with these kind of vessels in the monuments from Seča Reka, Karan, Požega, Ustikolina and Rogatica. All monuments are

However, the closest iconographical and geographical analogy to the monument from Singidunum is represented on the right lateral side of an altar found in the locality of Asseria (today Podgrađe, near Benkovac) in Dalmatia, with the representation of a *victimarius* leading a bull on the left lateral side (Fig. 6), a scene of a libation on the right lateral side (a priest is presented en face, *velatio capito,* and performs the libation in the presence of a flute player) and on the frontal side of the altar there is a scene of a she-wolf with Romulus and Remus. The altar from Asseria is dated to the middle of the 2nd century.[47]

As for stylistic analogies, we find the scenes from the Singidunum monument to be quite similar to human and animal figures (*victimarius, cultrarius* and sacrificial animals) in the relief of two victims from the Louvre (MA 1098) dated to the end of the 2nd century and the first half of the 3rd century and in the bas-relief from the theatre in Sabratha, Libya, dated to the 2nd century (analogy in the figures of a bull and the *victimarius* who is leading the bull).[48] The posture and pose of the *victimarius* on the Singidunum altar is very similar to the *victimarii* from reliefs in: Ince Blundell Hall (which represents a Sacrifice to Pax), Vatican (Sacrifice to a Divus), the Louvre (relief with a presentation of a *suovetaurilia*), Vatican Museum (cast from the Column of Trajan, scenes VIII and LIII showing the lustration of a camp), Column of Trajan (Arrival in a Dacian Town, Sacrifice at Six Altars, Scenes XC–XCI) and from the sarcophagus at Mantua.[49] Unfortunately, as we previously stated, as the fourth side with the inscription is badly damaged, so are the faces of the *cultrarius* and inferior priests, *tutulati,* probably due to Christian violence, since the altars (particularly those with sacrificial scenes) were a target of their anger (as were pagan temples, sculptures, statues etc.) and were easily approached if one wanted to damage them.

However, the well formed figures and the details of the *victimari*i faces, which are skilfully carved, the good perspective, the somewhat stylised way of modelling and presenting the human and animal figures (although with care and accuracy in certain details of the figures' clothes and the animals' heads and bodies) on the cuboid monument from Singidunum imply that it was probably carved from the middle of the 2nd to the middle of the 3rd century. Furthermore, the type of decorative vegetal ornaments that are presented in the double frame on the monument's sides (ivy leaves with vines and clusters of berries) are the type of ornamentation that appears from the middle to the end of the 2nd to the first half of the 4th century.[50] Typologically, the monument in the shape of a cuboid represents the influence from Pannonia, as does the motive of the garland, which is very frequent on funerary monuments (particularly of the *cippi* type) in the eastern part of the Roman province of Dalmatia.[51] Therefore, we suggest the dating of the monument to be from the middle of the 2nd century to the first decades of the 3rd century.

Referring to the question as to whether the monument from Singidunum was made in the city, it is necessary to mention that there was probably a stonemason workshop or workshops in such a large and urban centre as Singidunum was, which produced votive and funerary monuments. On a votive altar also found in the very centre of antique Singidunum, we see a dedication to the god Jupiter Paternus from the dedicant *Aurelius Crescentius, lapidarius*.[52] Therefore, we can presume with some certainty that *lapidarii,* like Aurelius Crescentius, worked on and produced votive and funerary altars in Singidunum during Antiquity.

To which deity the sacrifice of a bull and a ram from the monument from Singidunum was offered, we can only guess, but the rules for animal sacrifice were quite simple in the Roman world – male deities were offered male castrated victims (except Mars, Neptune, Janus and the Genii), while goddesses received female victims. Of course, animals selected for sacrifice had to be of a certain age, sex, colour etc. and had to be pure and perfect or *optata, optima*. Animal sacrifices

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dated to the end of the 2nd and the beginning of the 3rd century, Зотовић 1995, 105–107, fig. 23, 23a, 32, 126–127, fig. 137, 137a-б; Петровић 1986, 27, fig. 23–24, 33; Сергејевски 1936, 7, T. I, 10, 10–11, fig. 9.

47 The monumental altar with the scenes of *immolatio,* libation and the she-wolf feeding Romulus and Remus, was found in 1999, in the locality of Asseria, as a *spolia* in the late antique wall. It was concluded that it was an important monument, linked to the cult of the Roman emperor and that it was placed in one of the crucial places of the locality, Giunio 2003, 133–155.

48 Huet 2005, 95, fig. 6.

49 Ryberg 1955, Pl. XI – fig. 25, Pl. XXIX – fig. 45e, Pl. XXXV – fig. 54b, Pl. XXXVI – fig. 55, Pl. XXXVII – fig. 56, Pl. XLI – fig. 61a–b, P. XLII – fig. 64 and Pl. LX – fig. 96b.

50 Зотовић 1995, 42–45.

51 Вулић 1941–1948: 246, n. 483; 251–252, n. 491, 492.

52 The votive altar dedicated to the god Jupiter was found in 1920, on the corner of Knez Lazar Street, and is now in the Lapidarium of The National Museum of Belgrade. The text of the inscription reads: *I(ovi) O(ptimo) M(axiom) P(aterno)|Aur(elius) Cre|scentio |lap(i)dariu(?)|s pro salut|e sua |et suorum, IMS* I, n. 11.

Fig. 7. Map of the find site of the monument with scenes of a sacrificial procession (after: Поповић 2006, fig. 17)

Сл. 7. Мапа места налаза споменика са сценом жртвене процесије (према: Поповић 2006, сл. 17)

to Olympian gods were performed in daylight, while sacrifices offered to chthonic gods and di Manes were performed in the night. Although there is already an established view in scholarly literature that white animals were sacrificed to the Olympian gods and animals of dark colours were offered to the chthonian deities, it is somewhat questionable whether this was really that the case in the praxis of daily sacrifices in the Roman period.[53] It is well known that a bull was offered to gods: Jupiter (castrated oxen), Janus and Mars, and to the Genius of the emperor.[54]

The fact that bulls and rams (and boars as well) were the most expensive and the most frequently sacrificed animals for prominent deities like Jupiter, Mercury, Dionysos, Saturnus or on particular festivities (like major purifications and oath-takings),[55] somewhat narrows the possibilities as to which god the sacrifice of a bull and a ram on the monument from Singidunum could have been offered. Since two of the most prominent and expensive animals in animal sacrifice are represented, we think that the sacrifice could have been performed for the supreme Roman god Jupiter, the Genius of the emperor or perhaps the god Saturn. Two arguments are primarily in favour of the last proposition, that the presented scenes of the animal sacrifice phase of *immolatio* on the Singidunum monument were connected with the cult of the god Saturn and his festivities; the fact that a bull and a ram were animals offered in the sacrifice to the deity (as can be seen on an altar from the Bardo museum)[56] and that the sacrifices made to Saturn were performed *aperto capite*, that is in *Graeco ritu,* which points to this chthonian god, whose festivities, known as *Saturnalia,* began on 17th December and lasted several days, being enjoyed as a very entertaining and popular

[53] Since this view is derived from historical sources of Late Antiquity, it is doubtful whether they really pictured the real situation of the *ritus* of animal sacrifice in Antiquity. However, the animals which distinguished themselves upon birth by their beauty were those who were immediately selected as sacrificial animals. G. Ekroth mentions that some sanctuaries even raised their own animals, Ekroth 2014, 332–337.

[54] Beard, North, Price 1996, 325.

[55] Ekroth 2014, 334.

[56] Mantle 2010, fig. 1.

festival among common people.[57] The presumption that the scenes from the cuboid monument from Singidunum could perhaps be connected with the god Saturn might compel us to consider the existence and confirmation of his cult in Singidunum, which is unfortunately not the case, since none of the monuments found thus far are dedicated to this deity. However, on the other hand, the discovery of several votive monuments dedicated to the supreme Roman deity, the god Jupiter (particularly to Jupiter Paternus) in the vicinity of the site where our monument was found, in our opinion, represents a more plausible hypothesis regarding the god to whom the depicted animal sacrifice could have been offered and perhaps in whose sacred area the monument was situated.

Of course, we must not overlook the possibility that the scenes of sacrifice of a bull and a ram presented on the Singidunum monument might depict a sacrificial procession which was related to some public occasion or event.[58] Also, thinking about the possible function of the Singidunum monument, as far as it is known, funerary altars were very similar to votive altars in the context of their typology and decoration, which coincided with their cultic function. The iconographic scenes on funerary altars expressed the idea that obligations towards the deceased were fulfilled and respected; they celebrated the deceased's life, but could also serve in the cultic function of the altar in question.[59] Potentially something similar can be also presumed for the monument from Singidunum – perhaps the scenes of the sacrificial procession were in a function of the cultic dimension of the altar, which was, in that case, part of a real sacrificial praxis.

The monument from Singidunum was found in the very centre of the antique city of today's Belgrade, in the centre of its antique civil settlement, where other cult monuments, dedicated to various deities, were discovered (monuments dedicated to the god Jupiter – particularly Jupiter Paternus, a monument dedicated to Capitoline Triad, monuments dedicated to Hecate, Nemesis, Mithra and a Thracian horseman). Since as early as from Justinian's period of reign and his reconstruction of Singidunum, antique monuments and antique constructions were widely used as *spoliae.*[60] Therefore, nothing more definite can be said about the monument in the context of its finding or if it was found *in situ,* because there was no archaeological context except that it was found in the centre of an antique civil settlement near where more than a dozen monuments dedicated to the god Jupiter and fragments of different mythological marble sculptures were found and where (or near by), presumably the Roman forum of the antique city of Singidunum was.[61]

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[57] Ancient writers such as Dionysius, Varro, Cicero, Catulus, Cato the Elder and Lucius Accius (in his *Annals*) write about Saturn, his cult and his festivities, particularly mentioning the fact that during his festival slaves traded places with their masters and feasted with them, Dillon, Garland 2005, 165; Le Glay 1966, 449–478; Mantle 2010, 119–120, fig. 1.

[58] Major celebrations were mutual for the army and civilians, so we can presume some of the most important Roman festivals (like Vestalia, dedication of a temple, the "Birthday of Rome", celebration which honoured the reigning emperor, his family or predecessors etc.), Beard, North, Price 1996, 325.

[59] Funerary altars, which started to become popular during the reign of Tiberius, also had a cultic function during the period of their usage, that is until the end of the 2nd century, after which they became less common. They were usually made of marble and besides figural and vegetal representations, they could also include mythological scenes, Friedland, Sobocinki, Gazda 2015, 394–395. The scenes on the funerary altars celebrated the deceased and his life, but they could also serve the function of the altar being a ritual monument – as is the case with the *ara* of L. Caltilius Stephanus and Caltilia Moschis from Ostia, where the monument served as a ritual one (probably placed in front of the monumental tomb), Maršić 2013, 389.

[60] The building of the walls and towers of a Byzantine *castel* erected in the middle of the 12th century was also possible because of the used antique fortifications of Singidunum. Unfortunately, at the beginning of the 15th century, in the period of building new middle age fortifications in the city, all visible traces of antique constructions were destroyed. Parts of Roman walls, *stelae* and altars were built into the middle age fortifications, only to be destroyed almost completely at the end of the 17th and the beginning of the 18th century, during the Baroque reconstruction of the city. The destruction of the former urban centre (the centre of the civil settlement) of Singidunum was complete with the building of new Austro-Hungarian bastion, Поповић 2014, 15.

[61] It is presumed, from the architectural and archaeological remains in the very centre of the antique city of Singidunum, that it coincided with the contemporary centre of today's Belgrade. Since numerous votive monuments dedicated to the god Jupiter and fragments of different marble mythological sculptures were found in that area, it is presumed by the researchers that this area represented the area of the Roman forum with the temple of Capitoline triad (today it is the area around the building of the National Bank in the King Peter's Street). Unfortunately, the fragmented marble sculptures from the mentioned area were mostly lost or could not be identified with any certainty among the preserved fragmented sculptures of unknown provenience that are today stored in the National Museum of Belgrade's lapidarium, Popović 1997, 8–11. We would like to offer our opinion about the possibility of whether the monument was found *in situ* or not. We think that it is most unlikely that such a large and massive monument would be transferred to some other place (since then, it would be used as s*polia* or for some other purpose) and that it would be logical that it was found *in situ* (the missing parts of the monument – the base and crowning elements could have been destroyed during the construction works during which the monument was discovered).

Instead of a formal conclusion, we would like, instead, to emphasise the fact that in Roman religion the sacrificial altar was the focus of public and private worship, where ceremonies, ritual acts and animal sacrifices were offered to the gods. In the monument from Singidunum the scenes of sacrificial procession, were probably performed in honour of some of the main Roman deities (such as Jupiter), for a public cause or to designate a military triumph. Because of its unique and most interesting iconography, the monument represents an important archaeological find and evidence about ritual processions in antique Singidunum in the period from the second half of the 2nd century to the first decades of the 3rd century. Although we don't know the reason for erecting the monument nor the identity of its dedicant / dedicants, what we know is that it was made from expensive, high quality, coarse white marble and that the scenes of ritual procession were carved carefully and with clear knowledge of the ritual and its details (ritual instruments, *dorsuale*, *mantele*), which indicates that its dedicant was a citizen of high social status and substantial finances. As reliefs of this kind offer a narrative synthesis of the ritual in question and represent a memory of it, emphasising certain elements of the ritual in question, it is clear that an important occasion was marked with the sacrificial procession in which the most expensive animals were sacrificed and in which priests of lower rank took part, helping the flamen *maior*. We cannot be sure of the reason for dedicating the altar on the grounds of its iconography, but the general thought prevails that whatever the reason was, the dedicant was hoping to realize the direct communication with the god / gods and to please him / them, expecting that the prayers would be fulfilled, with him being granted divine benevolence. Since the monument was found in the very centre of ancient Singidunum where the Roman forum was presumably situated, we can suggest that it was found *in situ,* placed in a sacred area of a temple of the god Jupiter or, less likely, some other important Roman deity. Through its thorough analysis, we are more inclined to believe that it was a votive altar, very monumental in shape, iconography and decoration and very significant in the religious life of antique Singidunum. Further archaeological excavations in the area of ancient Singidunum's centre where the altar was found, could shed new light on some of these questions.

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IMS ..... *Inscriptions de la Mésie Superieure,* I–VI, Belgrade 1976–1995

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Nadežda GAVRILOVIĆ VITAS
Monumental Altar from Singidunum with Scenes of a Sacrificial Procession – *Pompa et Immolatio* (95–109)

Резиме: НАДЕЖДА ГАВРИЛОВИЋ ВИТАС, Археолошки институт Београд

МОНУМЕНТАЛНИ СПОМЕНИК ИЗ СИНГИДУНУМА СА ПРЕДСТАВАМА ЖРТВЕНЕ ПРОЦЕСИЈЕ – *POMPA ET IMMOLATIO*

Кључне речи. – римски споменик, жртвена процесија, жртвовање животиња, Сингидунум

Током грађевинских радова у самом центру Београда, античког Сингидунума, године 1932. пронађен је монументални римски споменик. На три стране споменика приказане су иконографске представе римске свечане жртвене процесије, док је четврта страна, на којој су се налазили натписно поље и натпис, на жалост, оштећена до непрепознатљивости. На задњој, широј страни споменика, насупрот оној на којој се налазио натпис, представљене су две мушке фигуре, у стојећем положају, са различитим ритуалним предметима у рукама и с коничним капама, тесно прилубљеним уз главу, које имају врпце за везивање испод браде. У питању су свештеници нижег реда који су помагали главном свештенику приликом приношења жртве – тзв. тутулати (*tutulati*), од којих један у десној руци држи крчаг за вино, док му се у левој руци налази посуда за либацију или ношење жртвених понуда – патера *(patera*). На његовом левом рамену налази се предмет са ресама, сличан пешкиру – тзв. мантеле (*mantele*), односно пешкир за брисање руку што га је свештеник нижег ранга додавао главном свештенику током приношења жртве. Други свештеник нижег реда држи обема рукама отворену кутију за тамјан – тзв. аџеру (*acerra*), орнаментисану фигуралном представом, вероватно вучице која доји Ромула и Рема. На левој бочној страни споменика (у односу на задњу страну са представом двојице свештеника) налази се сцена човека који води бика. У питању је слуга односно виктимаријус (*victimarius*), чији је посао био да води жртвену животињу и брине о њеном понашању, да је убије током самог ритуала жртвовања и да потом исече њено тело на комаде. Виктимаријус води бика левом руком, док у десној руци држи секиру којом ће га убити приликом жртвовања. На десној бочној страни споменика приказан је виктимаријус са жртвеним ножем, односно култраријус (*cultrarius*), који нож држи у десној руци, док левом руком води овна. На леђима обе жртвене животиње приказана је ритуална трака дорсуале (*dorsuale*), која је означавала посвећење животиње у ритуалне сврхе. Анализа и интерпретација монументалног споменика из Сингидунума показале су да је у питању археолошки споменик јединствене иконографије са простора римске провинције Горње Мезије, с обзиром на то да су представљене сцене свечане жртвене процесије. Изузетан значај олтара огледа се у томе што су двојица свештеника нижег реда, помагача главном свештенику, приказана на једној од ширих страна споменика. То само додатно оснажује хипотезу да је у питању била важна ритуална свечаност која је, вероватно, приређена у част врховног римског бога Јупитера, генија императора или предака римског цара. Најближу географску аналогију представља сцена жртвене процесије са жртвеника из Асерије, док се друге аналогије могу пронаћи на рељефу две жртве из Лувра и барељефу из Сабрате у Либији. Може се претпоставити да је споменик из Сингидунума са представама свечане жртвене процесије био вотивни олтар који се налазио у простору храма посвећеног богу Јупитеру или, мање вероватно, неком од других значајних римских богова, близу претпостављеног римског форума у Сингидунуму, где је и пронађен. Монументални споменик из Сингидунума датује се у време од друге половине 2. века до почетка 3. века.

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A MESSAGE FROM BEYOND THE GRAVE: HERCULES RESCUING HESIONE ON A STOJNIK FUNERARY MONUMENT

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Abstract. – The research of this study is dedicated to a unique iconographical scene in the territory of the Central Balkan Roman provinces, of Hercules rescuing Hesione from a sea-monster (ketos), depicted on a funerary monument found in 1931 at the site of Stojnik, in the vicinity of Belgrade, antique Singidunum, and now displayed in the lapidarium of the National Museum in Belgrade. The funerary monument was erected for the deceased, a veteran of cohors II Aurelia nova, Publius Aelius Victorinus, by his wife Aurelia Rufina and their son Publius Aelius Acutianus. The rich iconography of the monument makes it a very important example of funerary art in the period from the end of the 2nd and the beginning of the 3rd century – the eschatological symbolism of the presented scenes and motifs is more than clear and underlines not only the hope of the deceased's family for his eternal and blessed life after death, but also the deceased's victory over death and presents him as a symbol of courage and virtue. The architectural scheme of the monument, along with its iconography, suggests strong artistic influences from Noricum and both the Pannonian provinces, while the the mythical tale of Hercules and Hesione was chosen, it is argued, not only because Hercules was one of the most favoured gods in the Roman army, but also because he was a protector of miners and mines.

Key words. – Hercules, Hesione, mythological scene, Singidunum, funerary monument

Although Hercules was one of the most popular mythical figures represented in ancient art, especially depicted in the scenes of his famous twelve labours, the episode where the hero is depicted rescuing Hesione is quite rare. The representation of this scene on funerary monuments is even more interesting bearing in mind that besides its decorative function within the complex imagery of the afterlife the scene should also be interpreted in the context of its symbolism as well. For this reason, the funerary monument from Stojnik, which as an exceptional discovery that has not gained deeper iconographical analysis so far, has been taken as a showcase exemplar for the study of the scene of Hercules rescuing Hesione together with, and in regard to, other scenes, motifs, the architectural scheme and the epigraphic analysis of the inscription.

History and topography of the find

The funerary monument was found in 1931, on private property in the district of Stojnik (Sopot), in Belgrade, ancient Singidunum, and contains a mythological scene figuring Hercules rescuing Hesione from the sea monster (*ketos*), unique in the territory of the Central Balkan Roman provinces.[1] Unlike many other monuments, it was preserved during the Second World War and today it is to be seen in the *lapidarium* of the National Museum in Belgrade (fig. 1).

[1] The funerary monument was found in a private field belonging to Ljubisav Mihilović, in Stojnik, in a grave of a later period, where this funerary monument, along with another one, was used as *spolia* (the antique funerary monuments formed two longer sides of a grave of a later date), Вулић 1931, 219, n. 586.

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Architectural scheme of the monument

The monument is made of grey limestone; its height is 2.03 m, width 0.87 m and depth 0.33 m. Although not broken anywhere and undamaged, the monument is missing one part of its apex, so the iconographical scenes which were presented in the triangular pediment and external corners of the pediment are only partially preserved. The funerary monument belongs to the architectural type of *stelae* with rectangular top, triangular pediment with ornamented triangular corners on either side of the pediment and, below, a recessed aedicule, a recessed inscription field and a socle. Within the pediment, there is a figural scene, while between the pediment and aedicule and again, between the aedicule and the inscription field, there are two ornamented friezes. There is no notable damage to the body of the monument, yet, unfortunately, the surface of its front face is not well preserved, so the scenes presented, as well as the details, are not always recognisable. The stone used for the monument is of local origin, from the site of "Bogovica", near Stojnik, where the monument was found.

Text of the inscription and its analysis

Under the frieze with a hunting scene, there is a concave inscription field, flanked by two columns with capitals. The letters are skilfully carved, with heights between 3.5 and 6 cm and are better preserved than the figural scenes and ornaments presented on the monument. The text of the inscription is dedicated to the *Di*

Figs. 1 and 2. Funerary monument from Stojnik with the representation of Hercules rescuing Hesione, with detail (photo-documentation: National Museum in Belgrade, inv. num. 22_43)

Сл. 1 и 2. Надгробни споменик из Стојника са представом Херкулове спасавања Хесионе, и детаљ (фото-документација: Народни музеј у Београду, инв. бр. 22_43)

Manes, that is to the spirits of the dead, in memory of the deceased husband and father, the veteran Publius Aelius Victorinus, by his wife and his son: *D(is) M(anibus) / Publius Aelius / Victorinus vet(eranus) / coh(ortis) II Aurel(iae) nov(a)e / vixit ann(os) LX Au(r)el(ia) Ru/fina co(n)iugi b(ene) m(erenti) et P(ublius) Ael(ius) Acutianus / et P(ublius) Ael(ius) Victorinus / patri et sibi vivi posu/erunt*.[2] As can be seen from the text of the inscription, the deceased, Publius Aelius Victorinus, was a veteran of the cohors *II Aurelia Nova* and died when he was 60 years old. From his cognomen, we can see that he was a Roman citizen, who was outlived by his wife Aurelia Rufina and their son Publius Aelius Acutianus, who erected the monument. Publius Aelius Victorinus was a veteran of the cohors II Aurelia Nova, whose official name had the epithets *milliaria equitata civium Romanorum*.[3] This auxiliary unit, along with five more recently formed cohorts (two *cohors Delmatorum*, two *cohors Aureliae Dardanorum* and cohors I Aurelia Nova), was created towards the end of the 2nd century, for the protection of mining areas in the vicinity of Singidunum (Guberevac, Sopot, Stojnik).[4] All six cohorts were formed mainly from the indigenous population from the mentioned areas (or their vicinity) and in that way not only would the soldiers secure the mines against barbarian attack, but also the Roman state might hope to deal successfully with the potential internal threat from the indigenous *latrones,* who presented a threat to the safety of the mining districts in the Šumadija area.[5] Archaeological excavations have confirmed that there was a military fort at Stojnik and the text of an inscription dated to AD 179 on a *cippus* found in Stojnik, confirms the existence of a hospital (*valetudinarium*) for the soldiers of cohors II Aurelia nova.[6] The region of Mount Kosmaj–Stojnik, together with the mines situated at Avala, Železnik and Rudnik belonged, in the opinion of S. Dušanić, to the imperial domain of Šumadija, where lead, silver, some gold and iron were exploited.[7] Traces of Roman mining have been confirmed in these areas, and epigraphic monuments attest to the presence of imperial officials. The Kosmaj area yielded argentiferous lead (more than one million tons of ancient slag have been estimated, implying a vast exploitation that was particularly active in the period from the 2nd to the 4th century) and the *vicus metalli* of Kosmaj was situated in the vicinity of Stojnik fort and was called *Deumessus* (or similar).[8] Regarding the fact that most of the soldiers recruited to the newly formed cohorts around 169 were indigenous inhabitants, S. Dušanić thinks that the veteran, Publius Aelius Victorinus, was a local too, from Kosmaj or its vicinity.[9]

Iconography: description

As already stated, the funerary monument is made from grey limestone of local origin and it presents an architectural type of funerary stelae. It had a rectangular top on which was a triangular pediment containing a figural scene. The figural scene is hardly recognisable today and its description is based upon the reports given by the first researchers of the monument, who claimed that the representation contained a woman standing in the centre, a dog (or some other animal with a mane) on her left side,[10] and an unrecognisable ornament on her right side. The animal is turned towards the woman and it looks as though it is drinking from a vessel. In the external corners of the triangular pediment, two mythical sea monsters with long fish tails are presented, with their heads turned back and human skulls (?)[11] under their front legs. Since the top is missing, only the lower parts of this portion of the monument are preserved.

Under the triangular pediment, there is a narrow frieze ornamented with motifs in the form of waves of simple guilloche. Under the frieze, a recessed aedicula flanked by two stout columns is presented, within which

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[2] Вулић 1931, n. 586; *IMS* I, n. 120.

[3] *IMS* I, 105, n. 116.

[4] Four auxiliary units were formed around AD 169 in Moesia Superior: two *cohors Aureliae novae* and two *cohors Aureliae Dardanorum*.

[5] Hirt 2010, 194.

[6] *IMS* I, n. 116.

[7] S. Dušanić also thinks that the areas near Kalanjevci (Štovna), Petrovac and Ripanj were those where mines were exploited by the Romans during Antiquity. In addition, Dušanić believes that, to a certain extent, in the context of their administration and the metal transport, the mines in the Šumadija imperial domain were closely connected with Tricornium (*Metalla Tricorniensia*) and Singidunum, Dušanić 2010, 549.

[8] Ibid, 557.

[9] *IMS I*, 110; S. Dušanić believes that the recruitment of the soldiers around 169, when cohort II Aurelia nova was formed, was raised among the local population, Dušanić 2010, 564.

[10] N. Vulić thinks that a dog is presented, while M. Mirković and S. Dušanić see an animal with a mane, Вулић 1931, n. 586; *IMS* I, n. 120.

[11] N. Vulić recognised the round forms under the front legs of sea monsters as human skulls and S. Dušanić accepted the mentioned description. Due to the worse condition of the monument today, it is not possible to state with any certainty that human skulls are represented under the front legs of the sea monsters.

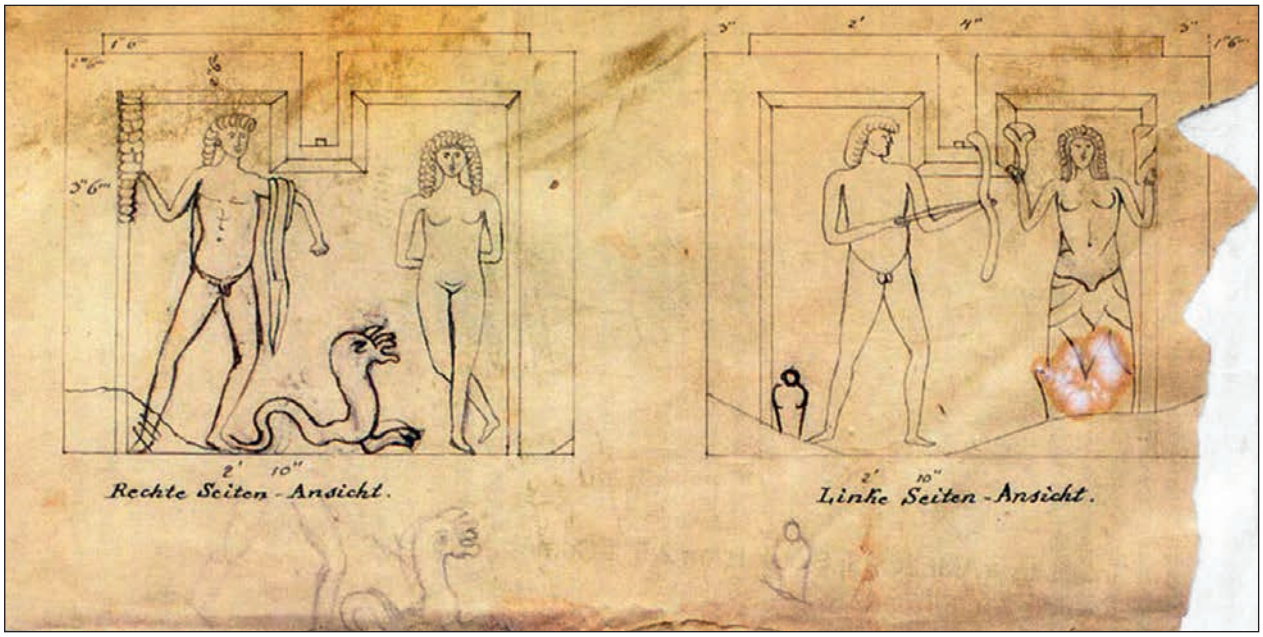

Fig. 3. Scenes from the lateral sides of the lost sarcophagus of Maximiana Aemilia, from Sisak (Siscia) (after: Migotti, Šašel Kos, Radman-Livaja 2018, S II. 9)

Сл. 3. Сцене са бочних зидова изгубљеног саркофага Максимијане Елије из Сиска (Siscia) (према: Migotti, Šašel Kos, Radman-Livaja 2018, S II. 9)

is the main figural scene. In the centre of the scene a half-draped female figure (naked down to her waist) is presented frontally, and completely static; she is standing and, judging from her posture, it is clear that she is chained to a rock, her hands bound behind her back so that she cannot move. On her left side, a very muscular male figure is turned towards her, holding a bow and about to shoot an arrow from it in the direction of the sea monster (*ketos)*, shown on the right side of the woman. The sea monster is presented very schematically, with its foreparts raised to threaten its female victim. Beneath this recessed aedicula, there is a frieze with a hunting scene. Unfortunately, due to the state of the monument's deterioration, we can only speculate as to which animals are presented. Looking from the left to the right side, N. Vulić and V. Kondić believe that a dog, turned to his right is presented, while S. Dušanić recognises a deer.[12] In the case of the next two animals, which are turned to the left (towards the first animal), N. Vulić and V. Kondić identify two wild boars, while S. Dušanić sees a horse and a wild boar.[13] The inscription field is also recessed and is flanked by two columns with capitals. Under the inscription is an empty field.

Iconography interpretation

The poor preservation of the figures in the central scene within the central recessed aedicula of the funerary monument from Stojnik, made it difficult, even for the first researchers, to accurately identify the main protagonists. Yet, the muscularity of the male figure on the left and the partially draped or naked female figure in the centre, standing as though she is chained to the background, together with the image of sea-monster, makes it possible for us to be reasonably sure that it represents the mythological scene of Hercules rescuing Hesione from the *ketos*.[14] The element that might puzzle the viewer in the scene is that Hercules holds a bow instead of a club, his usual attrib-

[12] Вулић 1931, n. 586; Kondić 1965, 227–228, n. 30; *IMS* I, n. 120.

[13] Ibid.

[14] Although N. Vulić (as later V. Kondić) did not presume which mythological scene is presented on the funerary monument from Stojnik, he was on the right path when he noticed a great likeness between the scene presented on the monument and the scene of Hesione's rescuing, shown in Roscher's Mythological Lexicon, Вулић 1931, 246.

ute, which, on the Stojnik monument, is depicted on the ground, behind the hero's left leg. However, representations of Hercules holding a bow or shooting an arrow are familiar in Greek and Roman art and by no means rare, although Hercules is usually shown, on completing his deeds or resting from them, draped with the skin of the Nemean lion, and with his club beside him. It is interesting, though, that in the earliest known scene of Hercules rescuing Hesione, a Corinthian column krater dated to the 6th century BC, the god holds a bow and not a club.[15]

The mythological scene of Hercules rescuing Hesione is recorded as one of Hercules' deeds, which took place following his return from his expedition against the Amazons. Hesione was a Trojan princess, daughter of King Laomedon and sister of the future Trojan king, Priam, who, because of the wrath of the gods Apollo and Poseidon directed at her father, was sacrificed to the sea monster (*ketos)*, in order to deliver Troy from both the sea monster sent by Poseidon and a plague sent by Apollo.[16] The scene of Hercules rescuing Hesione on the Stojnik monument depicts the moment when Hercules arrives to liberate her and kills the *ketos.* The mythical scene of Hercules' rescue of Hesione, although not much favoured in Greek and Etruscan art, became quite popular in Roman art, particularly in the 2nd and the 3rd centuries in the northern provinces of the empire.[17] The reason for the popularity of this theme, mostly on funerary monuments,[18] is explained by the popularity of the hero-god Hercules, whose life and fate in the afterlife inspired the artisans who produced provincial Roman art, but also because the episode was seen as an allegory of death and the afterlife, here symbolised in Hesiones' rescue from death and Hercules' victory over the monster.[19] The fact that Hercules had, beside all his other aspects, a chthonian function too, made him and the different episodes in his life, suitable themes in Greek and Roman sepulchral art.[20] However, as in the case of the funerary stele from Stojnik, the context, regarding the person of the deceased and his life, must be taken into account when analysing and interpreting the monument in question. In that regard, we should start from the mythological scene and how it is presented. Although the figures of the main protagonists are not so clearly visible today, Hercules' muscular body is emphasised, through his attributes, the bow in his hands and his club beside his left leg. He is presented naked, as is Hesione too, although she sometimes has, as here, her lower body covered. In the Roman period, Hesione was usually presented naked or half-draped, in contrast to Greek art where she is always presented clothed.[21] The figure of the sea monster, *ketos,* is crudely modelled on the Stojnik monument, with its small triangular head in profile and a massive body, yet it can be perceived that his head and upper part of the body are leaning towards Hesione with the intention of causing her harm. In Greek and Roman art, the *ketos* is shown in connection with Hesione, Andromeda and

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[15] Oakley 624, num. 3.

[16] Hesiona, Hesione (Ησώνη) was a Trojan princess who is first mentioned in Homer's Iliad, in a myth concerning the building of Troy's walls for King Laomedon, by Apollo and Poseidon on Zeus' orders. However, Laomedon refused to pay the gods their wages and the furious Poseidon sent a sea monster – *ketos,* to destroy everything on his way, including Troy and its citizens. The oracle predicted to Laomedon that the only way to please the monster was to sacrifice his daughter Hesione. Laomedon promised to give his immortal horses as reward to anyone who would kill the *ketos* and Hercules did that by entering the sea monster's belly and slaying it, thus rescuing Hesione who was chained naked to the rocks and waiting for her grim fate; to be devoured by the *ketos.* Later, Hercules gave his blessings to his friend Telamon to wed Hesione, and, indeed, Telamon appears in some iconographical scenes together with Hercules and Hesione in Greek and Roman monuments, Oakley 1997, 623.

[17] The earliest known depiction of Hercules rescuing Hesione from the *ketos* is that on a Corinthian column krater dated to 560 BC, while somewhat later the scene appears on Attic and Etruscan wares. Other scenes from the myth, like Laomedon and Priam beseeching Herakles to save Hesione, Heracles and Laomedon making a pact, Hercules claiming the horses of Laomedon, Hercules punishing Laomedon, Hesione marrying Telamon, and Hesione, Hercules and the young Priam, are less often presented in Greek and Roman art. Ibid, 623–628. The *ketos* is presented, skilfully and in detail, in the scene of Hercules rescuing Hesione from Dunaujvaros (now in the Magyar Nemzeti Museum's lapidarium, inv. num. 66.1906.1) http://lupa.at/3958/photos/4 and on the sarcophagus of Gaius Severinius Vitalis, dating from the 2nd century, https://pbase.com/bmcmorrow/image/139483811.

[18] It has been shown on about 30 examples of the Hercules and Hesione mythical episode, that it is mostly presented on the funerary monuments (around 20), two mosaics and five frescoes, dating from the 1st to the 4th century, Birchler, Chamay 1995, 52.

[19] In Roman funerary monuments the *exemplum Herculi* and various episodes from his life and deeds were most suitable for expressing ideas about dying and departure from this world, the fragility of a human life, the hope for divine protection and the destiny of triumph over death and the acquisition of immortal life, Bayet 1974, 210.

[20] Hercules' chthonian dimension was confirmed as early as in the 7th–6th century BC, on Thasos, where the dual cult of the god existed: the cult of Hercules as a hero and the cult of Hercules as a god. He was respected as a celestial, but also chthonian, deity, as in cities of southern Italy and Etruria. Berquist 1973, 40–41; Bayet 1926, 408.

[21] Ibid, 628.

Scylla and is usually presented with a serpentine body, canine head, forearms that resemble those of a lion, fish tail and fins or flippers.[22] The sea surrounding is emphasised by an ornamental register in the form of waves in the narrow frieze between the monument's triangular pediment and recessed aedicula, but also by the two sea monsters with long fish tails depicted beyond the external corners of the triangular pediment of the monument. The animals depicted on the frieze between the aedicula and inscription field on the Stojnik funerary monument, represent not only those which are usually shown in hunting scenes, but also those which are also connected to the god Hercules (a doe or a dog, and wild boars). In this context, we should mention a funerary monument from Smederevo Fortress, detailing a scene of Hercules returning Alcestis from Hades, which also contains a frieze with a hunting scene (one lion and four dogs).[23] Hunting scenes are frequent in Roman sepulchral art, particularly on funerary monuments from Noricum and both Pannonian provinces, from the first century, from where, in the 2nd century, this motif was transferred to the territory of Moesia Superior.[24] Hunting scenes appear on seven funerary stelae from Moesia Superior (but not south of Viminacium), which all belong to more complex architectural types of stelae, which only persons who were of a higher social status could have afforded.[25] Symbolising scenes of a happier life after death and the victory of life over death, the hunting scenes on Roman funerary monuments also expressed the heroism of the deceased and his virtues, which will have ensured immortal life after death.[26] The motif of the fabulous sea monsters in the external corners of the triangular pediment, which contribute to the "marine" atmosphere of the central scene in the monument's aedicula have already been mentioned, but what should we make of the central scene within the pediment? As is mentioned in the description of the scene by Vulić, who described it almost a hundred years ago, and we could believe that in that time the motifs were more visible since the monument was probably in much better condition, in its centre is recognised a standing figure of a woman, with a dog on her left side, turning towards her and drinking from a vessel. If we accept his interpretation, it could be said that this scene corresponds with the main mythological episode of Hercules rescuing of Hesione and all other presented iconographical motives, and we are in agreement with the aforementioned hypothesis of a connection between chthonian Hercules and the female figure with the dog who, in such a context, would probably represent a goddess with a chthonic dimension as well.[27] Since epigraphic monuments from the Kosmaj area, where our monument was found, confirm the worship of several goddesses venerated primarily as the protectresses of miners and mines, but also as chthonian deities, our first thought would lead us towards an identification of Dea Orcia[28] or Terra Mater.[29] The

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[22] Ogden 2013, 116.

[23] The hunting scene with one lion and four dogs presented under the mythological scene of Hercules returning Alcestis to Admetus from the funerary monument built as *spolia* in the outer wall of the tower between the so-called tower of Jerina in Smederevo Fortress and the tower with the benefactor's inscription, is probably an allusion to Admetus' success in bringing together a lion and a wild boar to draw a chariot. Judging by the Smederevo relief of Alcestis' return and all the presented iconographical details (Alcestis dressed in a long chlamys with a veil, Admetus grieving on a *kline* , the motif of Medusa's head in the triangular pediment etc.), it is clear that the sculptor of the monument knew the myth of Alcestis well, for more see Gavrilović 2008, 9–10.

[24] The hunting scenes, not being frequent in the Republican or Augustian period, became popular from the 1st century. Their popularity spread in this period from Northern Italy to the provinces of Noricum and both Pannonias, as is confirmed by numerous funerary monuments from Brigetio, Cibalae, Sirmium, Savaria, Sopiane and Scarabantia. Dautova-Ruševljanin 1983, 59. The cultural ties that existed between the above mentioned territories (including the province of Dalmatia) with Moesia Superior, is attributed to the appearance of the hunting motif in the funerary monuments from this province. However the scenes of the hunt from Noricum and the two Pannonias do not appear only on stelae of complex architectural types, as is the case in Moesia Superior, but also in simpler types of monuments.

[25] Hunting scenes are presented in seven funerary stelae from Moesia Superior, including our funerary monument from Stojnik: five monuments were found in Viminacium. *IMS* II, n. 73, 77, 92, 106, 110 and one monument is built in the outer wall of one of Smederevo fortress' towers. Вулић, Ладек, Премерштајн 1903, 66–67. For more information about hunting scenes in Moesia Superior see: Pilipović 2006, 337–352.

[26] Toynbee 1982, 39; Cumont 1966, 448–449.

[27] *IMS* I, 136.

[28] Ibid, n. 20. The votive monument dedicated to Dea Orcia presents a solitary testimony of the goddess' cult, not only in the Roman provinces of the Central Balkans, but in the whole Roman empire. S. Dušanić thinks that although the name of the goddess is Latin, derived from name of the god Orcus and reveals a chthonian goddess, *paredros* of Orcus, her origin is probably Celtic, Thracian or some other northern group. Her chthonian character is also confirmed with her presumed temple with reliefs showing bats, found in Kosmaj. Dušanić 2010, 506, 674; Gavrilović 2007, 135–142.

[29] The cult of the goddess Terra Mater is affirmed on a votive monument dedicated to Jupiter, Liber, Libera and Terra Mater, by a veteran of the Legion IV Flavia. *IMS* I, n. 16. Also, her temple has been epigraphically confirmed on the slopes of Mt. Rudnik, in a lead and silver mine. Ibid, n. 168.

Fig. 4. Relief with the scene of Hercules rescuing Hesione, from a funerary monument from Dallfingen (after: Oakley 1997, n. 22)
Fig. 5. Stone relief with the representation of Hercules rescuing Hesione, from Hallstatt (source: http://lupa.at/569/photos/1)

Сл. 4. Рељеф са сценом Херкулове спасавања Хесионе са надгробног споменика из Далфингена (према: Oakley 1997, n. 22)
Сл. 5. Камени рељеф са представом Херкулове спасавања Хесионе из Халштата (извор: http://lupa.at/569/photos/1)

only confirmation of the Dea Orcia cult comes from a votive monument found in Avala, dedicated to the goddess in her obvious Underworld capacity, by two *duoviri coloniae Singiduni,* which is dated to 287 AD. The cult of Terra Mater has been confirmed by a votive monument from Singidunum, dedicated to her and to Jupiter, Liber and Libera. A close relationship with Dea Orcia is suggested not only through Terra Mater's patronage over miners and mines, but also in her own persona as a chthonian deity.[30] Both goddesses were regarded as the main protectresses in the mentioned territory and, along with the goddesses Diana and Ceres and the gods Hercules, Jupiter and Vulcanus, were worshipped in the mining areas in the vicinity of antique Singidunum.[31] Although we cannot be sure which of the mentioned goddesses would have figured in the scene within the triangular pediment of the Stojnik funerary monument, the chthonian dimension of the female deity with a dog is undisputable, as is her connection with the god Hercules in his functions of the protector of mines and miners, the army, but also as a chthonic god in the Kosmaj area.

Finally, regarding this intriguing scene, the authors of this paper would like to offer one more possible interpretation. Although we used the "aDStretch application for rock art digital enhancement" for the purpose of a possibly better identification of the scene, the results were not sufficient to provide more information (Fig. 6).[32] Existing lines and surfaces are more visible and that only provided an opportunity for a different interpretation of the animal on the left. The head of the animal is damaged but, based on the tail, which is long and stretches to the corner of the triangular pediment, it is possible to say that instead of a dog, a panther is actually depicted here. In such a space, the panther could be presented with a vessel and as sacred animal of the god Dionysus, the Roman

[30] Dušanić 2010, 674–675.

[31] Ibid, 670–683.

[32] https://www.dstretch.com/Apps/index3.html The authors express their gratitude to their dear colleague Emilija Nikolić for providing the use of this application.

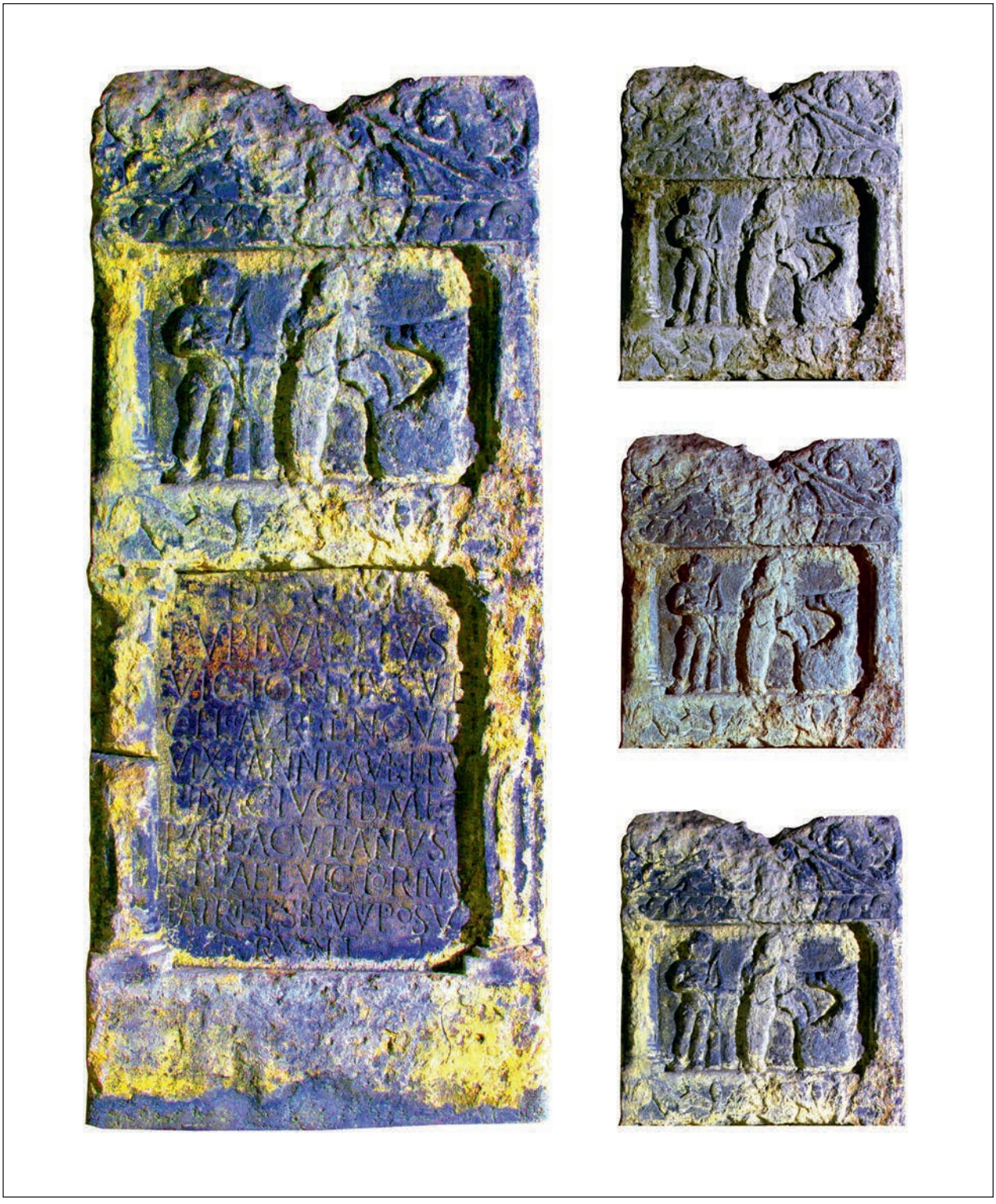

Fig. 6. Funerary monument from Stojnik with the representation of Hercules rescuing Hesione with applied "aDStretch application for rock art digital enhancement" (photo-documentation: National Museum in Belgrade, inv. num. 22_43 and https://www.dstretch.com/Apps/index3.html)

Сл. 6. Надгробни споменик из Стојника са представом Херкулове спасавања Хесионе кроз примењену апликацију "aDStretch application for rock art digital enhancement" (фото-документација: Народни музеј у Београду, инв. бр. 22_43 и https://www.dstretch.com/Apps/index3.html)

Bacchus;[33] it is possible that this scene can point to a Dionysiac context.[34] Bearing in mind the popularity of this cult and its strong association with the cult of death and immortality, it is possible that here too, as in already known finds,[35] both gods are engaged in conquering death, in a scene with a deep eschatological meaning for any mortal when it comes to the choice of his personal pictorial narrative and afterlife message.

The funerary monument from Stojnik represents a Roman monument unique because of its iconography in the territory of Moesia Superior; containing a scene from the myth of Hercules rescuing Hesione. The closest geographical analogy can be found in the scenes from the lateral sides of the lost sarcophagus of Maximiana Aemilia, from Sisak, dated to the first half to the mid 3rd century (fig. 3).[36] The representations of a hero holding a bow and rescuing a half-draped girl (on one of the lateral sides of the sarcophagus), and of a hero holding a club and saving a naked girl (on the other lateral side), were recognised as presentations of Perseus and Andromeda.[37] However, we are more inclined to agree with the authors B. Migotti, M. Šašel Kos and I. Raman-Livaja, who believe that because of the attribute of a club and good knowledge of the mythical episode of Hercules' rescue of Hesione in Pannonia Superior, these scenes as presented on the lateral sides of the sarcophagus of Maximiana Aemilia depict Hercules and Hesione, rather than Perseus and Andromeda.[38]

Since there are strong mythological and iconographical analogies with the tale of Perseus saving Andromeda (in both tales an innocent girl tied to a rock is to be sacrificed to the sea monster *ketos,* which is killed by a hero),[39] sometimes it is very hard to say which mythical story is presented, as, for example, with the sarcophagus of Maximiana Aemilia, but the opposite can also be true, as is demonstrated by the relief from Golubići, which was thought to present Hercules with Hesione, but actually shows Perseus and Andromeda.[40]

Close iconographical analogies with the scene from the Stojnik monument can be observed on two stone reliefs – a relief from Dallfingen dated to the 2nd–3rd century, on which Hercules is holding a bow in his left hand and approaching a naked Hesione, standing frontally, and a funerary limestone relief from Hallstatt, dated to the 2nd century.[41] The only difference between the scenes from the Stojnik monument and the Hallstatt funerary relief is that on the latter, Hercules is holding a club, not a bow and is swinging it over his head. The detail of Hercules holding a bow is known from three other iconographic presentations, a lost sarcophagus from Rome, a marble discus from Vienna[42] and a funerary relief from Intercisa (Dunapentele).[43] In the context of the stylistic characteristics of the Stojnik funerary monument, although its state has deteriorated, it is clear that the artisan was well acquainted with the myth of Hercules' rescue of Hesione and also aware of the popularity of Hercules in the mining area of Kosmaj. There are similarities in the way the human figures are carefully and skilfully modelled between the scene from the Stojnik monument and the representation on the sarcophagus of Gaius Severinus Vitalis from Köln, dated to the 2nd century.[44] However, less skill is shown in the artisan's modelling of the animals in the Stojnik monument, where the *ketos* is presented quite basically, as also are

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[33] Toynbee 1973, 82–86.

[34] The authors would like to thank to Prof. Bojan Đurić, who drew their attention to the possibility of such an interpretation.

[35] We will not enter into the elaboration of the close connection between Hercules and Dionysus, which exists from the 6th century BC, when they were worshipped together on Thasos. Bergquist 1973, 29. We will just emphasise that both deities triumphed over death and, thus, became the symbols of good and brave deeds with which they earned a happy and blissful afterlife.

[36] Vukelić 2009, 406–407. The sarcophagus of Maximiana Aemilia was found in the area known as the necropolis of New Sisak, that is the south-western necropolis. For her hypothesis that the scenes from the sarcophagus' lateral sides present Perseus and Andromeda, V. Vukelić provides no valid argument apart from her personl opinion. Vukelić 2009, 393–420.

[37] Ibid.

[38] The arguments of the authors depend on the club in the god's hand and also the fact that the motifs of Hercules and Hesione were familiar in Norico-Pannonian art. Migotti, Šašel Kos, Radman-Livaja 2018, 20–22, S II. 9.

[39] Although the representations of Perseus and Andromeda and Hercules with Hesione are contemporary and date from the 7th century BC, the scenes of Hercules with Hesione are much rarer in Greek art than the former ones. Birchler, Chamay 1995, 52.

[40] Imamović 1977, 432, n. 204; Toynbee 1977, 377, i.

[41] Oakley 1997, n. 22 and n. 33.

[42] Ibid, n. 35, 36, 628.

[43] On the funerary relief from Intercisa, Hercules is presented with a club, but on his back the bow and arrows are visible. Toynbee 1977, 382, ii.

[44] The sarcophagus of the veteran Gaius Severinius Vitalis, who served in the XXX Legion Ulpia Victrix from Köln, besides the scene of Hercules rescuing Hesione, figures also a scene of Theseus slaying the Minotaur. The sarcophagus dates from the first half of the 2nd century, https://pbase.com/bmcmorrow/image/139483811.

the figures of the animals in the hunting scene. Although the monument was made of a local stone, quarried from the site of Bogovica, near Stojnik, by the complex architectural type of the stela and by the choice of the iconographical motifs, it is clear that the deceased was a person of good financial status and had a certain social impact within the society in which he and his family lived. Judging by the iconographical and stylistic characteristics, but also the palaeographic characteristics and known facts about the activity of the *cohors II Aurelia nova*, the Stojnik monument should be dated between AD 171 and AD 200.

Conclusion

Besides the usual decorative function of a myth on funerary monuments, the choice of mythological imagery as a vehicle for their funerary message, which depended on the commissioner, in this case wife and son, cannot be neglected.[45] The language of images and their rhetorical effects on funerary monuments can be comprehend as archetypes, panegyric or forms of mythopoesis.[46] However, the relationship between the deceased and the mythological figures was oriented toward self-representation and commemoration, in order to idealise the memory of the deceased and to create a ritual space for mourning and consolation.[47] Bearing in mind that the complexity of the mythological interpretation could be understood as "culturally demanding language", it might have been expected that an important factor in choosing of the myth would have been cultural identity.[48] Considering the power of images, in this case associated with the inscription as a personal background of the suggested interpretation, some conclusions can be recapitulated.

Judging by the motifs and the mythological tale of Hercules rescuing Hesione presented on the Stojnik funerary monument, we believe that the inspiration for it came from Pannonia inferior, where funerary art was rich in mythical themes and symbolism, such as: Iphigenia in Taurus, the legend of the Sabine women, Apollo chasing Daphne, Helena and Eros, Hercules, a maenad or / and Venus, the sphinx, and possibly Endymion, and where the population was open to the symbolism that the themes, such as those mentioned, were associated with for them.[49] It is quite logical that, as J. M. C. Toynbee rightly emphasised, the myths that are allegories of death, salvation and victory over death, such as the tale of Hercules rescuing Hesione from death, were favoured in sepulchral provincial art.[50] Therefore, it is quite logical that Publius Aelius Victorinus, who was a soldier employed in guarding the mines in the Stojnik area, would worship the deities associated with these mythical stories, who were protectors of the army, miners and mines and would put himself under their protection. The fact that Hercules was one of the *dii militares* and very popular among soldiers, but was also venerated in Moesia Superior's mining areas as the protector of mines and miners, makes him the best choice in that context, which is, as we already saw, confirmed with examples of other funerary monuments of soldiers carved with the mythical episode of Hercules' rescue of Hesione;[51] for example the sarcophagus of the veteran Gaius Severinius Victorinus from Köln, or a relief on a block from Muchhausen, dedicated by the veteran L. Severinus Victorinus, [52] or a funerary relief from the Legionary fortress at Chester[53] and, of course, our monument from Stojnik. The mythological representations on funerary monuments, besides carrying messages of the sadness and sorrow of the deceased's family for their lost loved one, also contain their hopes and wishes for the deceased's fate and happiness, which are to be secured in the afterlife. Among all mythological persons, there is none more suitable, because of his life and fate after death, than Hercules.[54] The presentation of the mythological tale of Hercules' rescue of Hesione from the sea monster as a paradigm of virtue conquering the power of evil, combined with carefully chosen motifs of the chthonian goddess with a dog or vessel with a panther beside, suggesting a Dionysiac context, the fabulous sea monsters with chthonic dimension and the hunting scene, undoubtedly point towards the securing of a happy eternity through the example of virtue and brave deeds. The episode that precedes Hesione's rescue by Hercules is actually her sacrifice to the sea monster and, in such a context, it

[45] Newby 2014, 256–257, with reference 6.

[46] *Cf.* Hölscher 2004; Elsner 2014, 316–350; Koortbojian 1995.

[47] Birk 2014, 33–47.

[48] Zanker and Ewald 2012, 34–36.

[49] Migotti, Šašel Kos, Radman-Livaja 2018, 181.

[50] Toynbee 1977, 407.

[51] Henig 1970, 261.

[52] Toynbee 1977, 382, iv, 383, vi,

[53] Henig, Webster 2004, 29–30.

[54] Cumont 1966, 415.

may additionally be possible to consider a connection between this kind of background scene and the practice of devotio – involving the death of commanders in the field, vowed to commit themselves and the enemy troops to the gods of the underworld in order to ensure a Roman victory.[55] Thus, the mythological episode of Hercules rescuing Hesione on the Stojnik funerary monument symbolises, in an eschatological and possibly soteriological context,[56] the life of the deceased as a victory of life over death, as Publius Aelius Victorinus, with his virtues and courage, earned eternal life as his ultimate reward.

Translated by the authors

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[55] Schultz 2016, 58–76.

[56] Bayet 1974, 248; Birchler, Chamay 1995, 56.

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Abbreviations:

CIL . . . . . *Corpus Inscriptionum Latinarum,* Th. Momsen, ed., Berolini 1873: apud G. Reimerum

IMS . . . . . Gaius Iulius Solinus, *De mirabilibus Mundi* (*Gaius Iulius Solinus, The Polyhistor* (trans. by A. Apps), PhD thesis, Macquarie University, 2011.)

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Nadežda GAVRILOVIĆ VITAS, Jelena ANĐELKOVIĆ GRAŠAR
A Message from Beyond the Grave: Hercules Rescuing Hesione on a Stojnik Funerary Monument (111–125)

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СА ОНЕ СТРАНЕ ГРОБА: ПРЕДСТАВА ХЕРКУЛОВОГ СПАСАВАЊА ХЕСИОНЕ. ПРИМЕР НАДГРОБНОГ СПОМЕНИКА ИЗ СТОЈНИКА

Кључне речи. – Херкул, Хесиона, митолошка сцена, Стојник, надгробни споменик

Међу ретким римским надгробним споменицима са митолошким представама из Горње Мезије издваја се споменик од сивог кречњака из Стојника, и то по иконографској сцени – јединственој на простору римских провинција централног Балкана – која приказује Херкулово спасавање Хесионе од морског чудовишта кетоса. У питању је надгробна стела архитектонског типа, са троугаоним забатом, митолошком сценом представљеном у едикули и са натписним пољем. Фунерарни споменик је богато декорисан различитим мотивима, а из текста натписа сазнаје се да је посвећен Сенима мртвих због смрти Публија Елија Викторинуса, ветерана кохорте II Аурелије нове. Споменик су подигли његова супруга Аурелија Руфина и њихов син Публије Елије Акуцианус. Кохорта II Аурелија нова била је једна од шест кохорти које су пред крај другог века основане у циљу чувања рудника у области Шумадије, и то регрутовањем углавном локалног становништва, коме је највероватније припадао и преминули Публије Елије Акуцианус. С обзиром на то да су археолошка истраживања потврдила постојање војног логора на простору Стојника, као и постојање болнице за војнике кохорте II Аурелије нове у поменутој области, претпоставља се да је ова кохорта била задужена за безбедност како рудничке експлоатације олова, сребра, злата и гвожђа, тако и рудара из области Стојника.

Надгробни споменик садржи неколико иконографских сцена различите садржине: у средини троугаоног забата приказани су женска фигура која стоји и десно од ње пас који пије из суда (?), односно суд, у средини сцене, са пантером десно од њега (услед недостатка горњег дела сцене и утицаја атмосфералија, немогуће је извршити сигурну идентификацију мотива у средини забата). У спољним угловима троугаоног забата представљена су два морска чудовишта, с дугим рибљим репом, која предњим ногама стоје на људским лобањама (?). Испод троугаоног забата је танак фриз, а испод њега је представљена едикула са митолошком сценом. У центру сцене приказана је млада нага (или полунага) девојка, са рукама прикованим за позадину (стена?), док је с њене леве стране приказан наг мушкарац, наглашене мускулатуре, поред чије се леве ноге налази батина, који у рукама има лук из којег одапиње стрелу ка морском чудовишту што је представљено из профила са девојчине десне стране. Морско чудовиште кетос нагиње се горњим делом тела и предњим ногама према девојци у намери да јој науди. Испод ове митолошке сцене налази се фриз са представом лова, у којој су приказани јелен (пас?) и два дивља вепра. Испод фриза се налази удубљено поље са натписом, фланкирано стубовима са капителима, а испод њега је празно поље. Иако Херкулово оружје у иконографској представи спасавања Хесионе није батина што се налази поред њега, већ лук са стрелама – лук као оружје бога појављује се на првој до сада познатој представи Херкуловог спасавања Хесионе из 7. века пре н.е. (коринтски кратер), као и на још свега три рељефа са простора других римских провинција. Митолошка представа Херкуловог спасавања Хесионе од морског чудовишта припада његовим доживљајима након похода на Амазонке. Пошто део његовог обећања датог боговима Аполону и Посејдону није испуњен, на тројанског краља Лаомедона и Троју послато је морско чудовиште, а једини начин да се оно умири било је жртвовање Лаомедонове кћери Хесионе. Лаомедон обећава ономе ко му спасе кћер своје бесмртне коње, те Херкул одлази да се суочи с морским чудовиштем, које убија а Хесиону спасава од сигурне смрти.

Мит о Херкулу и Хесиони спада у алегоријске приче о победи над смрћу и задобијању бесмртног живота након смрти путем врлине. Оне су управо због своје симболике биле омиљене на римским надгробним споменицима. Херкул, који је представљао једно од омиљених војних божанстава, заштитника рудара и рудника, али такође и бога са хтонском димензијом, био је, захваљујући свом животу и храбрим делима, идеалан пример за смртнике који су настојали да себи обезбеде исту судбину попут Херкулове у контексту живота након смрти заслуженог храброшћу, моралом и часношћу. Есхатолошка, а могуће и сотериолошка, симболика надгробног споменика из Стојника додатно је подвучена представом у троугаоном забату, мотивима морских чудовишта у спољним угловима забата и сценом лова у фризу између митолошке сцене у едикули и натписног поља споменика. Претпоставка је да се у централној представи унутар забата, у приказу жене са псом, може препознати једна од хтонских богиња која је поштована на рудничком простору Стојника – Деа Оркија или Тера Матер, или пак то да је имплициран дионизијски хтонски контекст, уколико је представљен суд са пантером десно од њега. Представе лова познате су пак са седам надгробних споменика у Горњој Мезији и симболизују храброст и врлину покојника путем којих он достиже бесмртност у животу после смрти.

Митолошка представа Херкуловог спасавања Хесионе била је у периоду римске владавине нарочито популарна на

надгробним споменицима из северних провинција, а претпоставља се да је тај тип представа у Горњу Мезију доспео из Доње Панонији, где је био добро познат и омиљен, нарочито међу војницима.

Митолошка представа са надгробног споменика из Стојника има географски најближу аналогију у сценама са бочних страна изгубљеног саркофага Максимијане Елије из Сиска, као што је иконографски слична представама са рељефа из Далфингена и сцени са надгробног споменика из Халштата. На основу стилских карактеристика, надгробни споменик из Стојника датује се у период од 171. до 200. године н.е. и представља за сада једину представу Херкуловог спасавања Хесионе од морског чудовишта са простора римске провинције Горње Мезије.

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ANTHROPOMORPHIC AMULETS FROM *VIMINACIUM*

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Abstract. – The paper focuses on a group of five anthropomorphic pendants, deposited in graves of sub-adult and female individuals, discovered in cemeteries of ancient Viminacium (Serbia). The selection of raw materials (jet and amber), as well as other parts of the necklaces these pendants were incorporated in, suggest their apotropaic character. Various data sources have been employed in order to answer questions regarding the identification of the depicted beings, reasons for their usage by certain population groups, etc. A comparison has been made with analogous specimens from across the Roman world, which are not numerous but are prominently widespread. Three examples from Viminacium originate from recent archaeological campaigns, meaning that osteological material was available for analysis.

Key words. – *Viminacium*, Roman magic, anthropomorphic amulets, amber, jet

During several decades-long excavations of ancient Viminacium (modern-day Serbia) nearly 13,000 graves have been unearthed, yielding more than 18,000 artefacts, making this archaeological site a unique place to study various phenomena related to Roman Antiquity.[1] The research object of this paper is a group consisting of five anthropomorphic pendants manufactured out of various materials and dated to the 3rd century CE (Fig. 1).[2] Until recently, similar artefacts had not been thoroughly researched in academic papers, which were sporadically issued from the late 1930s onwards. Additionally, the majority of these amulets were published without precisely determined circumstances of the find. Such a situation contributes to the importance of the Viminacium collection, given that the pendants come from secure archaeological contexts. Before going into the interpretation of these artefacts in greater detail, an overview of the objects themselves as well as the sepulchral units in which they were discovered, will be presented.

1. Grave 3239 (southern necropolis, Pećine site)

The first amulet originates from the grave of a child[3] laid on its back in a plain burial pit. The osteological remains are almost completely deteriorated. The grave is dated to the first half or middle of the 3rd century.[4]

In the neck area, parts of a necklace were discovered. It consisted of four glass beads, a copper-alloy *bulla*, and a jet pendant (Fig. 2). The last-mentioned artefact (26 mm high and 24 mm wide) is modelled in the form of a bust of an anthropomorphic being, frontally facing the viewer. The eyes are round, the nose is

[1] Зотовић, Јордовић 1990; Korać, Golubović 2009; Спасић-Ђурић 2015.

[2] These artefacts were first presented to the academic community through a lecture at the conference HOMINES FUNERA ASTRA. Death and Children from Prehistory to the Middle Ages, held in Alba Iulia (Romania).

[3] Anthropological analysis was conducted by Ž. Mikić.

[4] Спасић-Ђурић 2011, 28–29; Спасић-Ђурић 2015, 211, кат. бр. 218.

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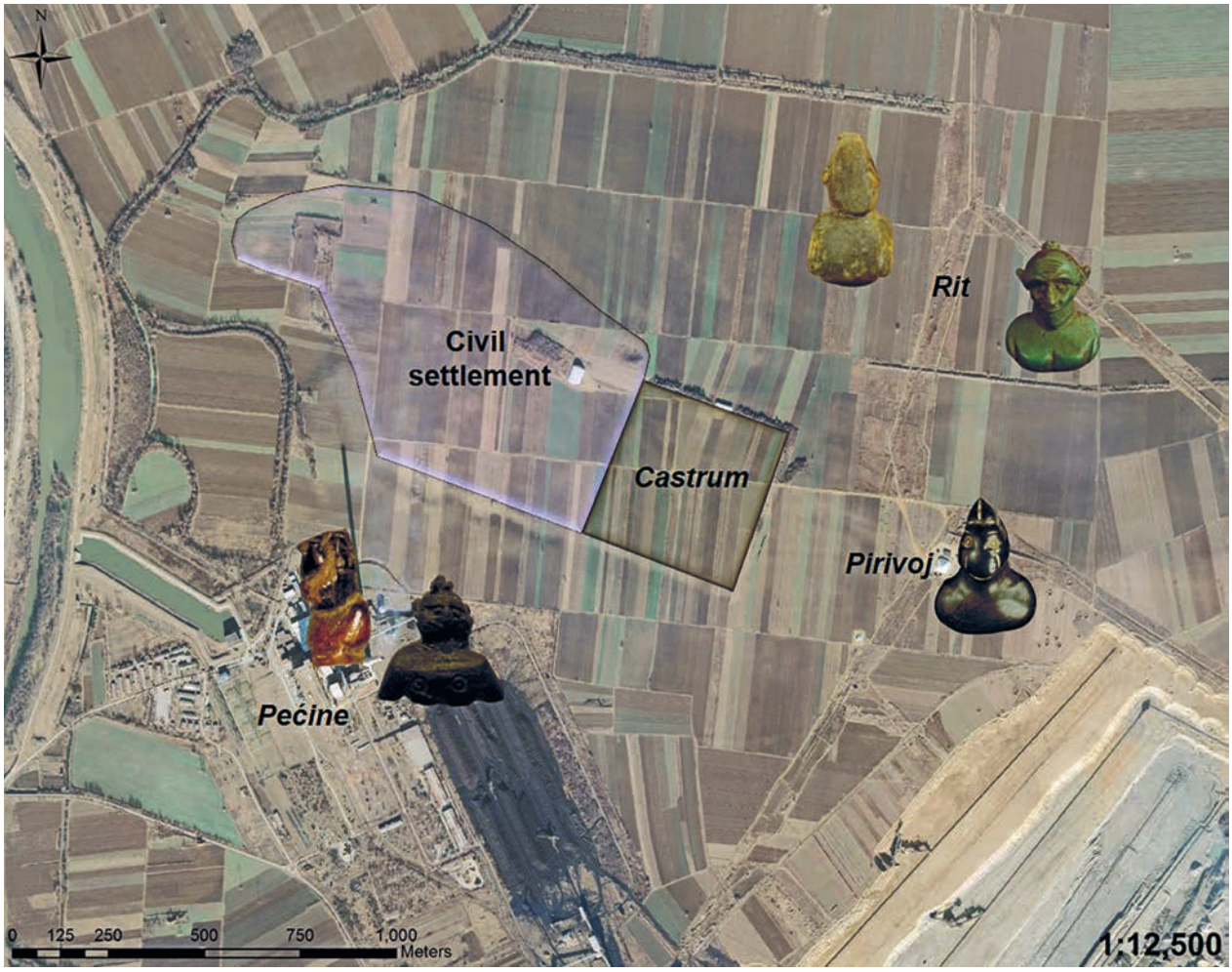

Fig. 1. Aerial photo of Viminacium *with the locations of the discovered amulets (Documentation Centre Viminacium)*

Сл. 1. Аеро фотографија Виминацијума *са локацијама откривених амулета (Документациони центар Виминацијум)*

broad, while the ears are prominent and pointed at the top. A topknot (*cirrus in vertice*) is observable on the crown of the head. There is a perforation in the pendant to allow suspension. The lower parts of the face are damaged. The neck is short and thick, while the shoulders are rounded with arms reaching away from the body. The nipples are represented with incised concentric circles. The backside of the being are polished with a central line accentuating the musculature.

2. Grave 5275 (southern necropolis, Pećine site)

The second burial was described in the field journal as a child's grave, which is an observation made by an archaeologist, and not a physical anthropologist. The deceased individual was also laid on its back in a plain burial pit. Only bones of the rib cage and arms have been preserved. The grave is dated to the 3rd century.

In the neck area, there were remains of a necklace made out of 27 beads of different coloured glass, a copper-alloy *bulla*, and a bone (possibly ivory) pendant (Fig. 3). A silver earring was also found in this grave. The amulet measures 20 mm in height and is modelled in the form of a bust of an anthropomorphic being, depicted *en face*, head slightly lowered. The eyes, nose, and mouth are executed with incisions. A pointed hat is observable on the head, and the amulet includes a perforation for suspension.

Fig. 2. Amulet no. 1 (Сīасић-Ђурић 2015, 211)

Сл. 2. Амулеш број 1 (Сīасић-Ђурић 2015, 211)

Fig. 3. Amulet no. 2 (National Museum Požarevac)

Сл. 3. Амулеш број 2 (Народни музеј Пожаревац)

3. Grave 288 (eastern necropolis, Pirivoj site)

The third pendant was discovered as part of the grave goods of a grave constructed out of bricks, inside which the remains of a female individual, between 16 and 18 years old, were found.[5] The body was laid on its back, with arms bent at the elbows and hands resting on the abdomen. Iron nails indicate the existence of a wooden coffin. The grave is dated to the mid-3rd century.

Parts of a necklace were discovered in the neck area (Fig 4a). It consisted of 68 glass, stone, amber and jet beads, as well as a jet pendant (Fig 4b). The grave inventory was completed with a silver ring and a tubular bronze container. The pendant (23 mm high and 17 mm wide) is modelled in the form of an anthropomorphic being, with incised, casually represented facial features. The eyebrows, eyes, nose (?), and mouth are executed with grooves filled in with a white, unidentified substance. On the top of the head, a pointed hat is represented, including a vertical incision in the front dividing it into two halves. A perforation for hanging runs from side to side of the head, in the locations where the ears should be.

4. Grave 79 (north-eastern necropolis, Rit site)

The fourth specimen was placed in a grave constructed with tegulas, which was, to some extent, damaged during plundering. On the same occasion, parts of the skeleton were dislocated. Only the lower jaw, several vertebras, and the lower parts of the legs were discovered *in situ*. Anthropological analysis determined that the individual buried here died at approximately 12 years of age. Based on enamel hypoplasia lines it was possible to detect at least four stagnations in development caused by periods of famine or severe diseases.[6] The grave is dated to the mid-3rd century.

Inside the grave, scattered parts of a necklace were found (Fig 5a). It was made out of 42 glass, jet and amber beads, a small silver loop, and a bone pendant (Fig 5b). The grave goods also included a bone die, nine coins[7], a bronze tubular container and two bronze rings. One of the rings had a glass inlay. The pendant depicts the bust of a frontal faced anthropomorphic being, 29 mm high and 21 mm wide, with incised eyes, an aquiline nose and a broad mouth. The forehead is high and wrinkled, while the ears are pointed. A topknot is placed on the top of the head, and in front of it there is a perforation ending in the back of the head, used for suspension. The back is plain and polished. The pendant is dyed green.

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[5] Anthropological analysis was conducted by N. Šarkić.

[6] Anthropological analysis was conducted by N. Šarkić.

[7] Three coins were minted during the second quarter of the 3rd century in the town of Nicaea (minted during the reign of Emperor Gordian III). Single specimens represent the mints of Macrinus (mint of Ephesus, BMC Ionia, 90, no. 297); Alexander Severus (provincial coinage, unknown mint); Gordian III (RIC IV.3, 25, no. 84); Philip the Arab (RIC IV.3, 76, no. 70), Herennia Etruscilla (mint of Viminacium; Борић-Брешковић 1976, 84, cat. 1257–1260), and one more originating from a provincial mint (2/4 of the 3rd century, Nicaea?). The ninth coin is illegible.

a

b

Fig. 4. Necklace with amulet no. 3
(Photo: Goran Stojić)

Сл. 4. Огрлица са амулетом број 3
(Фотографија: Горан Стојић)

a

b

Fig. 5. Necklace with amulet no. 4
(Photo: Goran Stojić)

Сл. 5. Огрлица са амулетом број 4
(Фотографија: Горан Стојић)

Fig. 6. Necklace with amulet no. 5 (Photo: Goran Stojić)
Сл. 6. Оґрлица са амулеґом број 4 (Фоґоґрафија: Горан Сґојић)

5. Grave 121 (north-eastern necropolis, Rit site)

The second pendant from the Rit site was discovered with a deceased laid on its back in a plain burial pit. Physical anthropologists were able to determine that the remains belonged to a woman, between 40 and 50 years old. One episode of metabolic stress was detected. It occurred before the individual reached seven years of age. Apart from occupational stress markers, the osteological remains showed traces of periodontitis.[8] The grave is dated to the second half of the 3rd century.

Parts of a necklace were detected in the neck and chest area (Fig 6a). It consisted of 105 glass, jet, stone, gold foil, and bone beads, a copper-alloy *bulla,* and an amber pendant (Fig 6b). The grave inventory also included a pair of gold earrings, a glass perfume bottle, and a bronze coin[9]. The pendant represents the bust of a frontal faced anthropomorphic being, 33 mm high and 18 mm wide.[10] The facial features are vaguely recognisable only on the left side of the face, which could be due to wear induced by rubbing of the artefact. The ears protrude from the head, which is elongated, and probably finishes with a perforated topknot. Two vertical incisions are used to represent the arms. The backside of the being are plain and polished.

To summarise, the types of graves in which anthropomorphic pendants were discovered do not imply that the deceased originated from wealthy population circles. The users were predominantly children (in three cases), while single specimens were worn by both a young and a mature female individual. All of the burials were dated to the 3rd century CE.

Interpretation of anthropomorphic pendants in Viminacium

Three important signs indicate that the anthropomorphic pendants discovered in the cemeteries of ancient Viminacium are, indeed, amulets or, more precisely, artefacts utilised in magical practice. Magic is, here, defined as a specific type of religious activity[11], in which professional persons "drew on religious traditions for both efficacy and exoticism".[12]

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[8] Anthropological analysis was conducted by N. Šarkić.

[9] The obverse of this coin is illegible, but the reverse shows that it is the product of Viminacium's mint, dating it to the middle of the 3rd century.

[10] Anthropomorphic amber artefacts are not very common in grave assemblages at Viminacium. Besides amulet no. 5, so far, an amber distaff with the upper part modelled in the form of a female bust (Danković 2019), and a ring with a portrait of a woman have been discovered.

[11] Bremmer 2015, 11.

[12] Wilburn 2012, 17.

First of all, these pendants occur in archaeological records together with other objects of apotropaic and magical capacity. In every single case, they were parts of necklaces made from beads of various sizes and colours, with some of them manufactured from raw materials that had magical connotations themselves, which will be discussed later. Three of these necklaces included bronze *bullae*, objects generally regarded as protective.

Such compositions of necklaces can be seen as evolved (or rather simplified) versions of 2nd century amulet strings, very well attested in the necropoles of Viminacium. Besides *bullae*, these usually consisted of pierced coins, crescent and phallic-shaped pendants, perforated animal teeth, shells, bells, and beads (often with the 'evil eye' motif). Such objects were all referred to as *crepundia*, derived from the Latin word *crepare* – to rattle, to make a sound, which indicates their function as an instrument that could ward off evil spirits and bad luck by producing noise.[13]

Crepundia were mainly reserved for members of the youngest age group in Viminacium, children up to seven years old, but occasionally one or two apotropaic pendants can be found in graves of older, even adult individuals. Such a situation corresponds with data available for pre-Roman Greece, where children could have more than a dozen amulets, while women wore only one or two.[14] Skeletons of the victims of Vesuvius can provide an interesting insight into the everyday use of amulet strings, which differs slightly from the image provided by sepulchral contexts only. Namely, few young women fleeing the eruption were wearing them, while a mature female individual had a casket containing an elaborate string with 35 various pendants.[15] The last example raises some interesting questions, given that this woman obviously wasn't using amulets, but rather keeping them as mementos, either of her childhood or her child.

Wearers of necklaces with anthropomorphic pendants in Viminacium are the second clue that points to their interpretation as magical amulets. Two such individuals were described as children, possibly under seven years of age, one is at the threshold of adolescence, 12 years old, one 16–18, and one 40–50. In the last two cases, anthropologists have confirmed the sex to be female. As shown in the previous passage, children and women were exactly the parts of the community one would expect to wear amulets, because they were deemed by their contemporaries as most vulnerable and in need of protection.[16]

The raw materials from which pendants were manufactured need to be taken into consideration. Primarily this concerns amber and jet, known for their healing properties, which led to them being regarded as apotropaic. Amber had numerous therapeutic qualities in Roman times, especially where children are concerned, and was believed to prevent and cure fevers, jaundice and bladder stones, as Pliny the Elder informs us.[17] Amber amulets in the cemeteries of Viminacium are restricted to children during the 2nd century, and only in the 3rd century can their intrusion into grave assemblages of older individuals (women, as a rule) be observed. A possible reason for such a phenomenon could be the expansion of eastern ideas regarding magic and religion, but also one could argue that this period of turmoil and constant concern for wellbeing and safety made the need for protection through amulets a daily concern.

On the other hand, there are no mentions of jet amulets in written sources, although references to its healing properties have been preserved. Pliny is the most informative author when it comes to this material, and he says that the kindling of jet drives away snakes, cures suffocation of the uterus, and relieves toothache, amongst other things.[18] When used for making amulets, the qualities of its smoke became permanent and non-degradable [19], and this could also be true for jet jewellery. Jet amulets are not a significantly diverse category, consisting of small bear figurines found in children's graves, medusa pendants [20] and, in the opinion of some authors, the so-called betrothal medallions.[21]

There are several qualities of jet and amber that contributed to their reputation as materials with magical potential. First of all, both substances possess electrostatic properties that the Romans were aware of.[22] Also, they tend to give off a distinctive smell when rubbed or exposed to fire.[23] The amber anthropomor-

[13] Martin-Kilcher 2000, 67; Milovanović 2016; Danković et al. 2018, 73.

[14] Faraone 2018, 51.

[15] Faraone 2018, 59–60.

[16] Huntley 2010, 136; Faraone 2018, 27–28.

[17] Plin. *Nat.* XXXVII.15.

[18] Plin. *Nat.* XXXVI.34.

[19] Faraone 2018, 92.

[20] Crummy 2010; Parker 2014, 15; Davis 2018.

[21] Eckardt 2014, 112.

[22] Solin. *De Mir. M.* XXIII.

[23] Faraone 2018, 91.

phic pendant from Viminacium shows signs of rubbing to the extent that all the facial features have been worn off. Also, due to the poor conductivity of amber, it can "feel warm to the touch in the cold, and cool in the heat".[24]

The colours of these materials should not be ignored, given that they could have played an important role when making objects intended for ritual use.[25] The black colour of jet is easy to associate with the chthonic domain, and ancients connected it to the night, death, and bad omens. The red colour of amber was linked to the fire and the sun.[26] Jewellery of certain colours may have had a protective function, and Pliny wrote that green malachite was especially useful for protecting children and defending against evil forces, and notes that in the East everybody wore a green stone as an amulet. The green colour of extremely popular emeralds symbolised vegetal growth, fertility, and prosperity.[27] Nina Crummy proposes that more affordable jewellery pieces (glass beads for example) were intentionally made in the colours of precious stones with apotropaic qualities.[28]

This brings us back to the fact that pendant no. 4 from Viminacium was made out of bone and dyed green, possibly with the intention of instilling certain magical qualities to an otherwise ordinary material. Bone is not usually considered to have magical characteristics, but it was often used for amulet production. Perhaps it was viewed as an animal substance with regenerative properties similar to those attributed to antlers.[29] The same can probably be proposed for ivory, if one of the pendants from Viminacium is indeed made out of it. Another important characteristic of the last-mentioned material is its exotic nature, and the fact that it was not that easy to come by.

Precisely its rareness or exotic factor played an important role in choosing a raw material for manufacturing artefacts used in magic rituals. Substances that looked unusual and strange were deliberately selected in order to achieve the desired "coefficient of weirdness". This coefficient was developed to measure to which degree magical language was different to the ordinary, and it may have included made-up words such as *abracadabra* and intentionally corrupted words, but it also could be applied to material culture.[30] A manifestation of the same phenomenon can be observed in recipes for remedies containing exotic ingredients, such as the hair of the mule, lizards, dung, blood of a baboon, etc, which possess no curative properties themselves.[31] Without a doubt, the grotesque appearances of beings represented by the Viminacium amulets contribute to the overall weirdness of these artefacts. Interesting is the comparison with the so-called *mīmī*, entertainers wearing grotesque looking masks, which were intended to illustrate scandalous and inappropriate affairs of everyday life. They took part in public festivities, such as *Lupercalia*, intending to ward off evil spirits.[32]

Analogous examples of anthropomorphic pendants

The first step towards the possible recognition of the supernatural entities in whose form the anthropomorphic pendants were modelled is to look for similar examples across the territory of the Empire. Analogous specimens are not numerous, and usually not published in detail, at least not in the literature available to authors of this paper.

Geographically closest to Viminacium are three specimens discovered in Stobi (North Macedonia). Two of them originate from the burial of a female individual, between 14 and 16 years of age. She was buried inside a stone and marble cist, with a bracelet consisting of pottery and glass beads, as well as five jet and amber pendants. An anthropomorphic amulet was made out of each of these materials. A gold ring, a bone pin, and a glass amphoriskos were also deposited with the deceased.[33] Unfortunately, the illustration provided in the original publication is black and white, and not of great quality, so any further discussion on these amulets is impossible. The third specimen from the same site, also made out of jet, has not yet been published.[34]

Single specimens exist in Aquileia (Italy) Ptuj (Slovenia), Astorga (Spain), Vienna (Austria), and Copenhagen (Denmark). The context of the amber pendant

[24] Causey 2011, 38.
[25] Wilburn 2012, 17; Eckardt 2014, 95.
[26] Eckardt 2014, 124: Davis 2018, 73.
[27] Berg 2002, 40.
[28] Crummy 2010, 54–55.
[29] Dasen 2018, 130.
[30] Wilburn 2012, 12–13.
[31] LiDonnici 2002.
[32] Wright 1875, II, 28, 30–31.
[33] Vinčić 1970, 141–142.
[34] The authors would like to express their gratitude to Dimitar Nikolovski (National Institution Stobi) for informing us about the existence of this artefact.

Fig. 7. Analogous specimens; a. Aquileia (After: Calvi 2015, Tav. 36), b. Astorga (After: Garcia Marcos, Vidal Encinas 1995, 115, 277, no. 4), c. Vienna (After: Casal García, Bóveda Fernández 2001, 132), d–f. Cologne (After: Hagen 1937, Taf. 29), g. Colchester (After: Parker and McKie 2018, cover), h–i. Palmyra (After: Raat 2013, 150), g. Unknown provenance (After: barnebys.com)

Сл. 7. Аналоїни ӣримерци; a. Аквилеја (ӣрема: Calvi 2015, Tav. 36), b. Асӣорїа (ӣрема: Garcia Marcos, Vidal Encinas 1995, 115, 277, no. 4), c. Беч (ӣрема: Casal García, Bóveda Fernández 2001, 132), d–f. Келн (ӣрема: Hagen 1937, Taf. 29), g. Колчесӣер (ӣрема: Parker and McKie 2018, насловна сӣрана), h–i. Палмира (ӣрема: Raat 2013, 150), g. Нейознаӣо налазишӣе (ӣрема: barnebys.com))

from Aquileia is not available, except a description of it as a part of a *crepundia*.[35] A feature that sets this specimen apart from others is the different and more elaborate coiffure, which appears to be shorter on top of a prominently high forehead, while it is longer on the sides and at the back. The eyes are executed by small holes, the nose is flat and triangular, or this might be the upper lip. The nipples are also represented by small holes (Fig. 7a).

The specimen from Ptuj comes from a fairly well documented context, given that it was discovered in the late 19th century. It was part of an amulet string found inside a lead sarcophagus. The necklace consisted of seven amber pendants and three snail shells. Besides the anthropomorphic one, three were phallic-shaped, two in the form of a gladiator's helmet, and one in the form of a teardrop. The one shaped like a bust bears most resemblance to amulet no. 4 from Viminacium. This burial was dated to the 3rd century by the find of a coin minted during the reign of Gallienus.[36]

An anthropomorphic jet pendant from north-western Spain shows striking similarities to specimen no. 4

[35] Calvi 2005, Tav. 36.

[36] Istenič 2000, 256–257, T. 177.

from Viminacium (Fig. 7b). It is 19 mm high, with angular facial features, an aquiline nose, bent ears, and a topknot. Around the neck, there is a gold wire collar with an additional piece of gold wire attached to it. The archaeological context of the find is unknown, but researchers have associated it with material dated back to the 1st or the 2nd century CE.[37]

Another very similar example is displayed in the Kunsthistorisches Museum in Vienna, originating from Syria, and dated to the 3rd or the 4th century CE (Fig. 7c). It is made out of clay and dyed black, perhaps in an attempt to imitate the rarer and more expensive jet. The description mentions a topknot, round nose, and "ears of a fighter".[38] A unique gold pendant kept in the Thorvaldsens Museum in Copenhagen was part of the private collection of Bertel Thorvaldsen, probably acquired during his stay in Rome. It is in the form of a bust, with marked nipples. A wide, flattened nose, an open mouth, and a topknot are observable on the head. This specimen is dated to the 1st century CE.[39] Amulets from Vienna and Copenhagen are also very similar to our amulet no. 4.

Most specimens, apart from those from Viminacium, come from Cologne (Germany). Three jet specimens are known from this important urban centre, with a fourth that could possibly originate from there.[40] The first of them (Fig. 7d; 15 mm high) is typologically closely related to amulet no. 4 from Viminacium, both pieces displaying a topknot, a beak-like nose, and pointed ears. An amulet that supposedly comes from Cologne is described in a similar manner, but there is no illustration provided for it. It measures 25 mm in height. The third pendant differs significantly from the previous two because the facial features are executed with grooves and notches on an egg-shaped head. In this regard, it is similar to our amulet no. 3, although it also has a topknot, while the Viminacium specimen appears to have some kind of a pointed hat (Fig. 7e). The last pendant from Cologne appears less grotesque. It is seemingly bald, without a topknot or a hat.[41] Triangular eyes, prominent eyebrow ridges, and depicted nipples make this amulet analogous to amulet no. 1 from Viminacium (Fig. 7f). Hagen states that there are two similar examples, one in Antiken-sammlung in Vienna, and one, badly damaged, in a museum in Aquileia. Neither of these finds was available to the authors of this paper. Hagen also mentions a jet anthropomorphic pendant from Coninxheim (Belgium)[42], which differs significantly from all the specimens described in this paper. It appears much more realistic, and is clad in clothes, which casts doubt on whether this artefact should be taken into consideration when talking about anthropomorphic amulets.

Geographically close to Cologne are two pendants recently discovered in Zülpich near Bonn (Germany). These finds stand out because they come from a secure archaeological context, namely they were placed with a female individual, buried in a stone sarcophagus. Both specimens are made out of jet. The first one resembles amulet no. 3 from Viminacium, while the other is slightly more schematic, and was initially recognised as a phallic-shaped pendant.[43]

Colchester in England yielded two specimens, one of amber and one of jet. The first pendant was included on an amulet string together with a perforated canine tooth of a dog, a copper-alloy phallus with a *lunula*, a miniature copper-alloy bell, an as of Hadrian in a silver mount, and two pierced bronze coins (Claudius I and Julia Maesa).[44] It has a ridged coiffure, an extremely narrow face, and an elongated nose (Fig. 7g). These features make it comparable to amulet no. 4 from Viminacium. A black mineral (possibly jet) amulet from Colchester has not yet been published.[45]

Two anthropomorphic pendants made out of ivory were discovered in the city of Palmyra (Syria), and could be dated slightly earlier than most of the rest, possibly to the 2nd century (Fig. 7h, i). Both of them were probably parts of the same amulet string, together with 36 beads of different colours, shapes, and materials, as well as four additional pendants: a heart-shaped bronze specimen, a miniature glass amphora, an ivory dog, and the Egyptian god Bes made out of stone. Interestingly, one of the ivory anthropomorphic pendants was dyed green. A bronze bracelet, 4 cm in diameter could indicate that a child was buried with these artefacts.[46]

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[37] Casal García, Bóveda Fernández 2001, 129; Menéndez Menéndez 2019, 167–168, Fig. 12.A.

[38] Casal García, Bóveda Fernández 2001, 129.

[39] Menéndez Menéndez 2019, 172, Fig. 12.M.

[40] Hagen 1937, 127, T. 2, 3.

[41] Hagen described it as a person wearing a helmet (Hagen 1937, 127), despite the existence of ears on the sides of the head.

[42] Hagen 1937, 127, abb. 8.

[43] Menéndez Menéndez 2019, 169, Fig. 12.F.

[44] Henig 1984, 244–245.

[45] We would like to express our gratitude to Glynn Davis (Colchester + Ipswich Museums) for informing us of the existence of this amulet (Crummy & Davis 2020 forthcoming).

[46] Raat 2013, 61–62.

Fig. 8. Geographical distribution of anthropomorphic pendants

Сл. 8. Геоīрафска дисīрибуција анīроīоморфних мулеīа

Lastly, four amulets were discovered in Crimea (Russia). Unfortunately, we have not been able to acquire works in which these finds were published, and we are only aware of them thanks to descriptions by Andrea Menéndez Menéndez. The amber specimen from Chersonesos is the earliest and has been dated to the second half of the 1st century – first half of the 2nd century.[47] The remaining three specimens are all made of jet, and dated to the period of the 4th century, two originating from the Sovkhoz cemetery, and one from the Neyzats necropolis.[48] Any comparison with amulets from Viminacium is not possible, given that we did not have access to photos or drawings of these objects.

Three additional specimens should be mentioned. The first one is displayed on the barnebys.com auction website (Fig. 7j).[49] It is not modelled in the form of a bust, but rather only the head of a grotesque anthropomorphic being, sharing similarities with amulet no. 4 from Viminacium, as well as with the amber specimen from Colchester. An almost identical pendant is kept in the National Museum in Lisbon, and originates from a private collection.[50] The last specimen, a jet amulet from Jacquelyn Babush's Gallery, has a piece of gold wire used for hanging, similar to the one from Astorga. Morphologically, it resembles amulet no. 1 from Viminacium.[51]

Identification of represented beings

The geographical distribution of anthropomorphic amulets, as shown in figure 8, is sparse but widespread, from north-western to south-eastern parts of the Empire. Such a situation implies the existence of a knowledge shared by a small group of people, connected to the same belief system or with the same ethnic background. Also, this could be the result of the activity of specialised individuals distributing magical amulets to anyone in need of them, regardless of their ethnic or religious affiliation.

The scarcity of this particular type of artefact, accompanied by the partial publication, often without archaeological context, makes the interpretation and possible identification of the represented being/s very difficult. Indeed, only a couple of attempts have been made to explain the nature of these amulets. Based on the "ridged coiffure, receding brow, and thick lips"

[47] Menéndez Menéndez 2019, 171–172.

[48] Menéndez Menéndez 2019, 170.

[49] https://www.barnebys.com/auctions/lot/ancient-roman-black-jet-pendant-amulet-of-a-head-of-a-grotesque-wdotyeggt

[50] Menéndez Menéndez 2019, 173, Fig 12.Q.

[51] Menéndez Menéndez 2019, 170, Fig. 12.J.

that can be observed on the jet pendant from Colchester, Martin Henig suggests that this is a depiction of an African. Also, he describes the slit eyes and pointed ears similar to satyrs, and the elongated nose as potentially phallic. To conclude, he describes the object as a fertility amulet, "the Ethiopian or Pygmy representing the teeming wealth and fecundity of Africa".[52] Such an attribution has since been doubted.[53] The amber specimen from Aquileia has similarly been described as "the head of a negroid".[54] The one discovered in Asturga was labelled as a "pendant with negroid" by Garcia Marcos and Vidal Encinas[55], while Casal García and Bóveda Fernández saw the represented person as Asiatic. The pendant kept in Vienna was similarly characterised as a bust of an "oriental gladiator".[56]

Dragana Spasić-Đurić interpreted the only published Viminacium specimen so far (amulet no. 1), as a grotesque portrait of an athlete, apotropaic-magical in its nature. According to her, it was supposed to protect the child against evil forces, securing his health and strength, which was the utmost ideal of the *palestra*.[57] A similar stance is taken and thoroughly elaborated by Andrea Menéndez Menéndez.[58] This interpretation is based mostly on the hairstyle of the depicted being. A topknot was indeed seen as a distinctive marker of male athletes in Rome, but it must be noted that such fashion originated in Italy, and did not exist in Greece and eastern parts of the Empire.[59] The last piece of information might be important, bearing in mind the possible provenance of anthropomorphic amulets. Certain facial features, and probably the colour of jet, were principal reasons that led some authors to describe these busts as depicting people of African origin. Indeed, it is important to notice that depictions of Pygmies[60] were also considered an apotropaic device in the Roman world. It was believed that the laughter produced by their antics and unusual looks could ward off the Evil Eye.[61] Nevertheless, when the whole corpus of these artefacts, as well as various coloured raw materials used for their manufacture, are observed, it becomes obvious that at least some of them do not possess features that could lead to interpreting them in either of the two proposed manners.

A very important issue that needs to be addressed in the attempt to identify the represented creatures is whether it is one or more supernatural beings we are dealing with. Undeniably there are common features that can be observed. Three specimens from Viminacium sport a ponytail, or a topknot,[62] while the remaining two seem to be wearing some kind of pointed hat.[63] Amulet no 4 from Viminacium has the most analogous specimens across the Empire and, in this case, the same creature is certainly depicted (Table 1).

At this point, the hypothesis that all these individual traits were not as important as the need for the being to appear grotesque should be taken into consideration. Such an appearance is to be expected if these amulets are to be seen as a continued eastern tradition of frontal face depictions on prophylactic pendants. These include Humbaba and Pazuzu in Mesopotamia, Bes in Egypt, silens and other demons of the Phoenicians, and Gorgon in ancient Greece.[64]

If the presumption is that it is one distinctive grotesque being in question, which would need to be backed up by several common features displayed on the amulets, how is it that some of them differ to such an extensive degree? The answer to this question could lie in the fact that anthropomorphic amulets are made in great detail, with some undeniable artistic value, and it would require a skilful pair of hands to produce one of them. It is hard to imagine that at least ten ancient magicians or sorcerers, scattered across the Empire, were such craftsmen that they were producing these artefacts themselves. A more reasonable solution is that the pendants were made by order and under instructions from a professional in jewellery workshops. Only after that, a specialised individual would perform a ritual that endowed the object with its protective powers.[65]

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[52] Henig 1984, 245.

[53] Eckardt 2014, 85.

[54] Calvi 2005, Tav. 36.

[55] Garcia Marcos, Vidal Encinas 1995, 115, 277, no. 4.

[56] Casal García, Bóveda Fernández 2001, 129.

[57] Спасић-Ђурић 2011, 28–29.

[58] Menéndez Menéndez 2019, 174–177.

[59] Crowther 2009, 348.

[60] Pygmies represented in frescoes and mosaics can sometimes wear a turban-like headdress (Clarke 2003, 208), possibly resembling the pointed hats seen in some of the anthropomorphic amulets.

[61] Clarke 2003, 195.

[62] As do the amber specimens from Ptuj and Colchester, one of the pendants from Palmyra, the gold one from Copenhagen, three jet specimens from Cologne. This is also true for the ones from Astorga, Vienna, Zülpich, Lisbon, Jacquelyn Babush's Gallery and the auction house, all made out of the last-mentioned material.

[63] This is probably the case with the other amulet from Palmyra.

[64] Faraone 2018, 68; Menéndez Menéndez et al. 2015, 464.

[65] Wilburn 2012, 37.

No.	VIMINACIUM	ANALOGOUS SPECIMENS					
1		Cologne	Aquileia				
2-3		Cologne	Palmyra				
4		Cologne	Astorga	Colchester	Vienna	auction	Palmyra
5							

Table 1. Analogous specimens by type

Табела 1. Аналоїни ӣримерци разврсӣани ӣо ӣиӣовима

Such a possibility could indeed explain similar traits of an essentially differentiated group of depictions. Maybe the magician was providing instructions based on vague descriptions of terrifying supernatural beings, available in magic textbooks of the time, which brings us back to the shared magical knowledge in Antiquity. Curse tablets and magical gems that have been found in various parts of the Roman world utilize the same phrases, formulas, names, and symbols or, in short, a shared vocabulary of magical practice.[66] Spreading this knowledge could have been done by travelling sorcerers teaching, exchanging or selling their practice, or by books.[67] A certain fact is that these amulets were not mass-produced, but rather ordered in cases with specific needs. Interesting in comparison is the case of jet Medusa pendants which differ beyond a reasonable degree, with no two specimens alike, suggesting that these pendants were produced by multiple hands.[68]

The most compelling argument for the theory of more than one being is the employment of various materials, as well as dying the pendants green in Viminacium and Palmyra. As stated earlier, these qualities could have been very important when making objects of ritual significance. The choice of raw material was not, in any case, random, given that magical practice followed strict protocols in order to be effective.[69]

The need for a specific substance in order to create an amulet could further imply different evil forces, enemies, or diseases against which the protection was required. Unfortunately, the corpus of only 29 amulets is not nearly enough to try and detect possible patterns

[66] Wilburn 2012, 51.
[67] Wilburn 2012, 265–266.
[68] Allason-Jones1996, 24; Eckardt 2014, 114.
[69] Sánchez Natalías 2018, 15.

in the occurrence of pendants of the same type (material, colour) with particular age groups, or their connection with possible diseases. Of course, the disease would have to leave traces on the osteological material, which most illnesses do not, and it must be kept in mind that sometimes magic could have been sought to resolve mental disorders. A detailed analysis by a physical anthropologist is available for only two graves from Viminacium, but nothing more than signs of metabolic stresses induced by famine or illness could be detected, apart from one individual suffering from periodontitis. This person was buried with a necklace comprising beads made out of jet, which was believed to relieve toothache when boiled in wine.[70] The pendant in this grave was made out of amber, which isn't specifically referenced by ancient authors as remedial for teeth related problems, but Pliny informs his readers that it is beneficial when attached to infants in the form of amulets.[71] This practice survived through the Middle ages, and in the 19th century, a physician in a respected medical journal writes about amber necklaces being used to protect children from convulsions from their first teeth.[72]

Finally, another expression of the heightened need for prophylactic amulets that can be observed in the cemeteries of Viminacium during the 3rd century needs to be noted. It is manifested by the occurrence of bronze and silver containers (*phylacteria*), used for storing gold and silver sheets inscribed with magical texts (*lamellae*).[73] One such sheet was discovered in the grave of a 4-years-old child in the north-eastern necropolis of Viminacium. It included 11 columns filled with names of various deities and demons, which can mainly be connected to eastern provinces of the Empire. Some of the mentioned beings are *Thôbarrabau*, *Semeseilam, Sesengenpharange*, and *Sasibêl,* originating from Aramaic, Syrian, Phoenician, Hebrew, and Egyptian religious-magic circles, and they were summoned for help and protection. Similar formulas have been observed on tablets discovered in Hermopolis Magna (Egypt) and Gelduba (Germany), and they represent reproductions of the same model from a long lost magical textbook.[74]

If the theory of amulets as depictions of multiple supernatural beings was to be true, and bearing in mind that they probably had roots in the ancient Near East, the same as magical *lamellae*, it could be argued that these pendants represent some of the numerous deities and demons mentioned on the tablets. In short, it would mean that *lamellae* containing prophylactic texts and anthropomorphic amulets are expressions of the same magical and religious concepts, manifested through different media.

Concluding remarks

At the current level of knowledge of Roman anthropomorphic magical amulets, it is not possible to derive any definitive conclusions or interpretations. A bigger corpus of data is needed, and one of the goals of this paper is to trigger the publication of similar specimens that presumably exist. Also, a reassessment of known pendants, including an analysis of osteological material where possible, would be valuable. The main reason for the lack of more thorough studies on these amulets lies in the fact that the material aspects of ancient magic were more or less neglected in academia, with researchers' emphasis mainly on texts, the magician himself, and the social practices related to magic. The materiality of magic entered the focus of scientific interest only recently, in the last decade.[75]

What can be stated with a high degree of certainty is that anthropomorphic pendants are magical devices epitomizing an aggressive stance against harmful forces threatening the health and existence of the wearer, which is usually the case when depicting a frontal face or an eye on amulets.[76] The provenance of the represented beings, as well as the practice of using such artefacts, should be sought in eastern parts of the Roman Empire, suggested also by the earlier dates for similar analogous amulets from Palmyra in Syria, where they are dated to the 2nd century CE, while specimens from Viminacium exclusively originate from 3rd century contexts. This does not necessarily imply migrations of the population from that region to other parts of the Roman world. It could be the result of the adoption of exotic elements into magical practice, or simply of the sharing of knowledge. In this regard, it would be interesting to conduct a study employing

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[70] Plin. *Nat.* XXXVI. 34.

[71] Plin. *Nat.* XXXVII.12.

[72] Riddle 1973, 4.

[73] An interesting case of a pairing of these containers with frontal faced amulets originates from the eastern necropolis of Viminacium. A woman in her early thirties was buried with three silver *phylacteria* as well as with a necklace incorporating a Medusa amulet, jet, and amber beads (Milovanović 2018, 107; 110; fig. 3).

[74] Korać, Ricl 2017, 164–170.

[75] Gordon 2015, 8–9.

[76] Faraone 2018, 72.

physicochemical methods to determine if the users of amulets were incomers to a specific area or residents utilizing foreign magical practice in a time of need.

It is also safe to assume that, based on differences in the choice of material, colour, and perhaps the physical appearance of the depicted supernatural beings, pendants were intended for protection against particular diseases and dangers. Amulets aimed against rather specific medical disorders are well attested.[77] The scarcity of anthropomorphic amulets indicates that they were used in unusual situations against peculiar ailments and enemies. The price of these apotropaic pendants was probably somewhat higher than other protective devices, especially bearing in mind that they were made of luxurious materials such as amber, ivory, and jet. An additional claim to such an idea is that anthropomorphic pendants never became part of the mass-production of standardised amulets employed against everyday concerns and threats, ready-made and available for purchase.[78]

A logical consequence of the expense of these amulets would be their exclusive usage by wealthier parts of the society, but archaeological evidence does not support such an assumption. Three out of five deceased wearers of pendants from Viminacium were inhumed in plain burial pits, while the remaining two were buried within simple brick constructions. On the other hand, they have not been discovered in more lavish types of graves (fresco decorated family tombs, stone sarcophagi, and memorial hypogea) belonging to the "elite" population of Viminacium. It seems that the need for the protective powers of anthropomorphic amulets dictated their consumption, rather than social status.

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[77] Gordon 2019, 701.
[78] Gordon 2019, 702.

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Anthropomorphic Amulets from *Viminacium* (127–143)

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АНТРОПОМОРФНИ АМУЛЕТИ ИЗ ВИМИНАЦИЈУМА

Кључне речи. – Виминацијум, римска магија, антропоморфни амулети, ћилибар, гагат

Током вишедеценијских истраживања виминацијумских некропола откривено је пет гробова, датованих у период III века, који су као саставни део инвентара имали огрлице са антропоморфним привесцима. Два привеска су израђена од гагата, два од кости (један, можда, од слоноваче), а један је од ћилибара.

Три су битне карактеристике ових артефаката по којима се они сврставају у ред апотропејских амулета, коришћених за заштиту њихових носилаца од злих сила, болести и урокљивог ока. Пре свега, јављају се у археолошким контекстима заједно с другим предметима протективног карактера, као делови огрлица са разноврсним перлама, од којих су неке начињене од материјала који сами по себи имају магијска својства. У три случаја откривени су скупа са булама од бронзе.

Важни подаци добијени су физичко-антрополошким анализама остеолошких остатака индивидуа које су ове амулете користиле. Две су окарактерисане као деца, највероватније испод седам година старости, једна особа неутврђеног пола преминула је око 12. године живота, док је женски пол утврђен за покојнице чија је старост процењена на 16–18, односно 40–50 година. Будући да су управо жене и деца сматрани најрањивијим деловима популације, сходно томе пружана им је и заштита.

Није био занемарљив ни избор сировине за израду амулета. То се првенствено односи на ћилибар и гагат, којима су приписивана куративна својства код разних здравствених тегоба, те су они као такви с временом стекли апотропејски карактер. Виминацијумски примерци упоређени су са аналогним предметима откривеним широм римског света, који показују изразито широку географску распрострањеност, уз не тако велики број примерака. Таква ситуација указује на постојање знања које је поседовала мала група људи, припадника истог религијског круга или заједничког етничког порекла, али такође и на могућност деловања специјализованих професионалаца, који су дистрибуирали амулете онима којима је заштита била потребна.

У раду смо покушали да идентификујемо једно или више бића представљених путем антропоморфних привезака, и то имајући у виду типолошке карактеристике, материјале, боје и археолошке контексте. У ширем смислу, чланак спада у ред публикација које као тематику имају материјалне аспекте античке магије, што је тренд који је у академски фокус ушао тек током претходне деценије.

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BLOCK-TYPE MILITARY BALNEUM IN TIMACUM MINUS
Its spatial arrangement, social impacts, and architectural analogies

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Abstract. – The remains of a Roman bath are situated northeast of the remains of the Timacum Minus castrum. The discovered building is small in size, with a total area of about 242 m². According to the specific layout of rooms, with a reduced spatial organization of its plan, the building belongs to the reduced block-type of military small baths - balneae. In the territory of Serbia, no military balneae of this type have been discovered so far, which are otherwise common for border areas throughout the Roman Empire. The specific spatial relationship between the individual rooms and the characteristic building forms registered in the building plan indicate that the origin of the architecture of the military balneum in Timacum Minus should be associated with the Roman architecture of the balneae that belong to the villae rusticae in Central Europe.

Key words. – Roman bath, block-type balneum, Timacum Minus

The remains of a Roman fortification identified as the castrum of Timacum Minus are situated near the present-day village of Ravna, 8 km north of Knjaževac (eastern Serbia), on the left bank of the river Beli Timok. This fortification, built in the last third of the 1st century, functioned until the middle of the 5th century, when it was abandoned after the Hun invasion of 441–443.[1] The military contingent of the fortification in the first half of the 2nd century consisted of the *cohort I Thracum Syriacae*, and then the cavalry units: *cohort II Aurelia Dardanorum*, in the second half of the 2nd to the 4th century, and *pseudocomitatenses Timacenses auxiliarii*, from the last decades of the 4th to the middle of the 5th century.[2] From the beginning of the 2nd to the last quarter of the 4th century, an urban settlement with public buildings was formed around the fortification, including temples dedicated to Jupiter and Diana.[3] Also, in the civilian settlement formed south of the fortification, economic and residential buildings were registered.[4] The large area of the necropolis, which stretches west and northwest of the fortifications (localities of *Širine*, *Slog* and *Ropinski potok*) testifies to the long and intense life of the Roman fortification and the settlement of Timacum Minus.[5]

Downstream from Timacum Minus, about 100 m northeast of the northeastern fortification tower, a Roman bath was discovered, marked by earlier researchers as "Terme I".[6]

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[1] Petrović 1995, 40–41; Петковић, Јовановић 2001, 277–279.

[2] Petrović 1995, 44–45; Petković et al. 2005, 13.

[3] Numerous epigraphic votive monuments, as well as parts of reliefs and sculptures, testify to the respect of many deities (Jupiter Dolichen, Sabasius, Mithras, Mars, Venus, Hecate), but above all to the existence of the temples of Jupiter and Diana. Inscriptions on two altars testify to the erection and reconstruction of the sanctuary dedicated to Diana. – Petrović 1995, 42, cat. no. 3–4, 6–12, 14; Петровић, Јовановић 1997, 23–24; Petković, Ilijić 2013, 54–57, Figs. 2a–b, 3a–b; Petković et al. 2020.

[4] Петковић, Илијић 2012, 153–178.

[5] Petković et al. 2005, 142–145; Petković et al. 2017b, 97–101.

[6] Петровић, Јовановић 1997, 23–24, сл. 22; Petković et al. 2005, 16, Fig. 5, Plan 2.

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The state of research of the object

The place where the Roman bath is located was first marked on the situation plan by Lieutenant Colonel Jovan Mišković, in 1888. The plan indicates a square castrum called "*Kulište or Gradište*", which was located to the west, not far from Beli Timok River. At the north-eastern end of the river embankment, next to the riverbank, the remains of the building are marked briefly. After that mention, this place was forgotten for a long time by researchers.[7]

Before the start of systematic research, the building was exploited as a source of construction material by the local population for decades. In the diaries of archaeological excavations, the extraction of stones and bricks was registered in several places to such an extent that some walls completely disappeared and only ‚*negatives*' of the traces of the walls were preserved.[8] The walls of the baths were mostly preserved only to the level of the foundations and hypocaust, while there were few traces of in situ above-ground constructions that indicated the composition of the floors.

The Roman bath building near the castrum of Timacum Minus was systematically excavated during the period 1977–1980. The methodological approach to the research, first of all, meant establishing the excavations in a grid system that covered the entire space of the building. No absolute value of a fixed benchmark on the site was specified.[9] The rooms within the western block complex (whose total area is 160m^2), the praefurnii (furnaces), and the eastern larger room of the building were completely explored by the archaeological excavations, while the area southwest of the baths was partially explored.

The results of the archaeological excavations in the Roman bath complex in Timacum Minus have never been fully processed or published. Expecting that the systematic archaeological excavations of Timacum Minus will be continued after the wars in our country, the first researchers did not manage to process in detail the analysis of the discovered remains of bath architecture, or the archaeological findings from this site. At the end of the 1990s, two leading researchers passed away: the head of the research and the director of the Institute of archaeology in Belgrade, PhD Petar Petrović, as well as the then only archaeologist of the Homeland Museum in Knjaževac, Svetozar Jovanović. This, along with the constant problems of financing the archaeological excavations of the Roman site of Timacum Minus, led to the absence of conclusions for a long time.

Although the archaeological research project of the Roman fortification and settlement of Timacum Minus was renewed in 2011, modest funding enabled only the processing and analysis of archaeological and anthropological material (2011–2012) and limited protective excavations at the Slog necropolis (2013–2015).[10] Research on the architecture of Timacum Minus did not continue until 2019, when the archaeological teams of the Institute of Archaeology, in Belgrade and the Homeland Museum, in Knjaževac returned to this topic for conservation and reconservation, to present this important Roman archaeological site.[11] During the renewal of the research, numerous questions and problems were opened, especially regarding the availability of technical documentation and its validity in some aspects.

The documentation available today in the Institute of Archaeology, in Belgrade and the Homeland Museum, in Knjaževac is incomplete or insufficiently precise on some issues.[12] Our considerations of the

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[7] Ilijić 2014, 7.

[8] AI documentation, inv. 368: Diary of archaeological excavations for 9/21/1978; Diary of archaeological excavations for 9/29/1978; Diary of archaeological excavations for 9/28/1978; Diary of archaeological excavations for 24.9.1977; Diary of archaeological excavations for 9/19/1979

[9] The measurement values of individual levels were reconstructed by the author of this text during the research in 2019 by comparing the old technical documentation, photo-documentation, a geodetic survey from 2003 and recorded condition in 2019.

[10] Petković et al. 2014a, 33–38; Petković et al. 2014b, 76–81; Petković, Miladinović-Radmilović 2014, 87–130; Petković et al. 2017a, 113–120; Petković et al. 2017b, 97–101; Miladinović-Radmilović, Petković 2020, 240–267.

[11] The leader of the team of the Institute of Archaeology, in Belgrade "Archaeological research, presentation and promotion of the Roman fortress and settlement Timacum Minus in Ravna near Knjaževac" is PhD Sofija Petković, a scientific advisor. Other members of the team are: PhD Igor Bjelić (Institute of Archaeology, Belgrade) and the archaeologists: Marija Jović MA Institute of Archaeology, Belgrade), Bojana Ilijić MA (Homeland Museum, Knjaževac), Milena Muminović MA (Homeland Museum, Knjaževac) and Nikola Radinović MA (Belgrade).

[12] During the building excavation during 1977–1980, plans that lack a large number of elevations were made. The majority of the *absolute measurement* values of elevations in this paper are the result of a reconstruction of the elevations by the author of this article. Also, the technical documentation from previous excavations lacks sketches of cross-sections of archaeological cultural layers, based on which the stratigraphy and levels of floors (elevations) and preserved parts of architecture could be precisely analysed. In the preserved diaries of archaeological excavations from the period of the research, the elevations of the bottom of the foundations of the individual walls are missing. Also, at that time, an architect was

Roman baths in Timacum Minus are, therefore, largely limited to architectural remains, illustrated by chronologically indicative archaeological finds of building material. From the technical documentation of the excavation, there are two general plans, one building section, some partial plans of specific rooms, and a modest fund of excavation photographs of the Roman bath, that are preserved.[13] One fortunate circumstance is that most of the diaries of the archaeological excavations, with valuable observations of their researchers, have been preserved.[14]

The results of the archaeological excavations of the building

The building as a whole has a complex plan, with five excavated rooms. There is a small deviation of 19° in the orientation of the bath from the northern axis toward the east. The plans of the individual rooms are rectangular. In the building plan, two parts stand out – a block on the west composed of small rooms and an eastern part that consists of a large room (Fig. 1).

The block part is divided into four small rooms by the inner walls of a north-south and east-west direction. In the north-western quarter, there is room 2, and south of it is room 7. In the north-eastern quarter there is room 3, and south of it is room 8 with annex 10 to the south (Fig. 2).[15] The remains of a hypocaust were found in rooms 2, 3, and 7, which show that they were heated. In none of these rooms was found any fully preserved hypocaust pier, or at least a partially preserved floor surface that was heated from below. There was one furnace *(praefurnium)* next to each of these rooms. Only in one room (8/10) there are no traces of the hypocaust or *praefurnium*. A preserved floor surface built with large bricks – (*bipedalis*) is on the south side of room 8/10, inside Annex 10, at an elevation ▼193.20 m.[16] This is also the only remnant of preserved floor surface in the entire building. The wall thickness of the western part of the bath is between 90 and 95 cm.

The eastern part consists of a large room, east of room 8, which, according to earlier researchers, is divided into two parts – northern (9) and southern (11). These two spaces are separated by the remains of shallowly founded masonry masses in an east-west direction, which was determined by earlier researchers as a wall. The south-eastern part of this area is very damaged (Fig. 2).

Room 2 inside the block part has a rectangular plan, with its internal dimensions of 3.85 × 3.53 m. The longer side is oriented in an east-west direction. It is been preserved only in the ground floor, that is, at a height of only four bricks of the hypocaust pillars. Only 11 hypocaust piers (*pilae*) were preserved inside the room. Based on their position, it can be reconstructed so that the *suspensurae* of the hypocaust consisted of six rows of piers, each arranged in six columns. On

not present, which can be seen from the Diary of Archaeological Research. Photo-documentation also did not follow in detail the course of the excavation of the Roman bath. During the research in 2019, only the bottom angle of the wall II foundation could be registered.

[13] On the plans made during 1977–1980, the depths of the excavation layers and the levels of preserved architectural remains and archaeological finds are very rarely marked. Elements have only relative measurement values, with no specific attachment to any particular permanent height benchmark over the years of research. The remaining two general plans (from S. Jovanović and S. Gušić) are incomplete, because both of them lack relevant data. For example, S. Gušić's plan does not indicate the grid system division of the excavated surface that was used during the entire research process. Also, the wall mass with the channel south of room 10 is missing. S. Jovanović's plan is insufficiently precise in terms of wall directions and room sizes. Also, the remains of the walls southeast of the apse of room 7 and the south wall of room 11 are missing. Squares 1 to 4, which were excavated during 1978 in the area southwest of the baths, are not marked. There was no sketch of any wall before the building went through the conservation process. Only by cross-referencing the data from both plans and overlapping them with the geodetic survey from 2003, and with field checks, was it possible to reconstruct a precise building plan (Fig. 1 and Fig. 2).

[14] Unfortunately, the diary of the archaeological excavations for 1980 is missing, and the excavations in this campaign are briefly described in the report on the archaeological excavations at the Timacum Minus site near the village of Ravna (Knjaževac) in 1980 (Documentation AI, inv. 368).

[15] In order to enable future interested researchers to practically check our opinion in this paper, the ordinal numbers of rooms and individual walls in the text and plans in this paper have not been changed in relation to the markings in the Diaries of Archaeological Research by P. Petrović and S. Jovanović.

[16] After a series of repeated readings of the diaries of archaeological excavations, the author concluded that this elevation served as a "permanent fixed benchmark". Although this term is sporadically mentioned in three places during the period 1977–1978, its absolute measurement value is not defined in any diary (diary of archaeological excavations for 24.9.1977 and 28.9.1977, 13.9.1978). For the date 28.9.1977 in the context of the research of squares A3 and A2, it is stated that a "permanent fixed benchmark" is "on the wall surface", and that the difference from the benchmark to the elevation of the bottom of the excavated surface in room 8/10 is 1.3–1.4 m. This led the author to the conclusion that the "permanent fixed benchmark" is a position that has not been changed in the process of conservation – that is, the level of the large bricks (*bipedalis*) at a floor level of 193.20 m in room 8/10 in contact with wall IV. From this point to the bottom of the excavated surface inside room 8, the elevation difference is still 1.3 m.

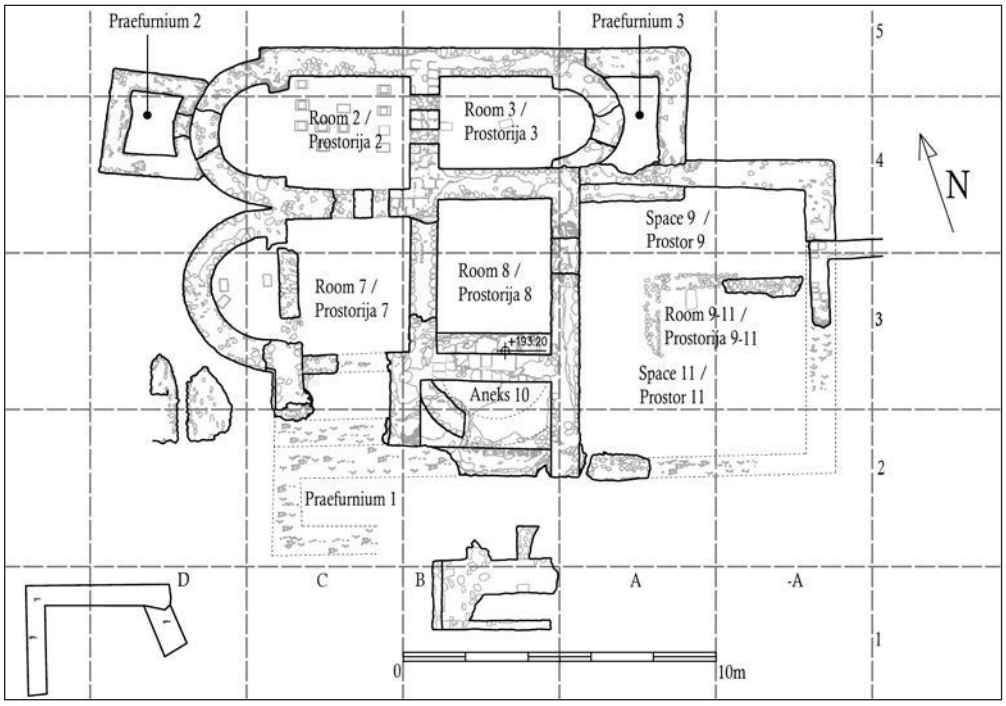

Fig. 1. Plan of the Roman bath in Timacum Minus in a grid system and with room numbering (according to the documentation of the Institute of Archaeology, Belgrade)

Сл 1. План римског купатила у Тимакум Минусу са квадратном мрежом и нумерацијом просторија (према документацији Археолошког института у Београду)

the west side of this room, there is an apse 2.95 m wide and 1.62 m deep. An opening was formed in the apex of the plan of the apse wall. The damaged opening is 73 cm wide. In the interior of the apse, in square D4, the rubble consisted mainly of broken stone, pebbles, and pieces of bricks.[17] A rare occurrence of calcareous tufa was noted between apses in rooms 2 and 7.[18]

To the west of the apse of room 2, a rectangular space was formed, bounded by walls, within which a large amount of ash and red baked earth was found under the rubble.[19] The thickness of the ash layer was 20 cm.[20] This space apparently served as a furnace (*praefurnium*) for the apse of room 2.

Room 3 has a rectangular plan, measuring 3.58 × 2.92 m inside. The longer side is oriented in an east-west direction. On the east side of this room is an apse 2.28 m wide and 1.25 m deep. Inside the apex of the apse, the wall has an opening 70 cm wide. The room is preserved only at the foundation level, i.e. at a height of four bricks of the piers of the hypocaust. Only three hypocaust piers were preserved inside the room. Based on them, it can be reconstructed so that the *suspensurae* of the hypocaust consisted of six rows of piers, arranged in five columns. Hypocaust piers are built in a specific way. In addition to the use of bricks in the format commonly used in the Moesia Superior area for the hypocaust *suspensurae* (25 × 25 × 10 cm), bricks with larger dimensions (40 × 27 × 5 cm) at the bottom were also used. No piers were registered in the apses of rooms 2 and 3, although they undoubtedly existed, taking into account the position of the furnaces next to them. Room 3 was separated from room 2 by the northern part of wall X. At the height of the hypocaust, three arched channels were formed in the wall, separated from each other by a masonry pier.

[17] AI documentation, inv. 368: Diary of archaeological excavations for 9.21.1977.

[18] AI documentation, inv. 368: Diary of archaeological excavations for 20.9.1978.

[19] AI documentation, inv. 368: Diary of archaeological excavations for 20.9.1977.

[20] AI documentation, inv. 368: Diary of archaeological excavations for 21.9.1977 and 22.9.1977.

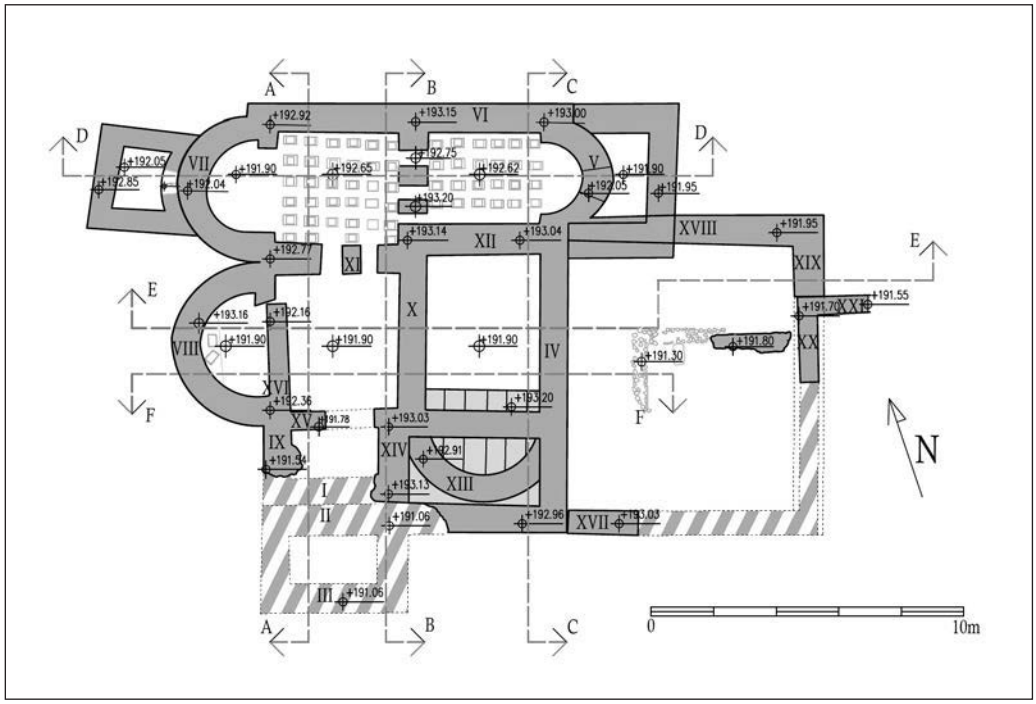

Fig. 2. Reconstruction of the plan of the foundation of the Roman bath with the indicated levels, the numbering of walls, and sections

Сл. 2. Реконструкција плана основе римског купатила са ознакама нивелета, зидова и пресека

According to earlier researchers, two phases of the hypocaust should be distinguished in heated rooms. This circumstance was registered in room 3, where the space under the base level of the later hypocaust (▼192.65 m) to the base level of the primary hypocaust (▼192.40 m) was excavated (Fig. 3: Section D–D). On the cross-sectional sketch, made by S. Jovanović, a mortar surface was registered on that level, while between the two base levels, according to the diary, there was rammed black earth and pebbles. One earring was found on the primary base level.[21]

To the east of the apse of room 3, a rectangular space bounded by walls was formed. Inside, very extensive building debris was found, as well as in the area of the apse of room 3.[22] The most intense debris was present along the west wall of this room and consisted of mortar and broken stone.[23] Under the layer of rubble in the area east of the apse, ash along with red baked earth was found, which indicates that the area served as a *prefurnium*.

Room 7 has a complex plan (Fig. 2). Its basic space has a rectangular plan, measuring 4.00 × 4.27 m. The longer side is oriented in a north-south direction. A rectangular annex measuring 2.79 × 1.49 m was formed along the southern side of this space. On the west side, an apse 3.30 m wide and 2.17 m deep was formed. Opposite the apex of the apse, wall XVI in a north-south direction was found. The wall is made of broken stone and larger pebbles and it has a face made using the flush pointing technique. Only this wall within the western part of the bath is 0.6 m thick, while others are 0,8–1,0 m thick. Traces of hypocaust piers were very scarce inside this room.[24] Hypocaust bricks were

[21] AI documentation, inv. 368: Diary of archaeological excavations for 28.9.1977. Cross-sectional sketch is in the technical documentation.

[22] AI documentation, inv. 368: Diary of archaeological excavations for 22.9.1977.

[23] AI documentation, inv. 368: Diary of archaeological excavations for 26.9.1977.

[24] Due to the scarce remains of the pillars, it was impossible to reconstruct their number and arrangement at the level of the hypocaust of room 7. Documentation AI, inv. 368: Diary of archaeological excavations for 21.9.1978.

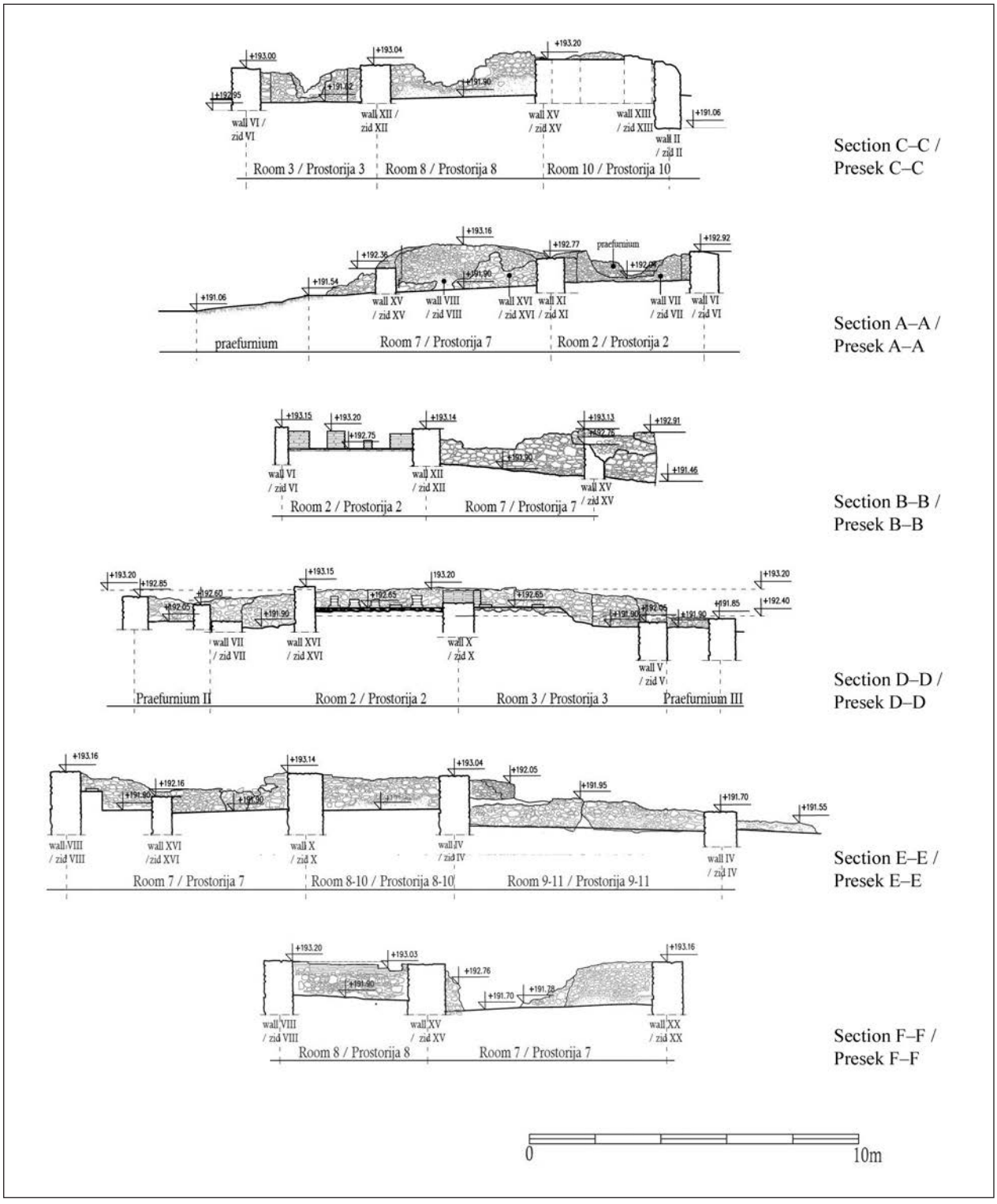

Fig. 3. Transverse and longitudinal sections of the Roman bath in Timacum Minus, current state (the remains of the hypocaust columns are additionally indicated in the section D–D, according to the older technical documentation of the Institute of Archaeology, in Belgrade)

Сл. 3. Поūречни и ūодужни ūресеци римскоī куūаūила у Тимакум Минусу, ūосūојеће сūање (на ūресеку D–D додаūно су назначени осūаци сūубића хиūокауста, ūрема сūаријој ūехничкој докумеūūацији Археолошкоī инсūиūуūа у Беоīраду)

also discovered in the apse space (Fig. 1, Fig. 3: Section E–E).[25] Under the hypocaust of this room, there was a mortar base level, as well as inside the apse of this room, at a depth of ▼ 192.40 m. In the northern part of the room, that is, along the northern end of its apse, the base level was damaged by subsequent digging. Gravel was used as a base for the mortar level of room 7.[26]

The walls I, II, III south of room 7 are very damaged (Fig. 1, Fig. 3: Section A–A). Their traces have been excavated at a greater depth in the form of the ‚*negatives*' of the *walls* in the soil. The southern wall of room 7 inside square C2 is formed as a double wall. Initially, only traces in the form of large pebbles were noticed from the wall. Deeper in the ground, the stones were mostly removed, which was apparent based on the lumps of mortar in which there were stone prints.[27] The inner wall I was 55 cm thick. The remains of the wall were found at a depth of ▼191.10 m, as along with the remains of wall II.[28] Wall II's direct contact with the wall masses of annex 10 is severely damaged.[29] The southwest corner has been much damaged by recent digging and quarrying. Both walls were connected to the south-western wall mass of annex 10.[30]

At the southern end of room 7's apse, a projection of foundations was noticed on the outside at a depth of ▼192.00 m.[31] On the inner side of the same part of the apse, there is a reinforcement made of pebbles with mortar at a depth of ▼192.13 m.[32] After excavation of the north-western corner of room 7 to a depth of ▼191.9 m, the inner corner of the north wall of room 7 was registered, and its connection with the apse of room 2 was discovered.[33] Room 7 was separated from room 2 by wall XI. In the level of the hypocaust, two openings, 72 cm and 52 cm wide, were formed in the wall. The two openings are separated by a 59 cm wide masonry pier.

South of the apse of room 7 is a rectangular space bounded by walls II, III, and by an extension of wall IX to the south. The eastern end of wall III, which is located south of room 7, is unclear. The function of this small space was determined by the baked earth and ashes in its interior. The descriptions related to the presence of rubble, ash, and baked earth in and around this area do not differ from those related to the furnaces of rooms 2 and 3.[34] Therefore, it can be concluded with a good degreee of certainty that another praefurnium was found in this area.

Room 8 has a rectangular plan, with internal dimensions of 3.63 × 4.91 m. The longer side is oriented in the direction north-south. Inside room 8 and its annex 10, very extensive building debris was found.[35] It is important to point out the rare appearance of a piece of mortar with a coating, 1 cm thick, of red hydraulic mortar, which was discovered in square B2. Inside room 8 and annex 10, a large amount of debris of pieces of brick, pebbles, and broken stones was found. Fragments of ceramic vessels as well as lead cramps in the rubble were rare.[36] A part of a mortar surface (floor) was found in the centre of the room.[37] The layer of mortar defined in the diaries as the "floor surface" (although uneven and dilapidated according to the notes) in this room was found 1.30 m deeper, at an elevation of ▼ 192.20 m.[38]

Annex 10 is rectangular in plan, measuring 4.18 × 2.11 m. The longer side is oriented in an east-west direction. Annex 10 was within the boundaries of walls

[25] Although this information is not mentioned in the diaries, we came to this fact using data from the technical and photo-documentation of the Institute of Archaeology, in Belgrade. The elevation of these columns is not marked in the technical documentation.

[26] AI documentation, inv. 368: Diary of archaeological excavations for 21.9.1978.

[27] AI documentation, inv. 368: Diary of archaeological excavations for 21.9.1978.

[28] The relative value of 2.1 m to the "permanent fixed point" is stated in the diary. Documentation of the Archaeological Institute, inv. 368: Diary of archaeological excavations for 28.9.1978.

[29] AI documentation, inv. 368: Diary of archaeological excavations for 29.9.1978.

[30] AI documentation, inv. 368: Diary of archaeological excavations for 28.9.1978.

[31] AI documentation, inv. 368: Diary of archaeological excavations for 28.9.1978.

[32] The relative value of 1.2 m to the "permanent fixed point" is stated in the Diary. AI documentation, inv. 368: Diary of archaeological excavations for 23.9.1978.

[33] The relative value of 1.07 m to the "permanent fixed point" is stated in the Diary. AI documentation, inv. 368: Diary of archaeological excavations for 23.9.1978.

[34] AI documentation, inv. 368: Diary of archaeological excavations for 21.9.1978, 22.9.1978 and for 29.9.1978.

[35] AI documentation, inv. 368: Diary of archaeological excavations for 21.9.1977 and for 22.9.1977.

[36] AI documentation, inv. 368: Diary of archaeological excavations for 24.9.1977.

[37] AI documentation, inv. 368: Diary of archaeological excavations for 23.9.1977.

[38] It is noted in the diary that this mortar surface was located at a depth of 1.30 m from the upper surface of the walls. AI documentation, inv. 368: Diary of archaeological excavations for 24.9.1977. This layer could not be confirmed in the recent field prospecting.

II, IV, XIV and XV. These walls also had preserved interior faces in the above-ground part (above the floor level). Within this space, at the floor level, an apse 3.36 m wide and 1.15 m deep was formed. The apse limited the space of the floor surface made from bricks of larger dimensions 60 × 60 × 8 cm (*bipedalis*).[39]

Remains of above-ground structures were registered, such as those from the wall installations or the roof covering in the area of rooms 2, 3, and 7. Ceramic spacer pins were mostly found at the beginning of the excavation on the surface near the outer walls of rooms 2, 3, and 7, while other pins were found inside rooms 2 and 7 on the level of the later phase hypocaust base, between the hypocaust piers.[40] There is no mention of findings of marble slabs, window glass fragments, frescoes, or iron wedges. There were a lot of pieces of tiles in the building debris, some of which certainly belonged to the roof covering that fell from the vaults to the outside of the building boundaries, which can be determined based on their location. Inside room 7, pieces of bricks and tiles were also found under and between the pebbles in the first excavation layer.[41] In the area of the south-eastern corner of the annex of room 7 and near its prefurnium, fragments of *tubuli* were found.[42] The faces of the foundation walls were mostly found with the remnants of the flush pointing technique originally applied on their surface.[43]

Outside the boundaries of the block complex, in the eastern part of the Roman bath, there is room 9/11. The width of the room, in an east-west direction, at its northern fully excavated wall is 7.19 m. The total length of room 9/11 is 8.6 m.

The room is divided into the northern part (space 9) and the southern part of the room (space 11) in its spatial relationship with the devastated masonry of an east-west orientation. The crown of the damaged masonry mass is located at a depth of ▼ 191.80 m, and only two rows of stone of that structure were registered.[44] The masonry mass is registered as 0.5 m shallower than the older walls of the Roman bath. Also, the mass was found in a space that was previously levelled. At the same depth, in the centre of the western half of space 9, a pebble base layer and two rows of horizontally laid bricks were discovered (one over the other).[45] About half a meter deeper, researchers found the remains of pebble dry stone walls (at elevation ▼ 191.30 m).[46]

The north wall of the new room 9 rested over the older south wall of the praefurnium of room 3.[47] This circumstance is sure proof of the termination of the function of the praefurnium of room 3 because its vault no longer had support on the side of the rebuilt wall.[48]

The southern boundary of room 9/11 is defined by a part of a wall 0.9 m thick and over 2 m long in an east-west direction. The remains of the wall slope to the south. It is noticeable that it was built entirely of pebbles covered with lime mortar. Previous researchers have not established a strong connection between the wall and the south-eastern corner of the block complex.[49]

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[39] AI documentation, inv. 368: Diary of archaeological excavations for 15.9.1977.

[40] AI documentation, inv. 368: Diary of archaeological excavations for 14.9.1977; also within squares C3 and C4 during 20.9.1977–21.9.1977.

[41] For the area of the north-eastern corner of square 4 – AI documentation, inv. 368: Diary of archaeological excavations for 16.9.1977 and 19.9.1978; For room 7 – Diary of archaeological excavations for 20.9.1978.

[42] AI documentation, inv. 368: Diary of archaeological excavations for 19.9.1978 and 20.9.1978.

[43] AI documentation, inv. 368: Diary of archaeological excavations on September 21, 1978; The faces of the walls of room 8 and inside the apse of room 7, according to the photo-documentation of the Institute of Archaeology in Belgrade.

[44] The author compared the current eastern appearance of wall IV, which was also geodetically surveyed, as well as older photographs from excavations of the eastern appearance of this wall. The date of these photographs according to the diary is known, as well as the depth of excavation for that date. The author concluded that the relative elevation 0.00 for 1979 in room 9/11 has an absolute value of 192.20 m (which is the upper level of the control profile next to the entrance between rooms 8 and 9 in 1979). Thus, the relative depth of 0.40 m corresponds to the absolute level value of 191.80 m. As a precaution, the notes also include relative depths for each recalculated value in the text, which are the only ones mentioned in the diaries of archaeological excavations.

[45] AI documentation, inv. 368: Diary of archaeological excavations for 14.9.1979.

[46] At a relative depth of 0.9 m from the ground surface according to Documentation AI, inv. 368: Diary of archaeological excavations for 24.9.1979.

[47] This circumstance was not mentioned by older researchers, but it is an obvious situation on the ground, which is also indicated on the building plans (Fig. 1 and Fig. 2).

[48] That would also explain the larger amount of rubble on that side of the prefurnium, although it should be borne in mind that it could also have originated from the collapsed upper structure of the apse.

[49] AI documentation, inv. 368: Diary of archaeological excavations for 24.9.1977.

[50] AI documentation, inv. 368: Diary of archaeological excavations for 19.9.1979.

The end of the east wall of the room to the south could not be defined – traces of mortar only hinted at its extension in that direction. The thickness of the wall is 57 cm.[50] There was a similar situation with the eastern end of the south wall XIX. During the research, a special trench was excavated in order to follow the direction of the wall. In the part where the south-eastern corner of the Roman bath was expected, only a layer of mud and sand was found, based on which older researchers concluded that it was river sediment.[51]

From the above-ground constructions in the eastern room (9/11), the finds of *tegulae mammatae*, window glass fragments, fragments of frescoes, and roof tiles should be pointed out. There was only one find of an iron wedge. Inside the room, a large amount of ash, charred wood and soot mixed with brown loose earth and lime mortar was found.[52] There is no mention of marble slabs or marble architectural elements. *Tegulae mammatae* were excavated at levels of ▼191.80 and ▼191.50 m.[53] Fragments of two *tubuli* were excavated in the same layer. A large number of fresco fragments with red paint were excavated inside space 11 at elevations of ▼192.20 and ▼191.60 m.[54] Window glass fragments were found mostly in space 11 between an elevation of ▼191.90 and ▼191.40 m.[55] Inside space 9, window glass fragments were found only in rare cases at an elevation of ▼ 191.40 m.[56]

Next to the east side of room 9/11, walls XX and XXI were found. They have a maximum width of only half a meter. Their faces are very damaged. The corner of these walls is leaning against the end of the east wall XIX of room 9/11, where, on the trace of that wall, the direction of wall XX extends. The trace of wall XXI stretches to the east, that is, to the coast of the Beli Timok River.[57] These walls, due to the nature of the connection with the east wall XIX of room 9/11, obviously belong to a later phase.

In the area southwest of the Roman bath, masonry walls of an object of an as yet unknown function were also explored in 1978.[58] Excavations of these structures have not established a direct connection with the Roman bath.[59] In addition to traces of walls, archaeologists also found channels made of fragmented bricks, two ceramic pipes, red-baked earth and pieces of floor and wall coverings.[60] These findings indicate the existence of another building. Its structures were not directly connected to the bath complex, although this fact does not exclude the possibility that the building was indirectly connected to the Roman bath in a part of the unexplored zone.[61]

Analysis of results

Room function and communication scheme of the building

Previous research tried to determine the function of each room of the Roman bath (Fig. 4a). [62] In this paper, this determination will be revised in further

[51] AI documentation, inv. 368: Diary of archaeological excavations for 27.9.1978; Diary of archaeological excavations for 21.9.1979.

[52] AI documentation, inv. 368: Diary of archaeological excavations for 13.9.1979 – 24.9.1979.

[53] The relative depths from 0.40 m to 0.70 m correspond to the values ▼191.80 and ▼191.50 according to the Diary of archaeological excavations for 14.9.1979, 18.9.1979 and 19.9.1979; I. Bjelić also found one *tegula mammata*, during a tour of the terrain on the outer side of the north-eastern corner of room 9, near the praefurnium of room 3.

[54] These elevations correspond to the relative depth of 1.30–1.40 m from the point where, according to the author of this paper, a permanent reference point was marked, and at a relative depth of 0.60 m from the soil surface of space 11; Diary of archaeological excavations for 28.9.1977 and 15.9.1979.

[55] These elevations correspond to the relative depth of 0.30 m to 0.80 m; Diary of archaeological excavations for 29.9.1977, 15.9.1979, 18.9.1979 and 21.9.1979.

[56] These elevations correspond to the relative depth of 0.80 m. AI documentation, inv. 368: Diary of archaeological excavations for 22.9.1979.

[57] There is no data on the depth of the bottom of the foundations of these walls in the Diaries of Archaeological Research.

[58] This explored area is defined within squares 1–4 outside the previously established grid system. Square 4 is positioned so that it is closest to room 7, where the north-eastern corner of square 4 rested over the junction of walls I and XVI. AI documentation, inv. 368: Diary of archaeological excavations for 7.9.1977–13.9.1977.

[59] AI documentation, inv. 368: Diary of archaeological excavations for 7.9.1977–13.9.1977.

[60] According to the technical documentation, the only two drawn ceramic pipes were two fragments that were attributed to the heating pipes, although they belong to the vault pipes. The date under which they are recorded in the technical documentation and the text is the same. Also, in the diaries, there are no statements of what sort were floor and wall coverings. – AI documentation, inv. 368: Diary of archaeological excavations for September 8, 1978.

[61] According to the author, this possibility is small, if we take into account the position of praefurnium 1, whose furnace opening would be facing these structures in that case.

[62] See the plan in: Петровић, Јовановић 1997, 24, Fig. 22. According to that plan, room 8 was a tepidarium, room 10 was a frigidarium, room 2 was a caldarium, and the apse of room 2 was a sudatorium, room 3 was a caldarium, and the apse of room 3 was a sudatorium, room 7 was a tepidarium, and its apse was a caldarium, and room 9/11 an apodyterium. Deeper reasons for this determination of the functions of the mentioned rooms are not stated. In this paper, the author gives a different interpretation based on the relevant architectural remains and the latest knowledge regarding the

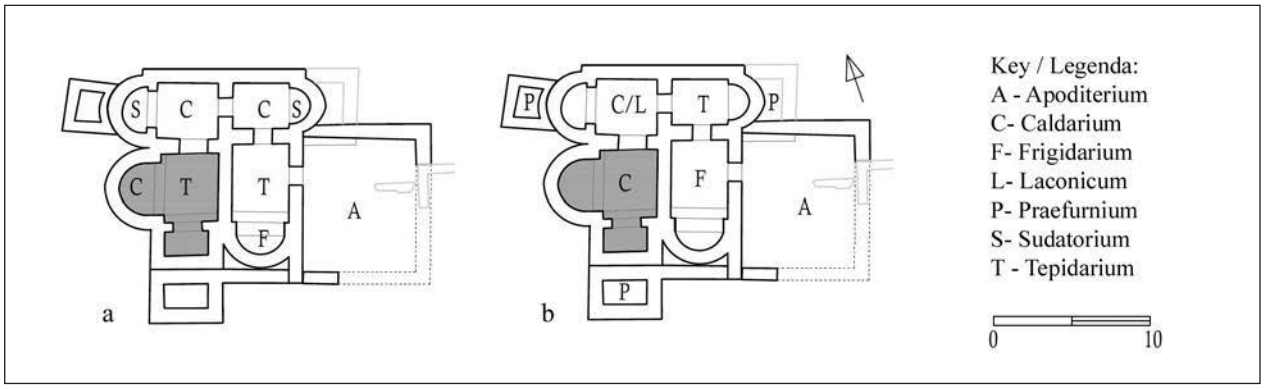

Fig. 4. Function determination for all excavated rooms in the plan of the Roman bath in Timacum Minus: a) according to the previous researchers (Петровић, Јовановић 1997, сл. 22); b) according to the solution elaborated in the paper analysis

Сл. 4. Одређење функција свих откривених просторија у плану римског купатила у Тимакум Минусу: а) према: Петровић, Јовановић 1997, сл. 22; b) према решењу изложеном у раду

text, so a different interpretation of the room functions can be suggested (Fig. 4b). As will be seen from the elaboration, the solution is only based on the final building phase of the baths, so a detailed analysis of previous building phases, successive additions, room functions and communication is needed.

The function of the rooms of the Roman bath is closely related to the communication pathways between them. The object of the bath in Timacum Minus is quite devastated – it is mostly preserved at the level of the foundations and the hypocaust, so the position of the entrances to separate rooms can only be reached by analyzing the remains of the architecture. Individual rooms had to be within boundaries of the masonry walls on all sides, due to the specific needs for heat maintenance. Due to the size of the room, the number of entrances had to be reduced to a minimum. The position of the entrances between the rooms at the level above the floor was most practically determined through the openings (i.e. channels) connecting the hypocausts of the individual rooms exposed to heating at the level under the floor.

The function of a room is directly indicated by the existence or absence of a hypocaust. Therefore, we have an insight into which of the rooms had floor-heating and wall-heating, and which did not. Unfortunately, the measures taken to prepare the baths for conservation, as well as the conservation itself, included "removal of piers and hypocaust floors built in the secondary phase of use."[63] This is why the present state of the building, after the conservation and restoration activities, does not give a true picture of the excavated hypocaust of the Roman bath in Timacum Minus. After revision of the available materials, it was noted that in the original condition of the western block, only one of the rooms was truly excluded from the heating structure. That room is located to the southeast of the west building part – room 8 with annex 10.

Previous data indicates the division of the block arrangement of the Roman bath into one "cold" room (certainly a frigidarium) and three "warm" rooms. Within the three rooms with warm bathing, each of them could have a different degree of heating. The generally accepted terminology indicates that the caldarium with alveus (or multiple alvei) was intended for hot bathing, while the tepidarium was dedicated to warm bathing.[64] Both rooms had floor-heating. The caldarium was directly exposed to the furnace, while the tepidarium had to be further away from the direct

use of small Roman baths in the Roman provinces, in territorially and chronologically close analogies. The way of bathing directly influenced the communication of the users inside the Roman bath.

[63] The report on archaeological excavations in Ravna for 1978.

[64] On certain dilemmas about the terminology of individual rooms following the degree of heating, see: Maréchal 2012, 146.

[65] Such spatial arrangements of the caldarium were common in Roman baths throughout the empire. Almost a century ago, Krenker pointed out the typological features of the caldarium arrangement in the plan. Krencker et al. 1929, 329, Fig. 329.

source of heating. Through the openings (channels) under the floor, the hypocaust of the tepidarium could be connected to the hypocaust of the caldarium. In this way, the floor of the tepidarium was indirectly heated. At the Roman bath in Timacum Minus, furnaces were registered next to all three warm rooms, which make the identification of caldarium and tepidarium rooms difficult.

When determining the precise position of the caldarium, the remains of the destroyed walls at the base of room 7 are of particular importance. Many Roman baths that were discovered in the Roman Empire have at least one room with a layout identical to room 7 in Timacum Minus.[65] This plan, in most examples in the region of Moesia Superior and its immediate surroundings, is characterised by a central space of a rectangular plan

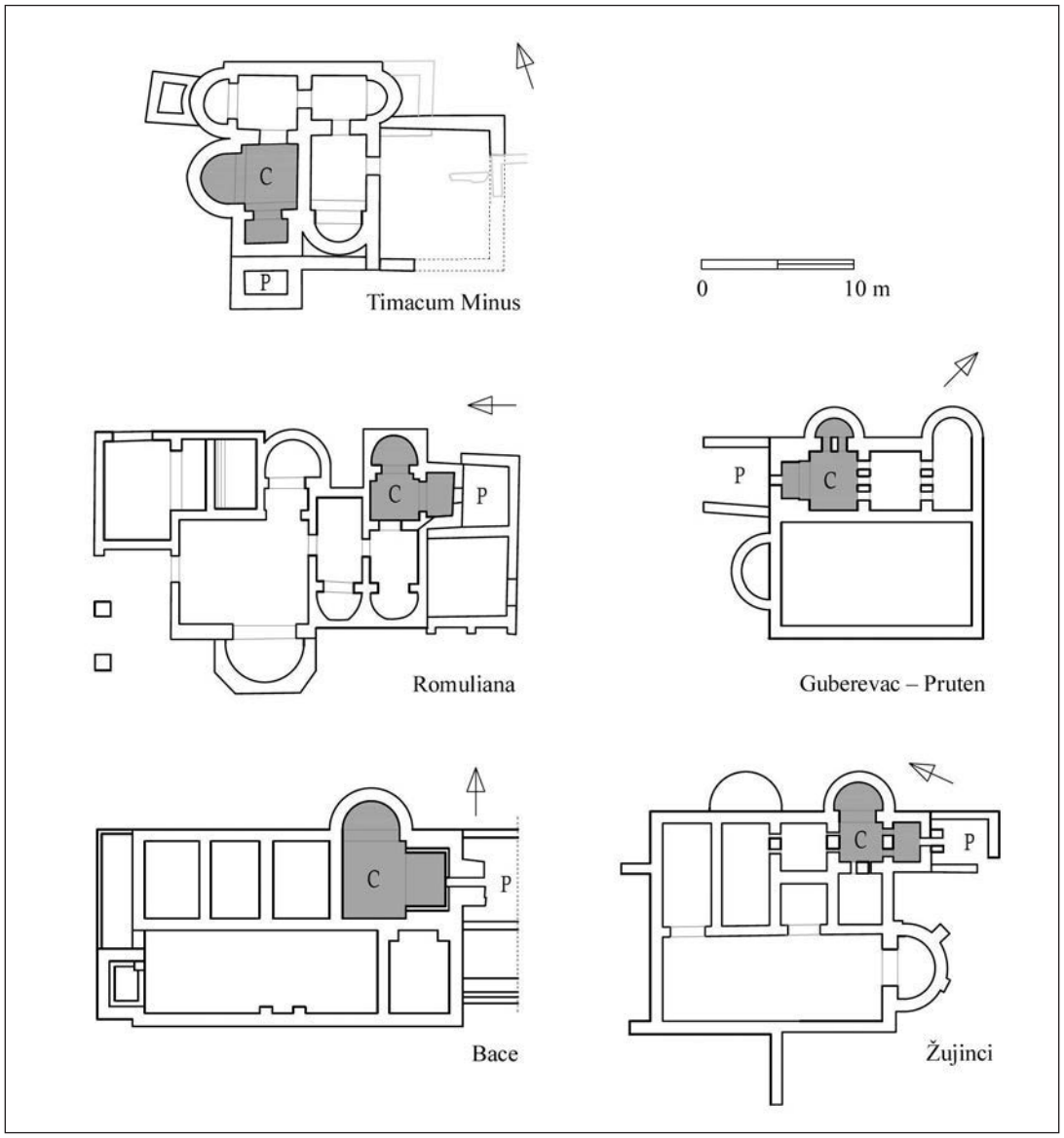

Fig. 5. Examples of the position and shape of the caldarium room in the plans of the Roman baths in the region of Moesia Superior: The room of the caldarium is marked with a grey tone and with the letter C, the position of the prefurnium is marked with the letter P

Сл. 5. Примери положаја и облика просторије калдаријума у основама римских купатила на тлу Мезије Супериор: сивим тоном и словом С означена је просторија калдаријума, а словом Р означен је положај префурнијума

which has a semicircular apse on one side and a rectangular annex on the other (Fig. 5).[66] At the same time, the furnace (*praefurnium)* is leaning on a rectangular annex. In these examples, the walls of the annex lean against the parallel walls of the praefurnium or the common wall between the annex and the praefurnium is of a greater thickness. It was necessary to make the masonry walls of the annex and praefurnium doubled or to increase the thickness of these walls at their junction because they were exposed to extremely high temperatures that could cause cracks in the wall mass due to constant heating and cooling. With these interventions, above the praefurnium, there could be special installations (boilers) for heating the water that flowed out into the alveus of the caldarium.[67] Inside the rectangular annex of the room was a tub that was directly heated. Inside the semicircular apse of room 7, another tub could be registered. In older examples of Roman architecture, a labrum could often be found here instead of a tub.[68] In addition to the fact that no traces of a labrum have been found, the position of wall XVI primarily leads to the conclusion of the existence of a space partially separated from the remains of room 7.[69] The thickness of the wall foundation of 60 cm indicates that it could only be a support for the low wall of the front side of the tub, which separated the semicircular apse of the pool from the rest of the room. The caldarium, together with the accompanying praefurnium, was obviously part of the original spatial concept of the balneum, as one of the basic rooms of the Roman bath.

The spatial relationship between the caldarium and the frigidarium in the reduced spatial arrangement of the block-type in Timacum Minus caused a problem regarding the practical functioning of these rooms.[70] In such a solution, the frigidarium and the caldarium are placed practically next to each other. The inner faces of walls II, IV, XIV and XV were found inside the frigidarium, which leads to the conclusion that the floor of the pool in the frigidarium was initially on a lower level in relation to the floor of the rest of the frigidarium, as were the tubs in the warm rooms. Such a spatial solution resulted in the heating of the caldarium to have unfavourable effects on the cold pool in the frigidarium, by heating it. At the same time, a larger amount of cold water inside the frigidarium would slow down the heating of the adjacent alveus of the caldarium and increases the consumption of energy (fuel) for heating (Fig. 6a). The initially established unfavourable solution for heating the balneum caused subsequent construction interventions, which would have had to improve the original condition. Certainly, in the second phase of the use of the baths, the inner space of the frigidarium pool was filled, that is, the space between the mentioned walls (Fig. 6b). On the filled mass of the former swimming pool, a semicircular apse was then built (by building wall XIII), within which a new swimming pool was formed. By this action, the floor level of the new pool was raised. The new pool was separated from the rest of the frigidarium by a low wall, built using 24 cm long bricks. On both sides of this wall, a floor of larger bricks, (bipedalis) 60 cm wide, was found. Inside the apse, the floor of the bipedalis extends to the semicircular wall of the pool, which indicates that this level is certainly simultaneous with the construction of the semicircular apse of the frigidarium. By filling the space of the previous pool and forming a masonry platform for the new pool, the level of its floor was raised above the level of the hypocaust in room 7.

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[66] Although this room very often appears within balneae in the region of Moesia Superior, as well as in its surrounding region, it is mostly treated as any space in a series of caldaria or tepidaria. This problem is also indicated by Kuzmanović-Novović et al. 2019, 30. There are several examples where rooms similar to room 7 in the Roman bath at Timacum Minus have been registered: in Čačak and at the site of Mansio Idimum (in both previous balneae the caldarium position was correctly identified according to: Јеремић, Гојгић 2012, Fig. 7 and Vasić-Milošević 2000, Fig. 13). At the balneum in Žujinci, it is located in the south-eastern corner – Томовић et al., 2005, 322. At the balneum at Mediana in the south-western corner – Петровић 1994, Fig. 16. At the Guberevac site – Pruten is in the eastern corner – Величковић 1958, Fig. 3. In Bace it is in the north-eastern corner – Jordović 1999, Fig. 1. In Romuliana it is at the southern end – Medić, Stojković-Pavelka 2010, Fig. 43 (in the Figure the north-mark is wrong). The position and constructive arrangement, which refers to the caldarium, is the subject of a special work by I. Bjelić, since this topic with all analogies from Moesia Superior and the surrounding area requires a longer explanation – Bjelić 2020, in press.

[67] An illustrative example of such installations above the praefurnium was given by Bouet, based on field findings. Bouet 2003, 192.

[68] Labra are usually large in diameter, about 2 m. They appeared in caldaria from the 1st century to the end of the first half of the 2nd century AD. Starting from this period, there are significantly more common solutions where there is one pool in the caldaria within each annex or apse. Biernacki, Klenina 2015, 53.

[69] Construction of this type has already been noted according to Krencker et al. 1929, 194, Abb. 257.

[70] It should be pointed out that even with more elaborated plans of Roman baths, there were cases where the frigidaria were positioned directly next to the caldarium. One example is in Histria in today's Romania (Suceveanu 1982, Figs. 35, 38 and 46).

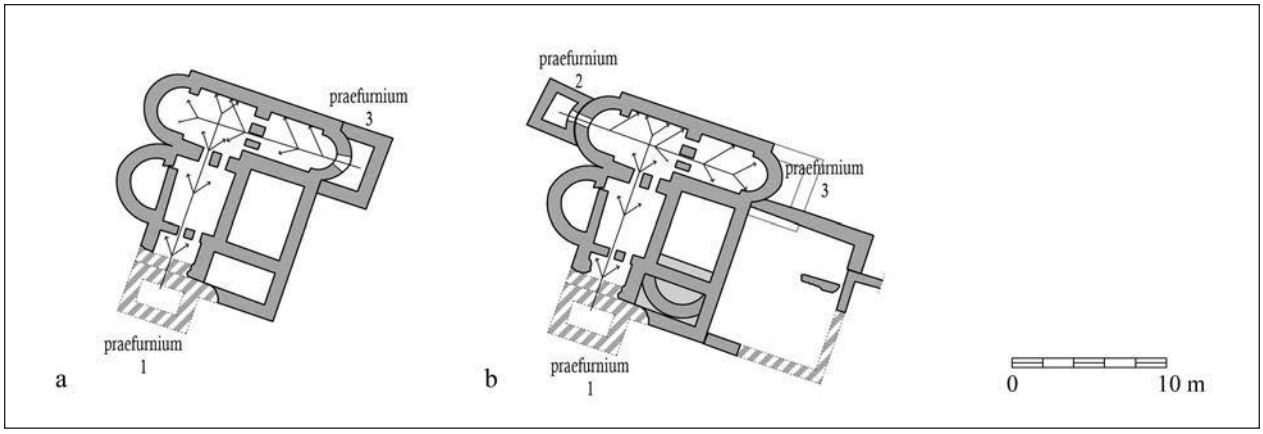

Fig. 6. Functioning of the hypocaust system: a) the first phase, before the addition of the apodyterium, with the indicated spread of hot air from prefurnium 1 and 3; b) the second phase, after the addition of the apodyterium, with the indicated spread of hot air from prefurnium 1 and 2

Сл. 6. Функционисање система хипокауста: а) прва фаза, пре доградње аподитеријума, са назначеним простирањем топлог ваздуха из префурнијума 1 и 3; b) друга фаза, након доградње аподитеријума, са назначеним простирањем топлог ваздуха из префурнијума 1 и 2

This improved the thermal insulation of the frigidarium space from the closeness of the caldarium.

The fact that room 7 was defined as a caldarium suggests that above the floor level there could have been no direct communication between it and room 8 (the frigidarium) because the connection between the two rooms would suppress their opposite functions of hot and cold bathing.[71] Communication between the caldarium (room 7) and the frigidarium (room 8) therefore had to take place through rooms 2 and 3, which would serve to adapt the human body to the gradual changes in temperature and humidity (Fig. 7).[72]

At this point, it is important to consider the reasons for the establishment of three furnaces (prefurnii) for the small block arrangement of the Roman baths in Timacum Minus. The existence of three furnaces 1, 2 and 3 is caused by the spatial relationship between rooms 2, 3, and 7. The block arrangement with the division of internal space by transverse and longitudinal walls imposed a solution where heated rooms are arranged in the form of the Latin letter L. Hot air from a praefurnium at one end of the L-shaped form would certainly not be heated up enough under the room at the other end of this form. Therefore, it is important to consider the heating of the floors of rooms 2, 3 and 7 by the functioning of praefurnium 1. Previously, it was indicated that room 7, a caldarium, was planned at the very beginning of the construction of the balneum, as well as praefurnium 1. Hot air from praefurnium 1 could move directly through the hypocaust system to the north wall of room 2. In this way, the floors of rooms 2 and 7 could certainly be heated by hot air from praefurnium 1. However, heating room 3 from the direction of praefurnium 1 would not be practically possible. Since room 3 was initially planned as a heated space, as indicated by the remains of an older hypocaust, it was necessary to provide it a better, direct way of heating. This initial problem of heating room 3 was certainly solved by the simultaneous construction of praefurnium 3 in the first phase of the use of the baths (Fig. 6a).

Room 2 and room 3 had their separate furnaces, which could heat rooms 2 and 3 equally strongly, as praefurnium 1 heated room 7. This could be a circumstance that relativizes the statement regarding the adaptation of the user's body to increasing temperatures

[71] During the reconstruction of communications in a similar case at a Roman bath in Romania, a different approach was noted. In Histria, where the frigidarium is also next to the caldarium, a solution with direct communication between these two rooms was applied, although it would make it impossible to maintain the desired temperature in each of them. During the excavations of this object, it was registered that the wall separating the two rooms was preserved at a level below the floor level – Suceveanu 1982, Fig. 46.

[72] Kuzmanović-Novović et al. 2019, 30.

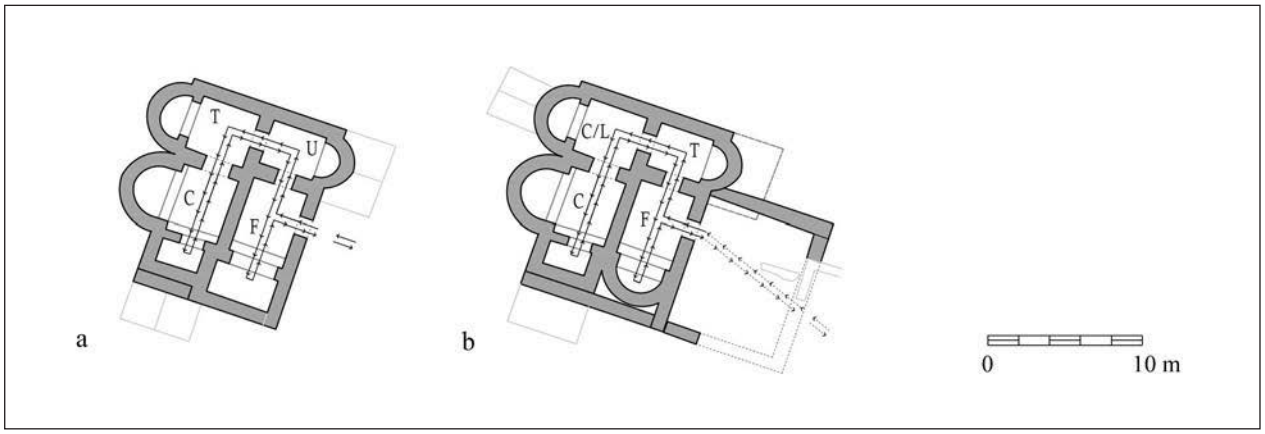

Fig. 7. Reconstruction of the plan of the building at the level above the floor:
a) the first phase, before the addition of the apodyterium; b) the second phase, after the addition of the apodyterium

Сл. 7. Реконструкција плана грађевине на нивоу изнад подне равни:
а) прва фаза, пре доградње аподитеријума; b) друга фаза, након доградње аподитеријума

on the way from the frigidarium to the caldarium. However, there are some differences in the construction concept between these prefurnii. The praefurnium of room 3 is built in the same way as praefurnium 1 – across the full width of the heated room, with walls of equal thickness. In contrast, the width of praefurnium 2 is noticeably smaller than the width of the room it heats. Also, praefurnium 2 has slightly thinner walls than the previous two, as well as the front wall with which its construction is separated by the semicircular apse wall. In this way, praefurnium 2 was built as a separate construction in relation to the corresponding apse of room 2, which is not the case with praefurnium 3. Judging by the equal width of praefurnium 3 and the room it heated, they are part of a unique spatial design concept. According to the above, prefurnii 2 and 3 cannot be simultaneous. Judging by the similarity of the constructions, praefurnium 1 and praefurnium 3 would be simultaneous (Fig. 6a), while praefurnium 2 would be a later construction (Fig. 6b).

Some other circumstances indicate the later construction of praefurnium 2. Namely, in the second phase (phase II) of the use of the building, the original block arrangement of the balneum was expanded to the east with the addition of room 9/11. By building the north wall of this room over the south wall of praefurnium 3, this furnace stopped functioning, because there was no more space to support its barrel vault.[73] With these activities, room 3, which was heated by praefurnium 3, was left without a direct supply of hot air in the new solution. At the same time, the new interventions were certainly the reason for the construction of praefurnium 2 at the opposite, western end, different in width and span from the previous ones (Fig. 6b). The new position for the praefurnium was chosen next to a semicircular apse that had not been exposed to direct heating until then. Praefurnium 2 enabled the direct heating of room 2 and indirect heating of rooms 3 and 7. In such a concept of heating, room 7 was the warmest one, room 2 somewhat less so, while room 3 was the least heated among the warm rooms.

The function of rooms 2 and 3 can be determined only in the context of considering the communication of users from the frigidarium to the caldarium. In the first phase, room 3 with the associated praefurnium 3 was closer to the entrance and certainly had a specific function (Fig. 7a). Certainly, room 2 could have served as a tepidarium because it was equidistant from praefurnium 1 and 3. Since the position of the caldarium was precisely determined in room 7, determining room 3 as another caldarium with a tepidarium between the previous two rooms would not make sense. There is, however, a strong possibility that room 3

[73] The purpose of a praefurnium is to perform a protective structure, which is resistant to fire (from the fire itself) and water (from the atmosphere). Such a construction is primarily a masonry vault.

had the function of a specially heated warm room in which the user was anointed with oils. This possibility would be corroborated by the fact that Romans had the custom of undergoing oiling before bathing.[74] However, this thesis does not change the fact that rooms 3 and 7 were the warmest in the first phase of the use of the bath. This arrangement of room functions also had a practical drawback in the first phase, because the user could not adjust the body to the increasing temperature values on the way to the caldarium (room 7). Certainly, this circumstance caused the termination of praefurnium 3 and the construction of the north wall of room 8 on the route of the south wall of the previous, although there was space to avoid such a solution.

When the use of praefurnium 3 was terminated in the second phase of the use of the bath, the hot air in the hypocaust of room 3 could only come indirectly, i.e. from the direction of praefurnium 2. Therefore, room 3 in this phase certainly acquired the role of a tepidarium (Fig. 7b). Since praefurnium 2 began to function directly next to room 2, it could have become another caldarium.[75] Some rooms on the way from the tepidarium to the caldarium were often, by earlier researchers of Roman baths, interpreted as sudatoria – rooms for sweating, which in our case could also apply to room 2.[76] By spilling water on the heated floor of this room, steam rose, which stimulated the sweating of the users and allowed them to get used to the atmosphere rich in vapour in the caldarium.

In the second phase of the use of the bath, after a series of the above-mentioned improvements, the bath in Timacum Minus functioned better than in the first one. The entrance to the block system was established on the east wall of room 8/10, that is, the frigidarium, which at that stage was directly connected to the apodyterium. The position of entrances in most examples of Roman baths is in close relation to the frigidarium. After conversations with some colleagues, the author concluded that there is slight confusion about the location of the entrance in Roman baths. The cause of this is the well-known Pliny's statement, where it is said that after bathing in hot water, bathing terminated with a cold plunge in a frigidarium. If we rely only on that statement, it would be logical to expect that the entrance was placed next to the caldarium room. Excavated examples of Roman baths largely relativize this thesis and indicate that the entrance was located on the opposite side and that the frigidarium was usually closer to or directly leaning on the entrance.[77]

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[74] Yegül 1992, 33.

[75] Two rooms of caldarium were found in Neptune's small baths in Ostia, Velleila, and Philadelphia; Yegül 1992, Figs. 74, 81 and 278. Two rooms of the tepidarium were found in small baths in Derventum, Leptis Magni, Timgad; Yegül 1992, Figs. 77, 279, and 281. Two rooms of indeterminate function with hypocaust constructions that were on the route from the frigidarium to the caldarium were found in small baths in Mirabriga, Cherchel, Volubilis, Humei-Tepe baths in Millet, Constantine's bathroom in Arles, Quasr-al-Hayr: Yegül 1992, Figs. 88, 272, 275, 307, 411 and 427. Several examples with two rooms each between the frigidarium and the caldarium were discovered in Germany. See Krencker et al. 1929, 236.

[76] The Sudatorium (Laconicum) was located at the direction from the tepidarium to the caldarium at Cimiez, the Virgilius baths at Millet, and the Agora baths at Side: Yegül 1992, Figs. 79, 301 and 383.

In science, there is still a vague differentiation between sudatorium and laconicum. According to Vitruvius, the laconicum was intended for sweating inside a dry heated atmosphere, while the sudatorium was used for sweating inside a humid heated atmosphere. Seneca cited the sudatorium in the service of sweating inside a dry heated atmosphere. Apparently, the use of the two terms was fairly free (according to Yegül 1992, 384). According to Vitruvius, every decent Roman bathroom had to have a laconicum, and it was positioned next to the tepidarium (Yegül 1992, 386–389).

[77] The relationship between the frigidarium to the apodyterium and the warm rooms in the region of Moesia Superior is also indicated by Kuzmanović-Novović et al. 2019, 30.

In one Roman bath, the organization of the rooms was usually done so that the caldarium was normally at the opposite end to the position of the entrance. In that way, the entrance was connected to the frigidarium, which provided ventilation and constant cooling of the frigidarium with the outer door. At the same time, the caldarium furnaces (i.e. its praefurnii) were remote from the entrance, which ensured that there was no close contact between the user and the caldarium furnace. Such an organization is represented regardless of the size of the Roman baths throughout the empire. Even in large baths where there was more space to bypass the frigidarium, the communication was resolved so that the frigidarium with the associated pools (tubs) was closer to the entrance than the warmer rooms. For examples in the western provinces see plans at: Yegül 1992, Figs. 74, 76, 77, 79, 82–84, 87–89, 91, 93, 94, 97, 98, 408 and 411. For the examples in north. Africa sees plans at Yegül 1992, Figs. 212, 217, 220, 226, 228, 243, 244, 249, 250, 265, 272, 274, 276, 278–282 and 288. For the examples in Asia Minor see: Yegül 1992, Figs. 300, 307, 336, 341, 343, 344, 346, 350, 351, 355, 359, 360, 383, 384, 401, 403 and 404. For the examples in the eastern provinces see: Yegül 1992, Figs. 414, 416 and 423–427.

The same organization can be seen at the imperial baths in Rome itself, such as Trajan's, Caracalla's, Diocletian's, Maximian's and Constantine's baths, but also outside Rome at the imperial baths of Hadrian's villa in Tivoli, at Villa Piazza Armerina, at the baths in Trier and Licinius in Duga. For examples of imperial baths see Yegül 1992, Figs. 97, 99, 101, 104, 181, 190, 191, 212, 217, 220 and 231.

All the examples have certainly not been given here, but only the more well-known ones, in order to understand the extent of such a solution of communication in Roman baths, as well as the order of certain bathing methods and other activities in maintaining hygiene.

The user moved from the entrance through rooms 2 and 3, adjusting the body to a higher temperature.[78] Therefore, from space 8 it was necessary to enter room 3, with a lower temperature, and from there to the warmer room 2, followed by the use of the hottest room 7 (caldarium). After bathing in the hot water of the caldarium, the user came to the frigidarium on the way back through rooms 2 and 3. In that way, the user adjusted the body again, but this time to a lower temperature. In the frigidarium, the bathing terminated with a cold plunge at the very end of the use of the Roman bath.[79]

Communication within the bath of a reduced block-type is precisely reduced to the direction from the apodyterium through the frigidarium and warm rooms to the hot caldarium. After bathing in hot water, the user would have to go through all the above rooms again in reverse order (Fig. 5b).[80] This kind of movement was valid with the reduced type of small baths arrangement, regardless of whether their rooms were arranged in a row, with a central layout or in a block-arrangement. The difference in communication between the rooms in a row arrangement and the block layout is that the direction of movement in the first solution is set along one line, while in the block-type the communication is performed via a detour.[81] When setting rooms in a row, it is always possible to add an antechamber (apodyterium or palaestra) next to the peripheral walls of the rooms, which would practically play the role of a communication corridor, in case the user wants to skip the use of one of the bath's rooms.[82] Subsequent additions of this type are practically impossible with the block type of room layout.[83]

In the eastern room, as already mentioned, there was no heating installation, but the fragments of frescoes, glass, a large amount of burnt wood and fragments of a roof covering were found. This room certainly served as an apodyterium – which in the modern sense of using the baths can mean a space for changing, storing clothes and cosmetics, as well as a place for storing sports equipment.[84] The apodyterium spaces were often equipped with benches and wooden chests or cabinets for storing things. Larger quantities of burnt wood can be interpreted as remnants of the wooden roof structure, wooden furniture inside the space, but they can also represent the remains of the wooden construction of the walls. The registered remains of the walls of this room are preserved only at the foundation level. A wooden structure on the above-ground level could have been supported on masonry foundations. The remains of a window (fragments of flat glass) indicate that the room was lit from the outside.

When it comes to walls XX and XXI and the space to which the walls belonged, the question of the function of this space must remain open until archaeologists systematically excavate the entire part of the space towards the Beli Timok River.[85]

Regarding the dating of the construction of the small bath in Timacum Minus, from the point of view of architectural remains, bricks with the stamp of *cohort II Aureliae Dardanorum* are indicative. Along the western wall of praefurnium 2, on the inside, a fragmented brick with the stamp *Coh II* was cleaned (Inv. 282). There are no brick stamps among the construction remains of the small bath, which would testify to

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Referring to the accuracy of Pliny's statements regarding the functioning of Roman baths, Yegül pointed out other problems such as the origin of the hypocaust system. Although Pliny claims in his letters that they were founded by a certain Sergius Oratus in the 1st century, Yegül pointed to the fact that archaeological excavations of Roman baths indicated that the invention of the hypocaust was much older. Yegül 1992, 38, 130; Nielsen 1992, 153, Fig. 1; Campbell 2009, 53.

78 It was determined by Yegül 1992 and Fagan that the user had to go through warm rooms to get to the hot water bathing (that is, to the caldarium) precisely because of the adjustment of the body. Fagan 2005, 10; Yegül 1992, 33; Campbell 2009, 53.

79 This pattern of movement was observed almost a century ago by Krencker et al. 1929, 234 b, c, d. It is globally accepted by Yegül 1992a (Yegül 1992, 130–132) and Nielsen (Nielsen 1992, Fig. 1), and in our environment in Romania (Tentea, Burkhardt 2017, 5) and Bulgaria (Petrova 2012, 319, Fig. 26). In our country, this thesis is more common in recent times (Kuzmanović-Novović et al. 2019, 30). We have already pointed out in note 62 that in the example of defining the functions of the rooms in the Roman bath in Timacum Minus by previous researchers, a different way of bathing was considered (Петровић, Јовановић 1997, 24, fig. 22). The deeper reasons for this approach remain unknown.

80 See types of Roman baths at: Krencker et al. 1929, 177–181, Abb. 234 a, b. This typology is accepted by Yegül, Nielsen, and in our environment by Tente and Burkhardt: Yegül 1992, 130–132; Nielsen 1992, Fig. 1; Tentea, Burkhardt 2017, 5.

81 Krencker et al. 1929, 177–181, Abb. 234 a, b, c, d, e.

82 Krencker et al. 1929, 177–181, Abb. 234 a, c, d.

83 Krencker et al. 1929, 177–181, Abb. 234 b, e.

84 Yegül 1992, 34.

85 The rather small thickness of these walls may indicate the existence of a vestibule or a palaestra – a space for physical activity, surrounded by a lighter wall construction. Its position in front of the apodyterium would be similar to numerous plan solutions of Roman baths: Yegül 1992, 37. Since there has been no complete excavation of the terrain towards the Timok River, this possibility remains only an assumption.

the presence of some other military formations.[86] The bricks with the mentioned stamp are one of the important findings that indicate the engagement of the army in the construction of this Roman bath at the end of 2nd century, or during the 3rd century AD. This dating is also in line with the archaeological material. Based on movable archaeological finds from the balneum in Timacum Minus, this building can be dated to the 3rd century, with the possibility that it was erected at the end of the 2nd century and abandoned in the 4th century.[87]

The balneum near the Timacum Minus castrum is so far the only building in this settlement which reliably served as a bath. However, one of the questions is whether it is a bath that is open, i.e. public, or closed, intended for private use? In that sense, modern analyses of the spatial relationship between individual rooms that influence the social behaviour of users are important.

Analysis of the relationship between indoor spaces and the social activities of users in the balneum

With the help of the Analytical Theory of Architecture we seek to understand architecture as a phenomenon, that is, as an organized system, which implies a quantitative representation of qualitative values in architecture.[88] At the same time, the qualitative value of architecture emphasises its influence on social behaviour.[89] One of the methods used by the analytical theory of architecture is the use of spatial syntax and visibility graph (VGA) analysis. Syntax in this case is established as a set of structures based on the relationships and rules of behaviour imposed by a space and it is composed of elementary combinations, elementary objects, relationships, and observations.[90]

For the analysis of spatial syntax and the influence of a space on social processes within the built environment, there have been, for some time, special software platforms, among which the DepthMapX-software platform should be highlighted in this case.[91] The software goal is to obtain variables that indicate the social significance of the space, in this case, the interior of a Roman bath. The use of the DepthMapX-software platform involves the application of groups of operations that consider the relationship between individual spaces, angles, obstacles, individual distances, and the maximum and minimum values in the field of action. The human eye can consider a particular position concerning the rest of the space in which the user operates. The quality of the DepthMapX-software platform is that it observes comprehensively the relationship of all points to the rest of the space, and marks out regions in which there is more or less pronounced social behaviour of users (e.g. communication axes, different regions in which visual communication is expressed and those in which communication is direct, that is, physical). Among the basic values that indicate the type of impact a space has on social action, there are the *isovist area*, *connectivity, visual integration,* and *the mean shortest path*.[92] The analyzed space is divided into several fields (points) over a square grid, respecting the given marked positions of communications (entrances and empty spaces of rooms) and obstacles (walls). Each of the values is measured by the number of influences of individual points to the rest of the space.

An *isovist* is a geometrically limited part of a space, which is directly visible from one position with respect to the obstacles and communications. Through the category of *isovist*, areas of vision (isovist areas) are defined in which it is possible to achieve several different views.[93]

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[86] In earlier archaeological considerations, it was assumed that in addition to the cohort, some part of the legion IIII Flavia was present, based on the fact that in 1977 a small fragment of brick with "four vertical lines" was found. In none of the campaigns that followed, bricks with the seal of the legion IV Flavia were found. However, it should be noted that two bricks with the seal of this legion were discovered in a circular monumental building, located in a settlement north of the imperial palace in nearby Gamzigrad, and dated to the last quarter of the 3rd century (terminus ante quem is Diocletian's administrative reform in 294), which testifies to the engagement of some parts of the legion of IV Flavia in the area of today's eastern Serbia. This information was pointed out by PhD Sofija Petković, whom the author kindly thanks. According to the author, the "four lines" by themselves are not sufficiently reliable data that would indicate the engagement of the second legion, because such lines could be freely derived shapes created by fingerprints on the surface of bricks.

[87] The dating is based on chronologically indicative findings, and not on the entire discovered archaeological material, and should be understood as a preliminary dating. This information was pointed out by PhD Sofija Petković, whom the author kindly thanks. Also, according to previous knowledge, the civil settlement of Timacum Minus, outside the castrum walls, existed from the middle of the 2nd to the last quarter of the 4th century – Petković, Ilijić 2012.

[88] Hillier 2007, 40–41.

[89] Turner 2002, 487.

[90] Turner et al. 2001, 104.

[91] Al Sayed 2014, 30.

[92] Varoudis 2014, 298.

[93] Benedict 1979, 47.

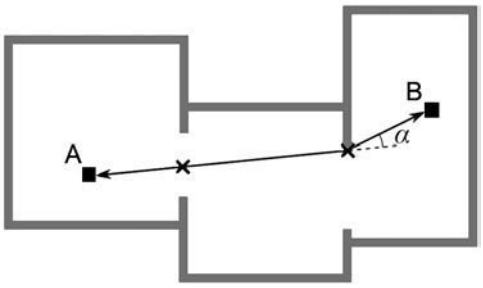

Fig. 8. Visual Mean Shortest Path between points A and B defined by a black solid line (according to Behbahani et al. 2017, Fig. 1)

Сл. 8. Визуелно главна најкраћа путања (Visual Mean Shortest Path) између тачака A и B, одређена црном пуном линијом (према: Behbahani et al. 2017, Fig. 1)

Connectivity represents the number of direct connections that individual points in space have with each other. This value directly indicates the availability of information that the user receives when moving from one space to another. Less information implies a slower user movement when he moves to the next part of the space because he has to visually look for new information before moving again to the target room. In this case, the amount of information that the user will receive in the next radius of action is limited. Within the circular plans of a space (for example semicircular apses), there is less loss of information concerning other parts of the room, while when moving from one rectangular shape to another there is more loss of information, due to the visual obstruction of certain parts of the space (e.g. corners).

Visual integration determines how well the spaces are visually interconnected.[94]

Visual Mean Shortest Path (Fig. 8) is defined by the ratio of the number of steps that one needs to cover the entire space to achieve visual accessibility of each location with respect to other spaces in the building. Visual Mean Shortest Path is directly proportional to the number of changes (i.e. the number of combinations) of directions of action (e.g. movements), and the steps are proportional to the depth of view.[95]

The described categories were tested through the DepthmapX software in the case of actions within the bath space in Timacum Minus (Figs. 9 and 10, Table 1). In doing so, two phases of the use of the building were considered: before the addition of the apodyterium and praefurnium 2 (phase I) and after (phase II). The detour movement of users in the older phase I was considered, together with the improvement of the specific social interrelationship among the users of the bath achieved by adding a larger room in the eastern part of the building in phase II.

In the first phase, the most important spaces in terms of connectivity were rooms 2 and 3 (Fig. 9). The directness of the DepthMapX software platform is already obvious in this step, as small values are read in the obstruct corners in terms of *connectivity* values. Due to the small difference in the traces of the walls between rooms 2 and 7 and between rooms 3 and 8/10, better *visual integration* occurs in room 2 than in room 3, although in both rooms it is significantly better than in the starting room room 8/10 and ending room 7. The low values of this category show that the last two rooms were poorly visually connected with the rest of the bath surface, which affected greater privacy in these rooms. Also, the possibility of a longer stay of individual users in the solitude of the bath is certainly greater. From a position where the values of *visual integration* are very high, the user is in a better position to see the space and further communicate in it. At the same time, these positions are attractive to other users, as a result of which they have the greatest opportunity to meet. Very low values for the *Visual Mean Shortest Path* were found in rooms 2 and 3, which indicate the unfavourable impact of such a space on direct communication.

After the addition of the eastern room 9/11, in phase II, the communication becomes more complex (Fig. 10). The size of this room means that the highest *connectivity* value is achieved at the entrance between it and the next room, while on the way to the caldarium this value loses its significance in respect to the extended part. The size of room 9/11 also means that *connectivity* within it has much higher values than in any other room of the older western part.

The *Visual Integration* value of phase II indicates that a strong communication route is formed in the direction from the southern doorpost between rooms 9/11 and room 8/10 to the northern doorpost between

[94] Rohloff et al. 2009, Ref. 094: 03–05

[95] Varoudis 2014, 298; Turner 2003, 663.

Fig. 9. Graph of Connectivity, Visual Integration, and Visual Mean Shortest Path of the first phase of the Roman bath in Timacum Minus

Сл. 9. Графикон повезаности, визуелне интеграције и визуелно главне најкраће путање за прву фазу римског купатила у Тимакум Минусу

Fig. 10. Graph of Connectivity, Visual Integration, and Visual Mean Shortest Path of the second phase of the Roman bath in Timacum Minus

Сл. 10. Графикон повезаности, визуелне интеграције и визуелно главне најкраће путање за другу фазу римског купатила у Тимакум Минусу

Scenario		*Node Count*	*Isovist areas*	*Connectivity*	*Visual integration*	*Visual Mean Shortes Path*
Phase I	Min	8709	38723	385	5.69243	0.177216
	Aver.		304402	3041.31	12.7979	0.642961
	Max		476249	4655	21.2936	1.852
Phase II	Min	15103	38723	385	4.89504	0.264558
	Aver.		499210	4989.83	11.1056	0.70025
	Max		820569	8207	20.1978	2.33818

Table 1. Overview of DepthMapX values of space impacts on social behaviour

Табела 1. Преглед DepthMapX вредности утицаја простора на друштвено деловање

rooms 2 and 3. Reducing the communication to this route indicates that the *visual integration*, that is, the visibility between the individual spaces in this phase is much smaller than the previous one, which can be seen through the values given in Table 1. This route is also the direction in which the low values of the *Visual Mean Shortest Path* are distributed because along it a shorter movement time is needed to achieve visual communication with the rest of the space. At the same time, the privacy in the caldarium (room 7) is much higher in phase II than before.

The quantitative values of this analysis indicate that the internal space of the bath became less visually connected with the extension of the bath by room 9/11. The block arrangement previously dictated the privacy of its users, but with the eastern addition on the building, the privacy in the block part only became more increased. The only part of the bath that could

have served the greater socialization of its users, in general, is room 9/11, which explains the higher degree of decoration (the presence of frescoes and glazed windows). Many authors have pointed out the greater degree of decorative elements in apodyteria in smaller Roman baths.[96] In this respect, the results of the analysis fit with the identification of the apodyterium at that position in the bath.

All qualitative data expressed here from the quantitative analyses of the DepthMapX software platform affect the conclusion that the integration of individual spaces in the block arrangement was very low. As a result, the degree of user socialization in the Roman bath in Timacum Minus had to be very small.

Classification of the Roman bath in Timcum Minus, analogies and the origin of the architectural concept

The ancient Roman bath on the left bank of the Beli Timok River, northeast of the Timacum Minus fortress, with its area of 240 m², belongs to the Roman baths of smaller dimensions. According to the widely accepted terminology, it could be primarily defined as a balneum[97].

Previous computer analyses indicate that the interior arrangement of this building did not significantly contribute to the social relationships, which is characteristic of *thermae*. Architectural and archaeological remains indicate that this building was not characterised by pronounced luxury, but, following its proportions, was more modestly equipped. Other details observed at this facility also correspond to the characteristics of a balneum. Based on all the above-mentioned, a balneum such as ours at Timacum Minus is characterised by the characteristics of military balneae and the context in which they were erected. According to Campbell's assessment, balneae were rarely erected inside the castrum walls, because due to the constant need for pronounced thermal changes inside these buildings, there was a danger of fire and its spread to the interior of the camp.[98] This is why Roman baths of this type were more often near the castrum. The process of bathing in military balneae was mostly reduced to maintaining hygiene: oiling, sweating, and washing in cold and hot pools.

It was a different case with the legionary baths that were part of larger fortifications. The number of facilities, the large rooms, and the luxury of the legionary military baths were similar to those in the city's civilian baths in Italy, which directly affected the different social connections of their users.[99] In large baths, the bathing process, in addition to the activities already described, included maintaining physical condition and maintenance in the gym, swimming in larger pools, sunbathing in solariums, exposure to dry and wet sweating, education and refreshments of food and drink, which led to many meetings of their users and better social cohesion.[100]

Smaller in size and with a restricted number of activities, the military balneae of the castra were characterised by less pronounced social connections among their users. This was exactly the case with our example, as previous analyses of the influence of the spatial organisation on the social behaviour of users have shown.

The military balneae of the castra were, to some extent, open to other sections of the population, especially when there were no other baths near the castrum. The openness of the smaller military balneae was also valid for women, so it is not surprising that items like earrings or glass bracelets have been found among the remains of the balneae in Timacum Minus.[101] There are many examples of epigraphic inscriptions that con-

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[96] In the case of Roman baths on the territory of Moesia Superior, see Kuzmanović-Novović 2019, 30 (with references).

[97] In some cases, the difference between a *balnea*e and a *thermae* is unclear. DeLaine pointed out certain shortcomings of the theory of I. Nielsen regarding her division into private and public baths (DeLaine 1993, 348–349). Yegül warned that from the user's point of view, the use of the terms of the *thermae* and *balnea* had no rigid rules for the Romans. According to him, balneae as well as well as thermae were public in the sense they were open to all (Yegül 1992, 43). Recently, Marechal has been dealing with the problems of the terminology of *thermae* and *balneae*, as well as separate rooms within those objects (Maréchal 2015, 140, with references). The general currently accepted standpoint in archaeology is that the *balneae* were small-sized baths, equipped more modestly, with a small number of rooms and facilities. As such, they served, more often, smaller communities, while *thermae* serviced larger populations.

[98] Cambell 2009, 52.

[99] Revell 2007, 231–235.

[100] Revell 2007, 235; Yegül 1992, 33–40.

[101] According to Fagan, there is evidence that in some Roman baths the regime of use was divided into periods during the day (Fagan 1999, 4), although in many cases the joint bathing of men and women was a matter of personal choice (Fagan 1999, 34). Nielsen also points to certain situations when women and men bathed together, according to ancient writers (Nielsen 1993, 195–203). Whitmore devoted a chapter in her dissertation to the findings that testify to the presence of women in military baths (Whitmore 2013, 242–244).

firm that the term *balneum* is used for the type of objects with the above-mentioned characteristics. Their distribution has been traced throughout the Roman Empire.[102] Their context of erection (the period and the position of the building toward the castrum) is the same as in Timacum Minus. There is also written evidence of the use of the term balneum in ancient times for smaller thermal facilities near military fortifications, regardless of whether they had a block or line type of room arrangement. Most of the testimonies have been preserved in the form of epigraphic inscriptions about the restoration of the balneae themselves throughout the empire.[103] In our territory, findings of such epigraphic inscriptions are rare.[104]

However, in most of the mentioned examples of balneae, apart from the position relative to the castra and the size of the baths themselves, there are certain differences in the architectural structure concerning the bath in Timacum Minus. There is a difference in the spatial relationship between the individual rooms, the communication paths, then the number, shape, and position of the bathtubs, as well as the number and position of the furnaces. The stated details within the reduced solutions of the block type of baths rarely exist in examples of Roman baths of castra. Therefore, the question arises of the origin of details in the architectural layout of the military balneum in Timacum Minus.

The answer to this question cannot be found in chronologically or territorially close analogies.[105] On the territory of Moesia Superior, there are no discovered balneae to date that have been identified as Roman military baths of the reduced block-type. Analogies of block-type thermal baths in the area of Moesia Superior are very rare, especially when it comes to reduced types of solutions. There are only a few smaller baths whose affiliation could be attributed to the block-type, and these are primarily balneae in Guberevac – Pruten, Žujinci, and in Porečka Reka.[106] However, according to the context of construction, spatial organisation, and the communication paths between individual rooms, the listed thermal objects differ from the object analyzed in this paper. At the same time, the buildings in Žujinci and Porečka reka are younger than the building in Timacum Minus and belong to the 4th century.[107] The thermal facility in Timacum Minus is a rare example of a reduced block-type, whose construction is reliably dated to the period before the end of the 3rd century. From this period, there are no reliably dated balneae on the territory of Moesia Superior with which our balneum can be compared. Therefore, the analysis of the architectural origin of the balneum in Timacum Minus must inevitably spread beyond the territory of Moesia Superior.

The analysis of the spatial structure and the presence of certain forms in the plan in other military balneae on the territory of Southeast Europe show that the situation is very similar. For example, on the territory of today's Romania, in addition to a large number of researched military baths next to castles, there are several examples that, according to the plan, have similarities with the balneum in Timacum Minus, but the differences in the above-mentioned details are greater.[108] The closest analogy to the spatial structure and applied shapes in the plan of the building is located at the site of Cumidava – Râșnov (Brașov), but the relative position of this balneum and the castrum is different from the bath in Timacum Minus (Fig. 11).[109]

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[102] Petrova 2012, 317.

[103] Examples are represented by castra of similar size on the territory of present-day Britain (Risingham, Bowes, Cliburn Church, Bearsden), Germany (Neckarburgen, Jagsthausen, Walldürn), Romania (Micia near Vetel), and Libya (Thenadassa near Ain Wif). Campbell 2009, 53–56; Revell 2007, 231, 235.

[104] The cause of the small number of preserved epigraphic inscriptions that testify to balneae on the territory of Serbia primarily lies in the general state of research of military fortifications and the small number of explored military balneae. Among the most famous are the inscriptions from Viminacium and Diana, and they were also recorded in Smederevo and at the Episcopal Church in Singdinum (?) – Јеремић, Гојгић 2012, 22 (with older literature); Kuzmanović-Novović et al. 2019, 26 (with older literature). In the area, the mention of the balneum was recorded in Domavija (near today's Srebrenica, BiH) and in today's Zvornik (BiH). Radimsky 1892, 15, 16.

[105] Janković 2012, 29.

[106] Величковић 1958, sl. 3; Bulatović, Kapuran 2008, sl. 2; Petrović 1982–1983, 288–289, sl. 6; Јеремић, Гојгић 2012, 22–26; Janković 2012, Figs. 4 , 5 and 7.

[107] Firstly, the communication paths towards the warm and hot rooms and their relation to the space of the frigidarium are different. In Guberevci–Pruten and Žujinci, the length of the apodyterium room was equal as the sum of the widths of the individual rooms that were exposed to heating, while the frigidarium was often reduced only to the pool area. This way of determining the plan of the balneum was otherwise common on the territory of Moesia Superior (Јеремић, Гојгић 2012, 22–26). In contrast, the block plan of the balneum in Timacum Minus implied that the rooms were created by dividing one rectangular surface with two or three walls into a plan with four rooms.

[108] Inlăceni, Hargita; Drajna de Sus, Prahova; Pietroasele, Buzău (Tentea, Burkhardt 2017, 25, 51, 53).

[109] In addition to the fact that the function of the building has not been confirmed with any certainty, the example in Cumidava was built inside the castle walls. Ţentea, Burkhardt 2017, 35.

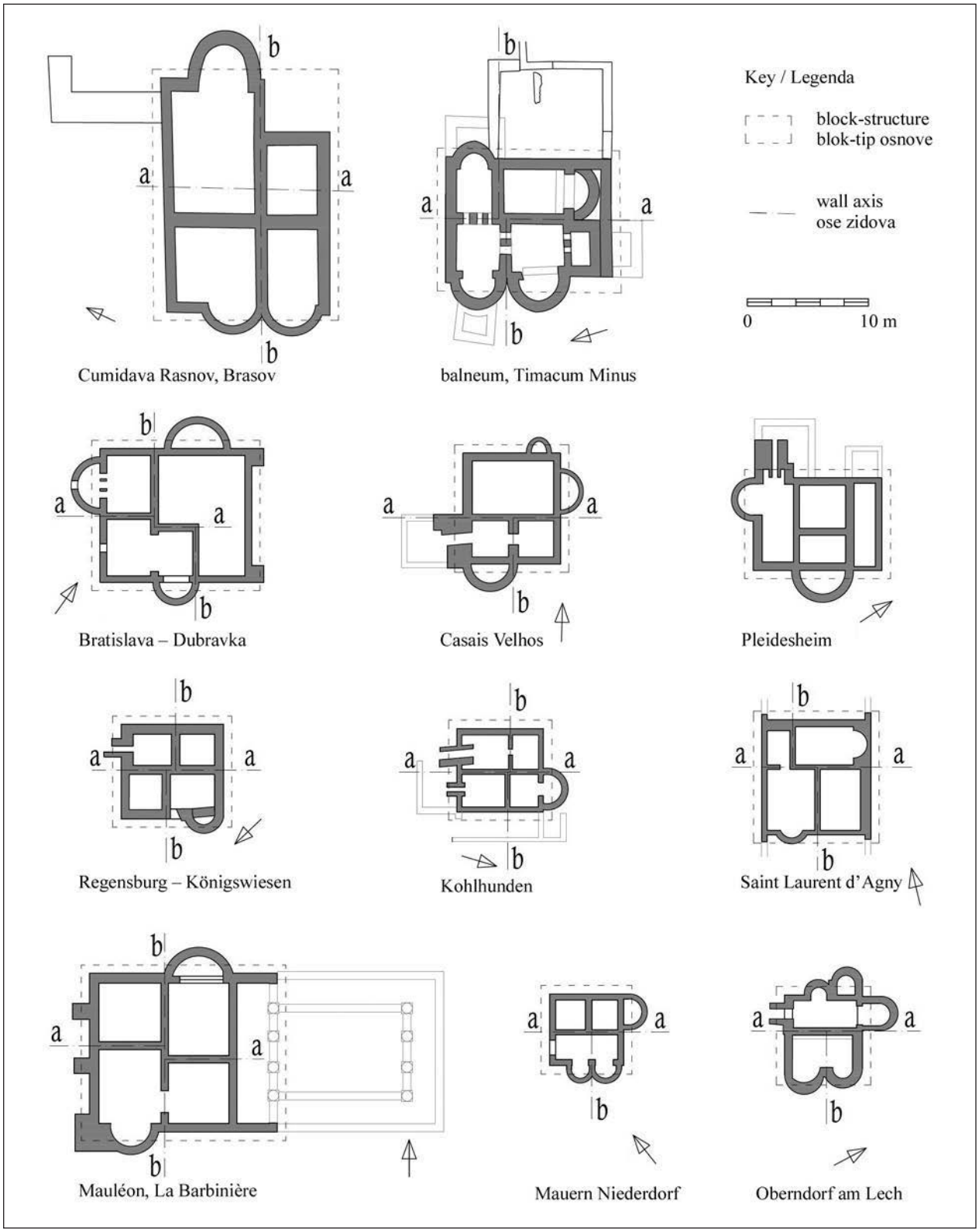

Fig. 11. Examples of block-type balneae plans closest to the plan of the Roman balneum in Timacum Minus (according to Ţentea, Burkhardt 2017, 35; Sedlmayer 2017, Abb. 1, Abb. 2)

Сл. 11. Примери блоковског типа решења балнеума најближих плану римског балнеума у Тимакум Минусу (према: Ţentea, Burkhardt 2017, 35; Sedlmayer 2017, Abb. 1, Abb. 2)

On the territory of the European part of the Roman Empire, there are several examples of reduced block-type balneae, most of which belong to *villae rusticae* from the sites of Pleideshaim (Retia, 2nd–3rd century), Casais Velhos (Lusitania, 2nd–3rd century), and Bratislava – Dúbravka (Pannonia, 2nd–3rd century) (Fig. 11). These examples are similar to the arrangement in Timacum Minus, but in some details there are quite different shapes and different positions of the rooms and tubs intended for cold, warm and hot bathing. The solutions of these details are specific for certain provinces and periods.[110]

The greatest similarity between the block-type baths with the balneum in Timacum Minus exists on the border of the Upper Rhine and the Danube (the southern part of the province of Germania Superior and western Raetia). Here, reduced block balneae are regionally and chronologically specific. Their resemblance to the balneum in Timacum Minus in the solutions of certain details is remarkable. The tubs in these examples are usually semicircular in their plan. Two semicircular tubs along one side of the building are present on the plans of the reduced solutions of block types of baths in the area of the province of Raetia (e.g. at the Mauern Niederdorf site (end of the 2nd century and the beginning of the 3rd century) and the Oberndorf am Lech site (1st–2nd century). The existence of the semicircular tubs of this type within most of the small number of rooms of the balneum caused apses of these buildings to be arranged along two or three facades, as is the case with the balneum in Timacum Minus. These examples of block-type balneae also belong to *villae rusticae*.[111]

According to Sedlmayer, the differentiation of individual block-type balneae throughout the provinces of the Roman Empire was also performed according to the position of the walls.[112] Within some examples of these baths, the inner transverse and longitudinal walls retain their directions along their entire route. However, several examples of baths have been observed where one or both inner walls have shifted directions (directions a–a and b–b, in Fig. 11). The type of balneum in Timacum Minus belongs to solutions where one inner wall retains a continuous direction (a–a), while the route of the other is shifted at contact with the first wall (b–b). Such examples are found at sites in Raetia: Regensburg-Königswiesen (2nd–3rd century), Bondorf (last quarter of the 2nd century), Kohlunden (2nd–3rd century), and in Gaul, Saint-Laurent d'Agny (1st century), Mauléon – La Barbinière (1st–3rd century) (Fig. 11). These balneae belong to rustic villas.

The individual spaces in the above examples are usually obtained by dividing the unique space of the block plan using the routes of the inner walls into a smaller number of rooms (three to four rooms). The details like forms of bathtubs in the rooms, then apses arranged along two or three facades, and the shifted routes of the inner walls are also common with the Roman bath in Timacum Minus. According to the above, this balneum shares many common features with the Roman baths located in the area of southern Germania Superior and western Raetia. The absence of similar solutions on the territory of Moesia Superior and in its surroundings, as well as all previous observations, indicate the possibility that the creator of the balneum plan in Timacum Minus could have come from these areas.[113]

Conclusion

Although among the researched Roman baths on the territory of Serbia there are examples that belong to the block type, there is no reduced spatial arrangement among them such as there is inside the building in Timacum Minus. Therefore, on our territory, this balneum represents, for now, an exceptional appearance of a reduced solution of the block-type, as well as one of the oldest examples of Roman baths in our area.[114]

With the inner walls of a transverse and longitudinal direction, the block plan is divided into four rooms. Among these rooms, only one was used for cold bathing, while the others were supplied with hypocausts, bathtubs, and hot water heating systems. The frigidarium (room 8/10) and caldarium (room 7) have been

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[110] For example, according to Traxler and Kastler, reduced solutions of block types of baths with square shaped tubs (without semicircular apses) are mostly present in the province of Noricum, regardless of whether it is bathing in cold or hot water. On the territory of Norikum, semicircular tubs either do not exist or are combined with a rectangular one. Traxler, Kastler 2012, 325–327; Sedlmayer 2017, 358.

[111] Sedlmayer 2017, 363.

[112] Sedlmayer 2017, 365.

[113] Details regarding the construction of the balneum in Timacum Minus point to the conclusion that most of the masons were of local origin, due to the similarities observed with the manner of construction in Roman baths on the territory of Moesia Superior and in its immediate surroundings.

[114] For the dating of this bath in respect to the other examples of balneae see Janković 2012, 29.

reliably identified. Although rooms 2 and 3 served as warm rooms to accustom users in the transition from the frigidarium to the caldarium, their precise function could have been somewhat different in the first and second phases of the use of bath. This circumstance was caused by the termination of the eastern praefurnium 3 and the establishment of the new western praefurnium 2. The interventions performed in the second phase indicate that the new builder tried with the new solutions to suppress the poor functioning of the balneum in the first phase. The termination of the old and the building of the new praefurnium affected the degree of heating in the warm rooms so that the user could gradually adapt their body to the different temperature. A change in the floor level was also registered in the frigidarium pool, which was previously at the level of the hot pool in the adjacent caldarium.

After some time, the block arrangement was expanded by adding room 9/11. Inside room 9/11 there are no remains of bathtubs or systems intended for floor or wall heating. Due to the size, spatial relationship to the rest of the building plan, and the manner of internal decoration and, above all, due to the access to the older block complex, this room certainly served as an apodyterium.

With a reduced size and arrangement, and a restricted number of activities, the architecture of military balneae directly influenced different social phenomena within castrum such as Timacum Minus, than the baths of larger fortifications. The analysis of social behaviour in the block-type military balneum in Timacum Minus indicates a small degree of user interaction. The small social interaction within the part of the block arrangement of the balneum, which was established in the first phase of functioning, was additionally reduced in that part by the addition of the apodyterium in the second phase. Somewhat greater social interaction was provided inside the apodyterium room.

The balneae of a reduced block-type arrangement are a rarity in Southeast Europe. Among the examples from the region, the balneum from Timacum Minus has the closest analogy at the site of Cumidava – Râșnov (Brașov) in Romania. On the other hand, block-type examples of Roman baths occur more often in Central Europe, some of which have great similarities with the balneum in Timacum Minus.

Reduced block-type arrangements of Roman baths are generally very rare in Europe, except in the area of the Upper Rhine and the Upper Danube. A great similarity can be found, above all, among the block-type baths from the area of southern Germania Superior and western Raetia with the one in Timacum Minus. At the same time, most of the listed examples from Central Europe date from the period from the middle of the 1st to the middle of the 3rd century. These baths could be an older model for the architecture of the somewhat younger or contemporary balneum in Timacum Minus. That is why the territory of the Upper Rhine and the Upper Danube is proposed as one of the possible places of the origin of the Roman chief builder of this balneum.

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Igor BJELIĆ
Block-type Military Balneum in Timacum Minus (145–172)

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БЛОК-ТИП ВОЈНОГ БАЛНЕУМА У *TIMACUM MINUS*-у

Кључне речи. – римска купатила, блок-тип балнеума, Timacum Minus

Приликом археолошких истраживања у периоду 1975–1980. откривени су остаци римског купатила на око сто метара североисточно од кастела. Према концепцији просторног плана објекта, јасно се издвајају два дела – источни и западни. Анализом конструктивних елемената тих делова утврђено је да западни део представља старију фазу а источни део млађу фазу римског купатила.

Западни део купатила подељен је унутрашњим попречним и подужним зидом на четири просторије које су опремљене кадама за купање. Три просторије имале су хипокаусте, а у четвртој нису постојале инсталације за грејање. Та последња просторија имала је функцију фригидаријума, док су преостале три имале функцију топлих просторија (калдаријума, тепидаријума и, извесно, лаконикума).

Источни део купатила састоји се од једне веће просторије у којој није било када за купање или инсталација за грејање. У њеним остацима затечено је више фрагмената фресака, стакла, кровног покривача и изгорелих дрвених конструкција. Према просторном односу између ове просторије и старијег западног дела утврђено је да је она морала имати функцију аподитеријума.

Софтверском анализом унутрашњег просторног склопа римског купатила испитиван је утицај архитектуре на социјално понашање корисника. Посебно су анализиране визуре, повезаност, визуелна интеграција и могућност визуелног дефинисања најкраћег директног пута при комуницирању између појединачних просторија. Утицај ових категорија на непосредну физичку и визуелну комуникацију указује на то да се овај објекат у свом западном делу одликовао ниском вредношћу социјалне повезаности. Источни део римског купатила (аподитеријум) карактерише већи утицај на социјализацију корисника. Генерално, степен интеграције појединачних простора у целину јако је мали, што упућује на то да је и степен социјализације унутар римског купатила на Timacum Minus-у био веома низак.

Просторни однос између појединачних просторија у старијем западном делу одређује припадност плана првобитног решења типу блоковског склопа римских купатила. Према површини коју заузима, степену унутрашње декоративности и социјалне интеракције коју простор објекта дефинише, римско купатило у Timacum Minus-у дефинише се као балнеум. Просторна концепција овог римског купатила јединствена је на територији Србије према специфичној сажетости решења блоковског склопа. На тлу југоисточне Европе постоји мали број сличних решења, у којима се могу препознати и извесне разлике у архитектонским детаљима. Највећи број сличних решења блоковског типа балнеума регистрован је код вила рустика на подручју горње Рајне и горњег Дунава (тј. античке Германије Супериор и Западне Реције).

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FROM AN ELEMENT TO A COMPOSITION: RECONSTRUCTION OF A VAULT OF TERRACOTTA TUBES FROM TIMACUM MINUS, SERBIA

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Abstract. – The renewal of the archaeological excavations of Timacum Minus in 2019 initiated extensive analyses and an additional interpretation of the results of previous excavations of its buildings. One of the buildings outside the fortification has attracted special attention, because of both its constructive solutions and its dimensions. Although the archaeological research of "the building with a hypocaust" has never been completed, there are enough discovered segments that indicate the applied building techniques and constructions. In addition to under-floor and wall heating systems, this building had vaults built of terracotta tubes. The rarely discovered and insufficiently documented examples of this type of vaulted structure in Roman architecture in south-eastern Europe necessitate a deeper analysis of their remains in Timacum Minus, with the aim of obtaining relevant information important not only for the reconstruction of the construction process and appearance of "the building with a hypocaust", but also for future architectural analyses of Roman buildings in the territory of Serbia and in the surrounding region.

Key words. – Vaults, vaulting tubes, terracotta tubes, tubi fittili, Timacum Minus, building techniques, Roman architecture, late antique architecture, Severan period, south-eastern Europe

Terracotta vaulting tubes represent specific elements, all shaped according to the same model, created as part of mass production intended for the construction industry of ancient Rome. The formation of the series of tubes enables the execution of rows, which are built next to each other, that is, multiplied, forming the vault. The tubes are shaped so that they can be placed on each other to follow the projected curve of the vault, with the mortar used for their mutual bonding. Before the 4th century, interconnected tubes were used to form the surface of the intrados (inner surface) of the vault, while concrete was then poured over them (Fig. 1a)[1]. From the 4th to the 6th century, in late antique architecture, rows of tubes placed longitudinally were more often employed, instead of rows placed transversally along the vault, which were more common in earlier periods. During this later period, the rows of tubes were also often doubled, with large volumes of concrete no longer applied over them (Fig. 1b). The technique of vault building using terracotta tubes is one of the few that, in the ancient period, enabled the absence of the use of wooden formwork. This avoided unnecessary processes and costs in the procurement, processing, installation and removal of formwork during the preparation for the construction of the vaults.[2]

In the relevant literature in English regarding the use of vaulting tubes, there is a parallel use of the terms *terracotta vaulting tubes* and the Latin term *tubi fittili*. In French literature, the tubes are defined as *tubes emboîtés* or *tubes de voûte,* in German, they are called *Tonröhren*, while Spanish researchers call them *tubos afusados* and the Italians, *tubuli fittili*.[3]

[1] Lancaster 2015, 116, 126.

[2] Bjelić 2020, 124.

[3] Lancaster 2012; Arslan 1965; Storz 1994; Lancaster 2015, 213.

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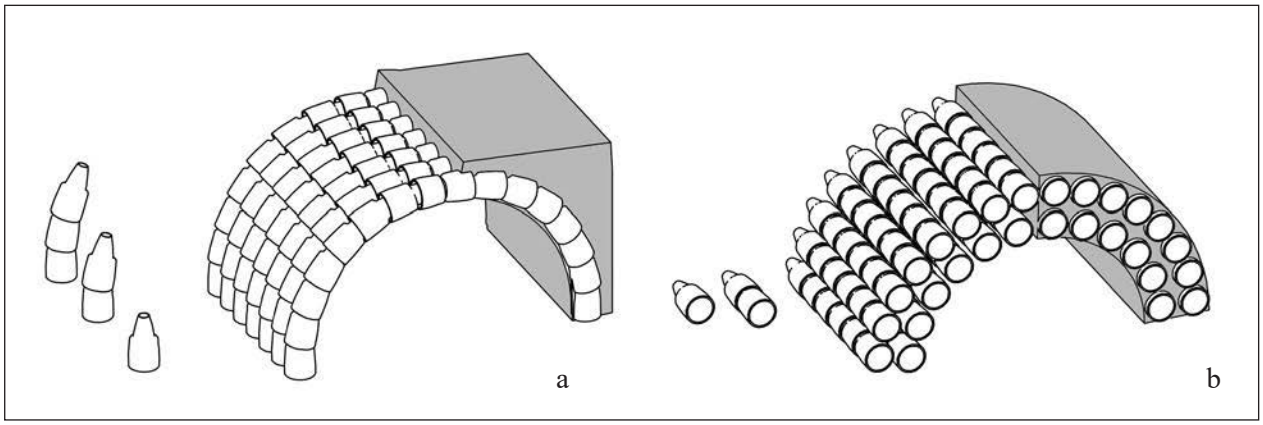

Fig. l. Variants of vaulting tube stringing within the mass of the semicircular vault: a) rows of tubes placed transversally along the vault during the 3rd century; b) rows of tubes placed longitudinally along the vault during the period 4th–6th century (Drawing: Igor Bjelić)

Сл. 1. Варијанте низања цеви за сводове унутар масе свода полуобличастог свода: а) редови цеви постављени трансверзално дуж свода током III века; b) редови цеви постављени лонгитудинално дуж свода током периода IV–VI века (Цртеж: Игор Бјелић)

The study of terracotta vaulting tubes has been ongoing for three decades. In south-eastern Europe, however, this topic has not been the subject of in-depth analysis. The main reasons for the insufficient research of this building technique in south-eastern Europe are the lack of recognition of these specific building elements during their discovery, i.e. the small number of experts who are familiar with the existence and function of vaulting tubes, as well as insufficient interest of researchers in specific architectural problems of the historic buildings and their interpretation.

These tubes are mainly intermixed by researchers with heating tubes or water pipes, giving them the role of these elements. However, this problem is not only a local one, it has been observed worldwide. For this reason, this paper will also give a brief explanation of the importance of the proper differentiation between several types of terracotta tubes, since it directly affects the acquaintance of researchers of Roman archaeology with specific building elements, such as vaulting tubes.

The renewal of the excavations of the Roman archaeological site of *Timacum Minus* in 2019[4] initiated extensive analyses and a reinterpretation of the results of previous excavations of its buildings, that is, their specific elements, of which vaulting tubes caught the attention most of the authors of this paper. Their identification was carried out, their function within the architectural complex was analysed, and then the elements necessary for the visual reconstruction of one of the researched buildings at this site near the village of Ravna in Serbia were proposed.

A brief overview of previous research on terracotta vaulting tubes

Terracotta tubes for the construction of vaults have been recorded in the literature since the 19th century[5]. However, the first extensive systematisation of this important type of building element was performed only at the end of the 20th century, by R. J. A. Wilson and S. Storz.[6] At the beginning of the second decade of the 21st century, L. Lancaster consolidated their knowledge and expanded it, on the basis of the works of other authors and her own research.[7] Also

[4] Petković, in print.

[5] Among the 19thcentury authors, J. Overbeck and R. Bergau are significant. In 1856, in his study of Pompeii, Overbeck noted the construction of domes from these tubes in the Roman city, and gave a drawing of the dome of a furnace built from them (Overbeck 1856, 259). Then, in 1867, Bergau published a short text on the use of amphorae to lighten vaults, but also on the use of vaulting tubes, giving drawings of shapes known to him at that time (Bergau 1867, 405–408, Tao d'agg L). Lynn Lancaster, however, writes that only one of the tubes shown in Bergau 1867 had the function of a vaulting tube (Lancaster 2015, 213).

[6] Wilson 1992, 97–129; Storz 1994.

[7] Lancaster 2012; Lancaster 2015.

significant are publications dealing with the appearance of terracotta vaulting tubes at individual sites across the former borders of the Roman Empire, among which are the works of E. A. Arslan and F. Tomaselo, which deal with the appearance of tubes on Italian territory.[8]

According to previous research, the appearance of vaulting tubes is significant in the areas of the western Mediterranean, while in other parts of the Empire their occurrence is rare.[9] The oldest tubes for vaults, mutually connected with gypsum mortar, recorded so far, are those within the North Bath of Morgantina in Sicily, which dates from the 3rd century BC.[10] Despite sporadic phenomena in the region of the western Mediterranean, there was no significant spread of the technique of constructing vaults using the tubes until the end of the 2nd century AD.[11] The most pronounced appearance of vaulting tubes from that time was recorded on the soil of North Africa, the southern coast of today's France, the eastern coast of Spain, on Sicily, as well as on the entire Apennine Peninsula. The real eruption in the application of terracotta tubes for vaults came in the 3rd century, during the rule of the Severan dynasty, in the province of *Africa Proconsularis*. Attention has to be also drawn to the fact that, according to the available literature, their appearance has not been recorded on Greek soil so far. The late appearance of these elements was registered during the 5th and 6th centuries in isolated regions of Byzantium, such as today's northern Italy.[12] Among the well known vaulting tube constructions from this period, the domes of buildings in Ravenna – the Church of San Vitale and the Baptistery of Neon, certainly stand out.[13]

This type of vault in the territory of south-eastern Europe has not been significantly treated, and mention of the vaulting tubes themselves is sporadic. According to the collected data from older authors, L. Lancaster has registered seven individual sites in south-eastern Europe: *Pietas Iulia* (Pula), *Orsera* (Vrsar) and *Sibinicum* (Šibenik) in Croatia, *Domavia* (Srebrenica) in BiH, Gârbou (Csáki Gorbó in Hungarian) in Romania, and *Sirmium* (Sremska Mitrovica) and *Timacum Minus* (Ravna) in Serbia.[14] Let us add here that, in addition to the listed sites, examples of such tubes were found in Bulgaria at *Novae* (Svishtov), in Romania at *Drobeta* (Drobeta–Turnu Severin), *Apulum* (Alba Iulia), *Colonia Dacica Sarmizegetusa* (Sarmizegetusa), *Potaissa* (Turda) and *Jidova* (Câmpulung), in North Macedonia at *Lychnidus* (Ohrid), as well as in Serbia at the site of *Viminacium* (Kostolac) (Fig. 2).

In the territory of Romania, near Trajan's castrum of *Drobeta* on the Danube, there is a bath that was built in the 2nd century and renovated several times during the 3rd century, in which vaulting tubes were identified.[15] However, they are used in the building presentation and arranged as wall heating tubes along a room wall.[16] During the excavations of a public building, probably erected in the second half of the 2nd century, also used during the time of Septimius Severus and later through the 3rd century, and situated in *Municipum Septimium Apulense*, near the fortress of *Apulum*, Romanian archaeologists found specimens

[8] Arslan 1965, 45–52; Tomasello 2005, 145–155.

[9] Lancaster 2015, 101, Figs. 66; The appearance of vaulting tubes has been registered in many sites in North Africa (Bulla Regia – Lézine 1954, 168–181, Sabratha – Dodge 1989, 249–251, Mlakou – Bukhenouf, Iaichouchen 2020, 51–60, Sbeitla – Duval 1971, Wilson 1992, 98–99, etc.), Italy (several localities in Sicily, including Morgantina – Allen 1972, 379, Piazza Armerina – Arslan 1965, 48, Syracuse – De Angelis 2009, 148, then Rimini – Arslan 1965: 47–50, Pompeii – Scurati – Manzoni 1997, 9–18, Florencia – Shepherd 2014, 257–265, etc.), Spain (Cercadilla – Hidalgo Prieto 1996, 126–127, Granada, Cabrera de Mar – Alcaide et al. 2019, 131–156, etc.) and France (Perpignan, Trans-en-Provance, Olbia, et al. – Lancaster 2015, 101, Fig. 66), as well as in individual localities on the east coast of the Mediterranean (among them is Caesarea Maritima – Vann 1993, 29–34), Britain (in several military fortifications: Chester – Mason 1990, 215–222, Heke 2017, 13–61, Chester – Wilson 2002, 180–185, Carlisle – Mills 2013, 459, York – Whitwell 1976, 45, Caerleon – Heke 2017, 18–19, 24). In this context, the appearance of tubes in the shipwrecks of the Mediterranean is also interesting (Bound 1997, 187–200, Anastasi, Capelli Distav 2016). Examples from south-eastern Europe are listed individually in the text.

[10] Willson 1992, 106; Lucore 2009, 43–59; Allen 1972, 361–383.

[11] Lancaster 2015, 116, 126; Willson 1992, 104–105.

[12] Verzone 1938, 7–12.

[13] For the appearance of the vaults in Ravenna, see in: Bovini 1960, 78–99 and Russo 1996, 285–329.

[14] The location of the seven sites in south-eastern Europe, where the vaulting tubes were identified, is correct on the Lynn Lancaster map. However, in the text for the site of Csáki–Gorbó, Lancaster writes that it is in Hungary, and in fact, it is in Romania (the village of Csáki–Gorbó in Hungarian, or Gârbou in Romanian). The vaulting tubes were found in a building named "Roman Baths" in the very village of Csáki–Gorbó (Lancaster 2015, 112; Buday 1914, 45–62), while a Roman fort is situated in the nearby village of Buciumi (Gyemant, Gudea 1984).

[15] Tudor 1965, 41, Tab VIII. These tubes were not recognised as vaulting tubes in the literature.

[16] When looking at tourist photographs of the colleague M. Muminović, from the Knjaževac Homeland Museum, during a visit to the ancient monuments in Drobeta–Turnu Severin, an author of this article recognised the tubes in one of the buildings; See in: Association 2017, 66.

of these tubes with lime mortar remains, whose function they connected to the vaults.[17] G. Băeştean writes about the difficulty of distinguishing vault tubes from water pipes, in the case of the *Sarmizegetusa* baths, where the origin of a large number of found tubes is unknown.[18] In *Potaissa*, terracotta vaulting tubes were found during the excavation of the baths in the legionary fortress.[19] The baths' erection was dated to 168, and renovation to the Severan period.[20] Băeştean assumes that in *Potaissa* these were originally water pipes, but later used in the construction of the vaults of the baths.[21] In *Jidova*, terracotta vaulting tubes were found in the Severan layer, in the rubble of the hypocaust space of a small building next to the *praetorium*.[22] As for the tubes from *Novae*, they were discovered during excavations in the area of a large early Christian basilica, when, according to Biernacki, a complex of baths was discovered dating back to the third quarter of the 2nd century, the use of which continued until the beginning of the 4th century.[23] In *Domavia*, tubes were found in a room within the building designated as a curia and in several rooms of the public baths and had a prismatic part that narrows up to a pyramidal nozzle. There is no mention of the function of these tubes related to the vaults.[24] However, the tubes found in the family tomb that formed two small vaults, at the site of Vidobišta of *Lychnidus,* have almost the same shape, although a closed nozzle, and are designated as vaulting tubes by its researchers. The erection of the tomb was dated to the first half of the 3rd century, while at the end of the same century or in the first half of the 4th century it was expanded.[25]

The finds of vaulting tubes at the aforementioned sites are not well documented, which is why the prevalence of terracotta tubes on the territory of south-eastern Europe should still be taken with caution (Fig. 2). The general state of research that is present on this issue in the region requires special attention in the consideration of the vaulting tubes at individual sites in Serbia.

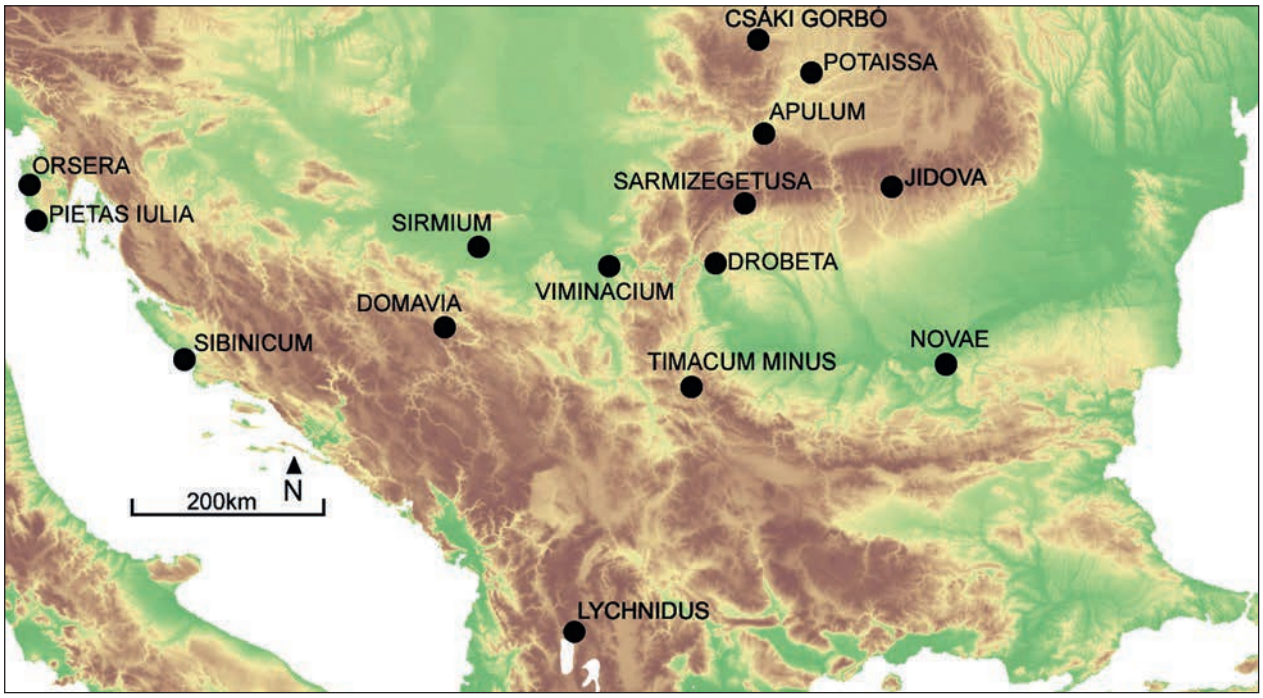

Fig. 2. Prevalence of the findings of terracotta tubes for the construction of vaults on the territory of south-eastern Europe (Map: captions by Igor Bjelić on "Elevation Map of Europe", Owner: European Environment Agency (EEA), CC BY 2.5 DK, https://www.eea.europa.eu/legal/copyright).

Сл. 2. Расūростūрањеносūи налаза керамичких цеви за изīрадњу сводова на шūлу јūгоисūочне Европе (Маūа: ознаке Иīора Бјелића на „Elevation Map of Europe", Owner: European Environment Agency (EEA), Creative commons license: CC BY 2.5 DK, Copyright holder: European Environment Agency (EEA), https://www.eea.europa.eu/legal/copyright).

The first author who published data on the vaulting tubes on the territory of today's Serbia was the architect Miroslav Jeremić (1943–2016).[26] Prior to the publication of his paper from 2006, there was not a single article in the Serbian scientific literature that dealt with this topic.[27] At the same time, Jeremić is credited with recognising these elements in the function of building vaults at the only two sites where they were registered in Serbia until then, and where they were previously treated differently. Using the data of older authors, as well as of M. Jeremić, L. Lancaster was the first to show the distribution of vaulting tubes on the territory of the former Roman Empire. Covering the territory of south-eastern Europe, she mapped individual examples, thus creating the preconditions for comparison between them. However, Lancaster also pointed out the general problem concerning all individual examples of vaulting tubes on the territory of today's Serbia, as well as on the territory of the whole of south-eastern Europe – poor documentation.[28]

When it comes to examples of vaulting tubes found on the territory of today's Serbia, i.e. in *Sirmium* and *Timacum Minus*, the observations of M. Jeremić are very important. Some of the rare specimens from today's Sremska Mitrovica come from site no. 68, and were found in the immediate area of a basin which was a part of a building from the 4th century whose function is unknown, but for which it is assumed that it represented public baths and that the tubes belonged to the vault above the basin.[29] The possibilities for determining the context of the vaulting tubes in *Timacum Minus*, as well as the former positions within the building to which they belonged, are much greater. However, in the existing archaeological documentation, as well as in the work of M. Jeremić, there were several points of confusion, which we will highlight later. The type of tubes in *Timacum Minus* is characterised by the existence of the cylindrical and conical parts of a tube, corresponding to similar types in the Roman Empire, and is characteristic for the period from the beginning of the 2nd century to the end of the 6th century.[30] As for *Viminacium*, the found vaulting tubes belonged to the building of the public baths, and they were found in the rubble of the hypocaust space of the middle and younger phase of the building, i.e. the period of the 3rd and 4th century. Unfortunately, their exact position was not documented during the excavations.[31] Apart from the probable similarity in the technique of making vaults, there is no other closer connection that could be reliably established between the terracotta vaulting tubes at the three sites in Serbia.

The problem of recognising vaulting tubes

Initially, the terminological indeterminacy of the use of special terracotta elements for the construction of vaults often led to the intermixing of vaults made of tubes with the use of ceramic vessels (usually amphorae) in concrete in order to lighten the weight of the vault near its springers.[32] The two techniques of vault construction, however, have nothing in common in performance or in terms of statics, since the vessels

[17] Ota 2012, 146, Planşa XV; Ota, Lascu 2011, 205, 212–213, 224.

[18] Băeştean 1998, 255–258, 260. In our opinion, based on the whole context of the find, the described tubes represent water pipes. However, in the Deva museum there is a tube with mortar and wall paint on it (Băeştean 1998, 257).

[19] Barbulescu 1999, 432, 439, Fig. 8; Barbulescu 2019, 111–114.

[20] Grec 2011, 187.

[21] Băeştean 2008, 171.

[22] Petolescu et al. 2018, 25–27, 282, Fig. 4; Petolescu et al. in print.

[23] Biernacki, 2003, 9.

[24] In the curia, the tubes were found *in situ*, within the wall itself, placed in transverse rows. In the baths, they were found installed in two rooms in longitudinal rows. The first opinion of the author V. Radimsky was that the tubes found in the curia were an insulating layer against moisture in the wall, but he later defined them as heating tubes, which, from the beginning, was his opinion on those found in the baths. I. Bojanovski also defined the elements from the bathroom as heating tubes. In our opinion, the registered tubes at these sites, based on to the context in which they were registered, did not serve as elements for the vaults (Radimsky 1892, 14, 15; Radimsky 1894, 8, 14, 15. Tabla II; Bojanovski 1980, 54–55).

[25] Kuzman 2015, 134: Figs. 4, 5, 140, Fig. 18, 135, 144–145, 161, 174–175, 184, 187.

[26] Jeremić 2006.

[27] In 2004, Ana Radivojević only mentioned the use of this technique as part of the general overview of constructions and construction techniques of ancient Rome (Radivojević 2004, 84–85), and then again, with more detailed information, in a 2018 book dealing with bricks in Late Antiquity (Radivojević 2018, 43).

[28] Lancaster 2015, 111.

[29] Jeremić 2006, 90.

[30] Following the typology of tubes established by Lancaster, we notice that other types belong to the bullet-shaped type (3rd century BC), while later the tubes similar to water pipes were used (House of Fabius Rufus, *Pompeii*, 1st century AD), or ceramic vessels in the shape of a bowl (the Rhine area, 1st–3rd century AD). According to this typology, the appearance of our type of tube can be followed in a wide period range, from 100 AD until the end of the 6th century (Lancaster 2015, 103, Fig.68).

[31] Milovanović et al. in print.

[32] Lancaster 2015, 99.

do not have a constructive role. Furthermore, distinguishing vaulting tubes from other types of terracotta tubes proved to be the biggest problem in Serbia and in the surrounding region. In that sense, it is of the greatest importance to keep track of the development of these terracotta elements.

The use of terracotta tubes in architecture was certainly not first applied in the field of vault construction. According to Wilson, the use of terracotta tubes for vaults resulted from the previous use of tubes and vessels for forming kilns. Kilns made of terracotta elements have long been used in the frontier area of the Rhine, but early examples of those kilns were discovered during research in the 19th century in *Pompeii*. These kiln vaulted constructions are rarely preserved, but their recognition can be based on the remains of mortar around the bottom of the found vessels. On the surface of the mortar, an imprint is noticeable, which fits with the inner surface of an identical vessel that was placed before in a series of vessels mutually bonded with mortar.[33]

Vaulting tubes are very different in relation to other types of terracotta elements used in ancient buildings. However, the evolution of the shape of these elementary parts for vaults was carried out in Antiquity through several stages. It was probably concluded very early that these terracotta elements did not require the formation of a base, so it was enough for them to be shaped almost like hollow pipes.[34] Thus, it can be also said that these vaulting elements can be actually similar to water pipes. After all, early examples of the appearance of vaulting tubes, such as those in the House of M. Fabius Rufus, testify to the use of water pipes for vaulting purposes.[35] In later examples of the use of vaulting tubes, especially those from the 3rd century, there is a more pronounced difference in shape in relation to water pipes. The degree of narrowing of the top of the vaulting tube becomes so great that it could cause uneven pressure from the source to the endpoint of the liquid delivery. The main difference in relation to heating tubes, i.e. the *tubuli*, is that a cylindrical part[36] and a concave nozzle that goes into the next tube can be seen in the structure of a vaulting tube, while the *tubulus* has a constant width and no nozzle. The nozzle implies a narrowing of the vaulting tubes, so any use of them in the function of heating is not possible because with each subsequent narrowing, the amount of heated air decreases in the next tube. Both kinds of terracotta tubes – *tubuli* and vaulting tubes, have been found in *Timacum Minus*.

The problem of recognising vaulting tubes was also present in the research of *Timacum Minus.* In archaeological diaries, the use of certain terms was not precise enough. Finds of hollow tubes were registered in two buildings: at the baths northeast of the fortification, and during the excavation of "the building with a hypocaust", southwest of the fortification. On that occasion, no distinction was made between terracotta tubes of different functions (spacers, *tubuli* for wall heating, water pipes or vaulting tubes). After the process of detailed verification of the findings during 2019, we came to the conclusion that the vaulting tubes in the diaries older than 1988, i.e. before the field visit by M. Jeremić, were treated as heating tubes.[37]

Vaulting tubes of Timacum Minus

The context of found tubes

Timacum Minus is located in eastern Serbia, 8 km north of the town of Knjaževac, near the village of Ravna. The first data on the existence of *Timacum Minus* is related to the stay of the cohort *I Thracum Syriaca* during the 1st century when a fortification with wooden-earthen ramparts was built. From the middle of the 2nd century until the end of the 3rd century, cohort *II Aurelia Dardanorum* was situated in it. The castrum and the settlement around it experienced greatest prosperity, and many masonry buildings were erected. The settlement developed along the bank of the river Timok, and within it, the thermal baths and "the building with a hypocaust" have been archaeologically explored. During the 4th century, *Pseudocomitatenses Timacenses Auxiliarii* resided in it. During the third quarter of the 3rd century until 378, *Timacum Minus* was attacked by the Goths, and then by the Huns in 445, after whose attack it never recovered.[38]

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[33] Wilson 1992, 107–108.

[34] Such tubes were registered as early as the 3rd century BC in the North Bath of Morgantina, in Sicily (Lucore 2009, 43, Fig. 4).

[35] Scurati–Manzoni 1997, 9–11, Fig.5.

[36] Or prismatic shape in rare known cases, such as those in *Domavia* and *Lychnidus.*

[37] M. Jeremić recognised the function of tubes for vaulting immediately during a visit to the *Timacum Minus* site in 1979, but they were recorded as heating tubes in archaeological diaries until 1988 (Jeremić 2006, 90, Note 27, Documentation of the Archaeological Institute (AI), inv 368: Diary of archaeological excavations 1988).

[38] Петровић 1975, 46–47; Petrović 1995. 33–34; Petković et al. 2005. 13–19.

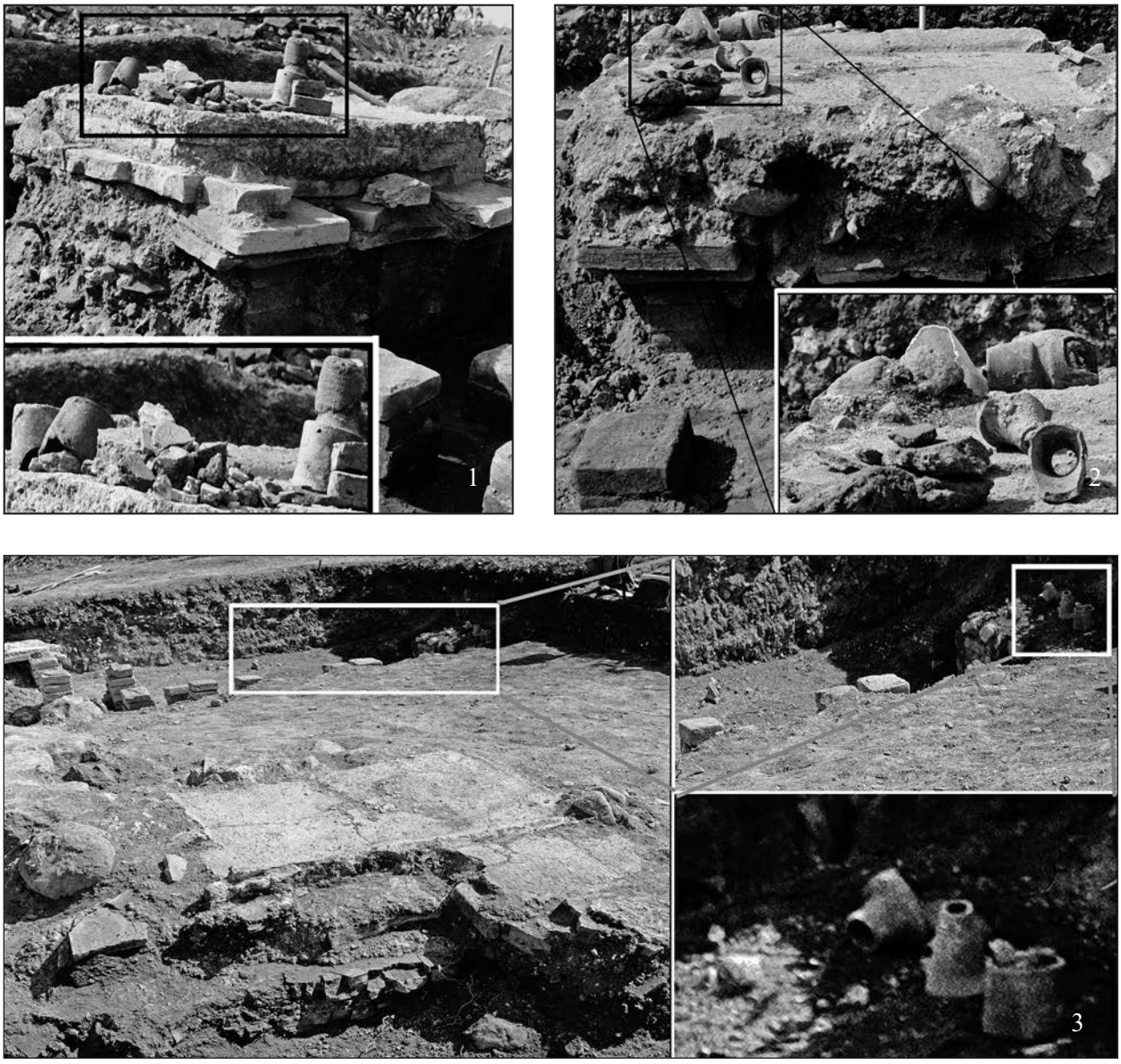

Fig. 3. Vaulting tube finds inside the rooms of "the building with hypocaust":
1) "room 2" – detail of the regular tube for vaults;
2) "room 2" – detail of the central element for vaults;
3) "room 1" – detail of the regular element for vaults;
4) "room 3" – floor layer over the hypocaust pillars and fragments of terracotta vaulting tubes (Photo-documentation of the Institute of Archaeology, Belgrade)

Сл. 3. Налази цеви за сводове унутар просторија „објекта са хипокаустом": 1) просторија 2 – детаљ регуларних цеви за сводове; 2) просторија 2 – детаљ централног елемента за сводове; 3) просторија 1 – детаљ регуларних елемената за сводове; 4) просторија 3 – слој пода преко стубића хипокауста и уломака керамичких цеви за сводове (Фото-документација Археолошки институт, Београд)

The context of the findings of terracotta vaulting tubes at *Timacum Minus* was initially debatable.[39] The early death of prominent researchers of *Timacum Minus* was an additional factor in the slow identification of these tubes.[40] In the work of M. Jeremić, it is stated that the tubes originated from the building named "the Small Baths" outside the walls of *Timacum Minus*.[41] There are two buildings on the site that have been identified by older researchers as the baths, situated outside the fortification, northeast and southwest of it. None of the archaeological diaries, technical documentation or published works related to *Timacum Minus* have identified the site under the name given by M. Jeremić. Only "Thermae I" and "Thermae II" – which is also known as "the building with a hypocaust", are mentioned.

There are no drawings of complete tubes originating from the site in the technical documentation.[42] Such drawings were later made by M. Jeremić, during the writing of his paper, based on specimens that had already been dislocated from the site itself. There are no fragments of vaulting tubes at the site near the excavated parts of the mentioned buildings. However, the building where a large quantity of one type of vaulting tubes was excavated was identified using photo documentation of the Institute of Archaeology, in Belgrade and the Homeland Museum, in Knjaževac. It is "the building with a hypocaust ("Thermae II") (Fig. 3). The tubes were found in all discovered rooms of the building.

As presented above, the largest number of tubes was found as part of the research of "the building with a hypocaust". It was researched in the period from 1978 to 1980 and again in 1988. During the research, the methodology of excavation and documentation was changed several times.[43] Unfortunately, none of the four rooms of the building has been fully explored (Fig. 4). Initially, the central part of " room 1" was explored, and during the next research campaign the research was extended to the west, i.e. to the north-eastern part of "room 2". During the third campaign, in 1980, the previous excavations were completed, and expanded to the southern part of the building, when two conches were discovered. In 1988, during the last excavations, the central part of "room 3" was explored, and excavations of "room 4" were started. In most of the space, stone extraction from the walls of the building was noticed, so the remains of the building were heavily damaged and, in some sections, the entire mass of the walls was almost gone, with either only very low remains or only remains in the negative found.

Judging by the area explored so far, the perimeter walls of the rooms were placed orthogonally to each other. It is noticeable that the walls of "room 2" stand next to the walls of "room 1". The northern walls of the two rooms are not on the same course, but on two courses very close to each other, so it seems that they do not belong to the same spatial concept of the building. The scope of research of "room 2" does not allow us to fully understand its plan. Walls 4, 9 and 10 belonging to "room 1" and "room 2" are about 0.90 m wide. The walls of the praefurnium are adjacent to the northern walls of "room 1" and "room 2". Inside all four rooms, pillars of hypocaust suspensions were found. Some of the pillars were quite highly preserved, at a height of ten rows of square bricks, above which were bricks of a format in standard use in most of the Roman sites on the territory of today's Serbia (28 × 40 × 5 cm), then bipedals (60 × 60 × 7 cm), and finally two floor layers, each of 8 cm. Along the northern walls 4 and 10 of "room 1" and "room 2", *tegulae mammatae* were placed, through which the wall heating functioned. A large number of these tegulae were found along walls 6, 7 and 8, which essentially belong to one course of a wall only 0.5 m wide.[44] Walls 6, 7 and 8 are separated by two channels which are the same width as the praefuriums, and which

[39] Some specimens of the tubes from the excavations of *Timacum Minus* are today in the Archaeo-ethno Park Ravna, available to researchers for analysis.

[40] Petar Petrović, the director of the excavations at *Timacum Minus* and the former director of the Institute of Archaeology in Belgrade, passed away in 1997. Svetozar Jovanović, once the only archaeologist of the local Homeland Museum in Knjaževac, on whose territory Ravna – *Timacum Minus* is located, passed away in 2000. Miroslav Jeremić, who correctly pointed out the identification of these elements on the site, passed away in 2016.

[41] Jeremić 2006, 88.

[42] Among the rare drawings of these tubes in the archaeological diary for 1978 (Inv. No. 1), there is a drawing of two fragments of conical tips of tubes. They were discovered in the area southwest of "Thermae I" within the walls that do not belong to the baths. Judging by the drawing, there are no similar examples of vaulting tubes in the preserved inventory of the Homeland Museum in Knjaževac.

[43] The marking and orientation of the square grid have been changed several times. In the initial years, the archaeological diaries recorded the observations of archaeologists in great detail, and during 1980 and 1988, they were much reduced.

[44] Documentation of Institute of Archaeology, Belgrade, inv 368: Diary of archaeological excavations 28.9.1978.

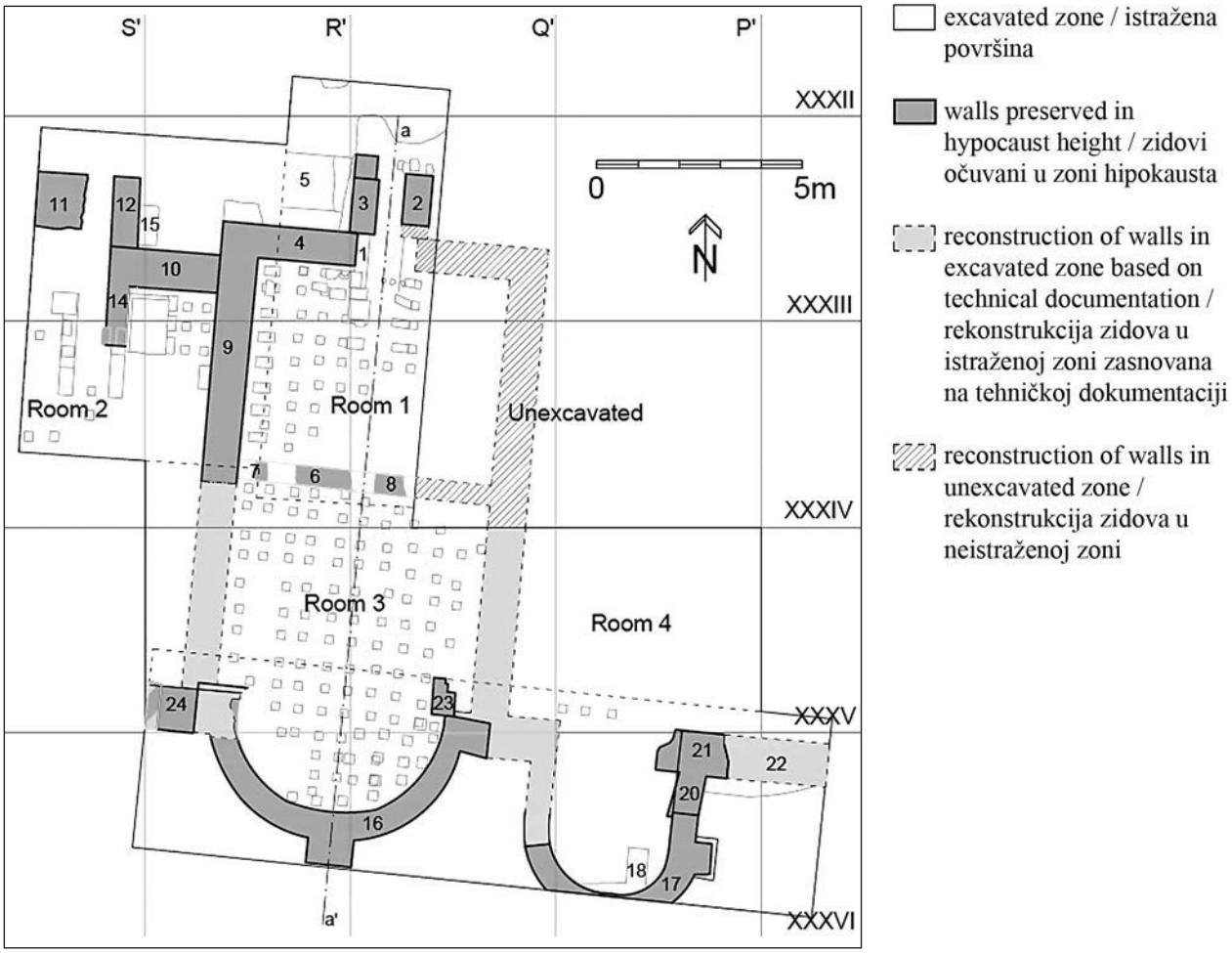

Fig. 4. Plan of "the building with a hypocaust" with the indicated route of the registered walls (dark grey), the route of the removed walls (light grey), and the reconstructed route of the walls (hatch) (Drawing: Igor Bjelić)

Сл. 4. Основа „објекта са хипокаустом" са назначеном трасом регистрованих зидова (тамно-сива), трасом повађених зидова (светло-сива) и реконструисаном трасом зидова (шрафура) (Цртеж: Игор Бјелић)

were once vaulted. For the channel between parts of walls 6 and 8, it is explicitly stated in the diary that its interior faces are on the same course as the interior faces of the praefurnium of "room 1".[45]

In "room 3" and "room 4" in the south, the walls of the south conches of the building are the best-preserved (walls 16 and 17). A buttress was registered in the axis of the conch in "room 3". Other walls (walls 20–24) are only partially preserved. There is no data in the documentation for the west wall of "room 3", but its beginning at the northern end was registered when following the course of the extension of the wall. Its further course was determined on the basis of preserved photo documentation.[46] Judging by the position of the hypocaust pillars of this room and the thickness of the wall at the northern end, the eastern face of the wall was on the same course as within "room 1". According to this data, it is certain that the thickness of the western wall of "room 3" was the same as in its extension. On the east side of "room 3"

[45] Documentation of Institute of Archaeology, Belgrade, inv 368: Diary of archaeological excavations 27.9.1978.

[46] The diary of archaeological excavations for 1988 is unfortunately not preserved in its entirety. The fortunate circumstance is that photographs were preserved with which it was possible to identify the spots from which the photographs were taken, and then to identify the excavated parts of the walls.

during the research, a wall in the negative was registered, of which, to some extent, fragments of mortar and stone on the course between the conches remained.[47] Traces of this wall are of great importance for defining the boundaries of at least one of the rooms within "the building with a hypocaust", i.e. "room 1", because they define the span of the vault which covered it. The position of the hypocaust pillars helps to better define the course of this wall.

If we look at the plan of "room 1" and "room 3", it is noticeable that the position of the praefurnium channel in the north and the channel in wall 6–8 is on the course of the axis a–a', as well as the axis of the conch in "room 3" which is otherwise emphasised by the buttress position. The position and size of the hypocaust pillars inside the northern part of "room 1" are also designed almost symmetrically with respect to the a–a' axis. According to the data presented so far, the course of the east wall of "room 3" also fits into the whole of the spatial concept. It seems certain that in relation to the course a–a' symmetrically to the massive wall of "room 1" and "room 3" on the west side, there was an equally massive wall on the east side of these rooms.

Several other factors that are of interest for our research topic have been subjected to the presented reconstruction proposal. It was stated above that the walls of "room 2" were unconstructively leaning against the walls of "room 1". The thickness of the walls 4, 9, 16, 17, and 21–24 indicates that these walls could have carried a heavier load, which corresponds to the finding of a huge number of terracotta vaulting tubes and roof tiles in these rooms.[48]

When considering the possible spans of the vaults of "room 1" and "room 3", whose boundaries are the clearest so far, it was noticed that the shorter span of "room 1" is defined in a south-north direction. The initial possibility for defining the supports of the vaults along the course of wall 4 and walls 6–8 had to be discounted, however. It is clear that the walls 6–8, with a thickness of 0.5 m and weakened in their lower part by channels, could not play the role of vault supports. This is especially pronounced taking into account the possibility that concrete was poured over the vaults of the tubes and that they also partially carried the load of the roof construction and covering. Therefore, the forces due to the load from the vaults of the tubes had to be transferred to the west and east walls of "room 1". The load transmission had to be realised in the same way in "room 3", and the walls 6–8 with the east-west direction was a thin partition wall between the mentioned rooms. This again justifies the assumption that the eastern walls of the rooms must have been as strong as the western ones.

The shape of the vaults above "room 1" and "room 3" is defined precisely by the possibility of load transfer to the mentioned walls. A semicircular vault above the rooms is most certain here. Its shape would also fit well with the position of the conch in the south of "room 3". Above it, a gabled roof could have been easily built, having the same orientation as the vault itself. The roof is also in line with the position of the praefurnium of "room 1" since all atmospheric waters would be diverted outside the course in which it is located.

During the construction of "room 1", a mortar base for hypocaust suspensura (floor no. III) was constructed, as well as the floor itself (floor no. II). At the time of the destruction of the building in a later period, the vaults made of tubes fell and broke the floor. On that occasion, terracotta vaulting tubes got among the pillars of the hypocaust along with other collapsed material (bricks, fragments of wall paintings, etc.). In the renovation of the building, a new floor (floor no. I) of bricks and larger pebbles was laid in "room 3" over the collapsed structures of the vaults and the hypocaust.[49] In that way, the entity to which the hypocaust and vaulted constructions of the earlier phase of the use of the building belonged was closed.

Regarding the function of "the building with a hypocaust", Miroslav Jeremić cautiously suggests that it is a thermal building from the 4th century. The only finds of the 4th century in the area of the building are coins from the time of *Constantius II* and, stratigraphically speaking, they belong to later pits.[50] The identification of the building as baths has never been con-

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[47] Documentation of Institute of Archaeology, Belgrade, inv 368: Diary of archaeological excavations 1988. 1–2.

[48] Analysis on the relationship between the wall thickness and the vault span in the architecture of Roman public baths in Algeria is given in Bahloul Guerbabi 2016, while interpreting different possibilities of the spaces covered with wooden roofs and vaults (235–250). Barbulescu et al. 2019 used the results of the study to interpret the types of vaults over the baths in the legionary fortress of *Potaissa* (111–120).

[49] In order to avoid confusion during the work of future researchers, the numbering of floors in this paper has not changed in relation to the diary of archaeological excavations from 1988.

[50] Documentation of Institute of Archaeology, Belgrade, inv 368: Diary of archaeological excavations 18.9.1978.

firmed with any certainty. Namely, four large rooms with hypocaust were excavated, without the rooms that would correspond to the *frigidarium*, *palaestra*, *apodyterium* or other contents.[51]

Among the building material, it is important to point out the bricks and tiles on which the stamp of *Cohors Aurelia II Dardanorum* (COHAURIIDARD) is printed. In "room 1", such specimens were registered among the floor bipedals, the bricks for the hypocaust pillars and the roof tiles.[52] In "room 2", a fragment of a brick with a part of an inscription COH and an imprint of a tile in the mortar with a stamp imprint were found.[53] The letters in the mortar cannot be distinguished, but the length of the stamp corresponds to stamps of the previously mentioned cohort. In "room 3" and "room 4", in the layer of collapsed structures with the vaulting tubes, between the floor constructions (II and III), fifteen pieces of bricks with the same stamps were found.

The appearance of *Cohors Aurelia II Dardanorum* in *Timacum Minus* is related to the period from the first half of the 2nd century to the end of the 3rd century, while, according to *Notitia Dignitatum*, *Pseudocomitatenses Timacenses Auxiliarii* appears in this area from the beginning of the 4th century.[54] Due to the appearance of the stamp of the previous cohort, the present dating of "the building with a hypocaust" must be moved at least a century forward, i.e. into the period of the 3rd century. Since, in other provinces, there was a real rarity of the appearance of vaulting tubes in the period of the end of the 2nd century and the beginning of the 4th century, the dating of "the building with hypocaust" to the 3rd century coincides with the period of expansion of the technique of making vaults using terracotta tubes.

The characteristics of tubes

The shapes of the vaulting tubes found in *Timacum Minus* are diverse. The tubes belong to the type with a cylindrical part on one side and a conical part on the other side (Fig. 5). However, different sorts are present within this type (Fig. 6). This classification was performed according to the specifics of the conical and cylindrical part, since the shapes, dimensions, colours and textures can also vary among individual specimens. The average dimensions differ in the largest range of values of 5 cm (± 2.5 cm), which is a consequence of the fast manual work of a large number of specimens, the quality of the clay, the firing temperature, and drying of individual specimens. The colour varies from dark (black) to red, which corresponds to brick products and is also affected by the quality of the clay and the firing temperature.[55]

Among the very rare types of vaulting tubes from *Timacum Minus,* the context of which has not yet been discovered, is a tube that has a slight concave transition between the cylindrical and conical part (Fig. 6a).[56] The tube is smooth on the outside, while a ribbed surface is recognisable on the inside. The tube is characterised by its red colour. This sort belongs to larger types of tubes with a length of 23.4 cm and a diameter of the outer edge of the cylindrical part of 10 cm.

In *Timacum Minus*, a sort of tube which has a ribbed outer surface was also discovered. A larger such tube, 19 cm long and 9.6 cm in diameter (Fig. 6b), has a conical part that is slightly convexly shaped (in the shape of a bullet), and a ribbed outer surface is present on the cylindrical part. The smaller tube has a length of 16.5 cm and a diameter of 8.4 cm, while more pronounced ribbed outer surfaces are present on both the conical and cylindrical parts (Fig. 6c). This sort of tube is characterised by its red colour. Unfortunately, the context of the finds has not been identified.

The previous sorts of tubes belong to the usual forms of vaulting tubes in the Roman Empire. However, the most present sort of tube in *Timacum Minus* is characterised by having a conical part of a smaller diameter and a cylindrical part of a slightly larger diameter, and a clearly accentuated transition between them. The outer surface of these tubes is smooth. A ribbed surface is registered on the inside of the tubes. The colour varies from dark red, through grey, all the way to black. The length varies from 17.5 cm to 22 cm,

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[51] On the other hand, most of the buildings in which the vaulting tubes are registered in the territory of south-eastern Europe are designated as baths related to military fortifications.

[52] Documentation of Institute of Archaeology, Belgrade, inv 368: Diary of archaeological excavations 25.9.1978, Documentation of AI, inv 368: Diary of archaeological excavations 26.9.1978.

[53] Documentation of Institute of Archaeology, Belgrade, inv 368: Diary of archaeological excavations 21.9.1979.

[54] ND, Or. IX, 40; Petrović 1995, 34.

[55] Small variations in colour and dimensions, according to Wilson, are primarily a consequence of the different firing temperature of a particular series of tubes, and were not of great importance since the rows of tubes in the interior of the room were covered with plaster, over which decoration in the form of paintings or mosaics were laid (Wilson 1992, 98).

[56] In Jeremić 2006, this species is listed as type (b) (89, Fig. 11).

Fig. 5. The appearance of a terracotta vaulting tube found at Timacum Minus inside "the building with a hypocaust" (Photo-documentation of the Institute of Archaeology, Belgrade)

Сл. 5. Изглед једне од керамичких цеви за сводове пронађених на Тимакум Минусу унутар „објекта са хипокаустом" (Фото-документација Археолошког института Београд)

and the diameter is in the range from 9.1 cm to 11.4 cm.[57] In most specimens, the length of the conical part in relation to the cylindrical one is the same (Fig. 6f), and it is not uncommon for some specimens to have even a slightly longer length of the conical part (Fig. 6g).

Among the found vaulting tubes, a special one was also discovered. It is characterised by a cylindrical shape and a characteristic convex narrowing in the middle of the tube (Fig. 6d). Its belonging to the mentioned group of finds is certain, based on the texture and colour of firing. It is characterised by a smooth outer and ribbed inner surface. It is 25.0 cm long and 11.6 cm wide. This is the only known find of this sort in *Timacum Minus*.[58] Its shape is characterised by the absence of a conical part, i.e. the presence of a duplicated cylindrical part and, thus, the possibility to pull rows of tubes into such an element from two opposite directions determines its function in a series of tubes. Based on that, we conclude that this element played the role of a "keystone" in the arched constructions of rows of tubes.[59]

The found "keystone" tube is more proof of the existence of a semicircular vault above the mentioned rooms.[60] It is of the great importance because it shows us that the tubes were lined up in transversal arched rows, and that there was a system of load transmission from one tube to another (Fig. 1a). The tubes, therefore, played a constructive role. In the case of rows of tubes placed longitudinally along a semi-cylindrical vault, there is no load transmission between individual tubes, but they play the role of formwork through which the mortar with coarse rubble aggregate (concrete) is poured (Fig. 1b).

As for the construction above the conch of "room 3", the covering construction was probably made using terracotta tubes and was certainly based on the principle of establishing arched transversal rows, but since the rows go in the direction to the top, the cen-

[57] In Jeremić's paper, this type is listed as type (a), but constant values of 22 cm in length and 11.36 cm in width have been attributed to it. However, only the largest of the specimens are distinguished by these values (Jeremić 2006, 89, Fig. 11).

[58] M. Jeremić listed this finding as type (c). It is not clear from where in the paper the different dimensions of 2 to 3 cm in the drawing of this find come, since this is the only find of its type on the site (Jeremić 2006 89, Fig.11).

[59] Jeremić 2006, 89.

[60] In the case of domed vaults made of tubes, especially in their upper part where the diameter of the meridian of the sphere becomes narrower, the tubes had to be arranged in horizontal rows. In the Ravenna domes, the spherical shape is made of two rows of tubes that lie on top of each other and are arranged in a spiral, at an angle close to the meridians, at the same time following the shape of the dome. Thus, it is not necessary to have a central element that would connect the tubes from two directions.

[61] Kassab Tezgör, Özsalar 2010.

[62] According to Wilson 1992, 98.

tral element is not applied. Such a system of arranging tubes was previously noticed in the dome forms of Roman pottery kilns in Turkey.[61]

The execution of a row of tubes in the form of an arch with a central element was also characterised by some specific interventions. Namely, the whole procedure was conditioned by stringing the elements from the beginnings of the arch to its top, with them being connected to each other with mortar. S. Stortz noticed that the tubes were lined up to the top of one such arch by pulling another filled with mortar on the previous one.[62] However, this procedure could last until four to five elements remained on each side of the central element at the top of the arch itself. These elements

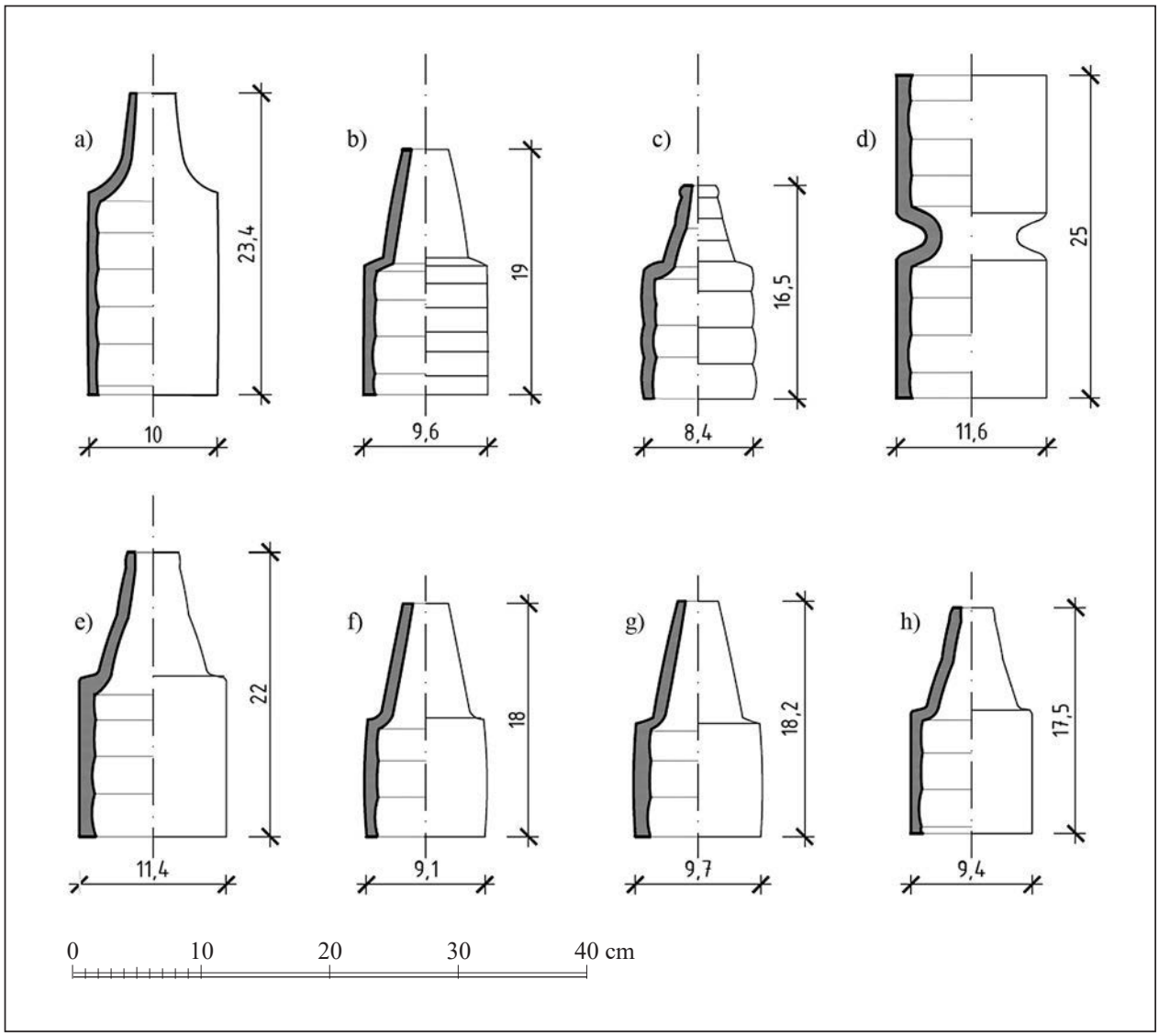

Fig. 6. The types of vaulting tubes found in Timacum Minus:
a) tube with a smooth surface and a larger cylindrical part; b) larger tube with a pronounced ribbed surface;
c) smaller tube with a very pronounced ribbed surface; d) central element for the apex of the vaults;
e–h) the most common sort of terracotta vaulting tubes (Drawing: Igor Bjelić)

Сл. 6. Врсте цеви за сводове пронађене у Тимакум Минусу:
а) цев са глатком површином и већим цилиндричним делом; b) већа цев са благо израженом ребрастом површином;
c) мања цев са веома израженом ребрастом површином; d) централни елемент за темена сводова;
e–h) најчешћа врста керамичких цеви за сводове (Цртеж: Игор Бјелић)

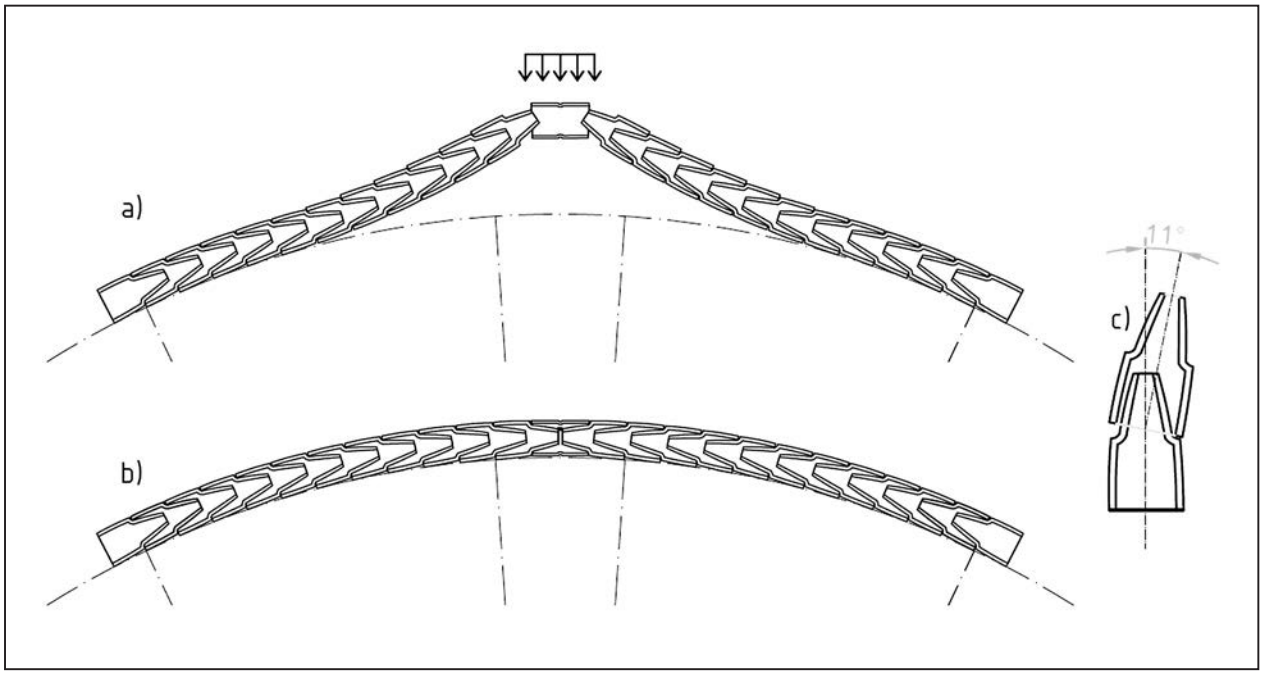

Fig. 7. The procedure of arranging terracotta tubes in the apex of the vault: a) placing the central element at the ends of the rows of tubes; b) placing the tube on the correct route of the curve of the vault (Drawing: Igor Bjelić)

Сл. 7. Поступак ређања керамичких цеви у темену свода: а) постављање централног елемента на крајеве низова цеви; b) постављање цеви на правилну трасу кривине свода (Цртеж: Игор Бјелић)

were lined up on top of each other without being interconnected with mortar and curved into the central element on each side (Fig. 7a). Then the whole set of elements was pushed down (Fig. 7b). In case the length of the row of these elements did not correspond to the curvature of the arch, the whole procedure took place again, choosing slightly longer or shorter elements until the appropriate curvature was reached. If the length of the elements in the row satisfied the curvature of the row at the same time, the procedure was repeated, but this time the mortar was finally introduced.

Traces of mortar found on the mentioned tubes are equally important for the analyses of vault shapes. In most cases, from examples in North Africa to Chester in Britain, the composition of mortars that joined individual elements corresponded to gypsum mortars, which basically consist of calcium sulphate.[63] Also, it was not uncommon to use lime mortars, which could be waterproof. By adding crushed or ground, baked bricks, which are characterised by a high content of silicate, as an artificial material that could have pozzolanic properties, to pure lime mortar, calcium-silicate-hydrate was obtained. It initiates the setting speed, and gives water resistance and strength to the mortar, giving it the characteristics of hydraulic mortars. For the joining of tubes in *Timacum Minus,* lime mortar with the addition of crushed brick was applied. Unevenly distributed fragments of bricks in the composition of the mortar were up to 0.5 cm. Brick, however, was only one of the possible additives to give the mortar the mentioned properties. Often, the mortar that connected the vaulting tubes in Roman buildings also included other materials that could have pozzolanic properties, such as coal and ash obtained by burning straw,[64] which, however, was not noticed in the mortars of *Timacum Minus*. Whether hydraulic lime mortar was formed with the addition or exclusive use of materials of natural or artificial origin with pozzolanic properties as a binder or aggregate, whether the lime used was formed by firing impure limestone,

[63] The reasons for the greater use of gypsum mortars are explained in: Lancaster 2015.

[64] Lancaster 2012.

or even part of the aggregate had mild pozzolanic properties, cannot be easily concluded.[65] As for the lime mortar with coarse rubble aggregate, which could have been poured over the terracotta tubes in *Timacum Minus*, it is important to say that, in this region, quality natural materials with pozzolanic properties are not easily available, so this mortar could never have achieved the properties of Roman concrete where volcanic materials with pozzolanic properties were used, which enabled the construction of monumental structures in the Roman Empire. Brick was the most used pozzolanic additive that could improve the properties of lime mortar in the eastern part of the Roman Empire, and in the territory of today's Serbia.[66] Inside the tubes themselves, mortar of the same visual composition as on the tubes was found. It was also found inside fragments of the conical parts of the terracotta tubes, being deposited there during the pulling of the next tube with the inserted mortar on it. The ribbed surface in the cylindrical part improved the mutual contact of the mortar and the tube.

According to the considered properties of the plan of the rooms and the analysis of the tubes, it was concluded that there was a semicircular vault above "room 1" and "room 3". However, when it comes to "room 2" and "room 4", given the degree of their research, we have not been able to reconstruct the vault above them.[67]

Analyses of the dimensional characteristics of the vault

Although various theories are represented in the field of analysis of masonry structures, the structural theory of masonry has been proved to be the most practical model for obtaining the acceptable results in the analyses of arches and vaults.[68] It relies on the plastic theory, which theorises the possible extreme conditions under which the structure could collapse. Based on the type of construction, arches are considered, within the framework of plastic theory, as statically indeterminate constructions that are sensitive to small movements.[69] In relation to the structural theory of masonry and plastic theory, the following assumptions are adopted for arches and vaults. The first assumption is that the value of the frictional force between the voussoirs is so great that any tendency to slide is prevented (Fig. 8a and 8b). Another assumption is that masonry structures are not resistant in any way to tensile forces. The third assumption is that the masonry structures of the arches have a high compressive strength and that the stresses are so low that there is no crushing of the mortar.[70]

By transmitting the load from the vault to the walls and further to the ground, the action of horizontal thrust occurs, which can affect the mutual spacing of the upper ends of the walls and the alter the geometry of the vault, i.e. the appearance of cracks within the vault structure. The minimum thrust value at which cracks occur is observed. The mutual influence of horizontal thrust within the structure in relation to the gravitational action of the mass of vaults and walls can be represented by the graphostatic method, with a thrust line in the form of an inverted chain[71] (Fig. 8). It, in

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[65] Nikolić, Rogić 2018, 40–45. Future laboratory analyzes will show the characteristics of this mortar and some indications will be obtained about the materials used for its preparation. With the research of available natural materials in the vicinity of *Timacum Minus*, valuable conclusions about their exploitation will be obtained.

[66] Radivojević, Kurtović-Folić 2006, 693–694.

[67] Since this space measures only 1.45 × 2.15 m, the first question was whether this space could have been covered with a vault of tubes at all. Namely, since in the mentioned tube type the flat conical part is quite pronounced in relation to the usual design of this type, the greatest slope between individual tubes was questioned, which gives a given minimum radius of the semicircular vault. Measurings showed that the slope was about 11° (Fig. 7c), and that it provides a minimum radius of only 84 cm. Therefore, it is certain that the mentioned space was also covered with a vault of tubes since a great amount of tubes was discovered between the pillars of the hypocaust inside that space over which the floor collapsed. According to the dimensions, i.e. to the shape of the space itself, it would be impractical to envisage a spherical or cross vault over such a space, which could also be made of vaulting tubes. It is thus, the most likely that there was a semicircular vault over this space.

[68] The "classical" approach based on the field of strength of materials does not lead to results that are close to the actual behaviour of masonry vaults, and more confidence should be given to observing the stability of rigid disks that turn into a mechanism. For the whole assembly, the equilibrium equations do not contain enough data to determine the positions of the support line within a single arch (Bošnjak-Klečina, Lozančić 2010, 409–410; Heyman 1995, 6).

[69] One of the basic laws of the plastic theory applied in the consideration of statically indeterminate construction systems is that which states that the structure is safe if one state of equilibrium in a particular structural element can be determined (Heyman 1995, 22).

[70] Heyman 1995, 114

[71] The line of action of the tensile force in a chain is the analogue to the thrust line of the arch in arched structures. For the arch, the thrust line is, in its appearance, vertically inverted from the shape of the chain, i.e. from the appearance of the line of tensile force in it. At the same time, it is important to note that the chain cannot be defined precisely enough as a parabola, so for that reason, this analogy is used – the shape of a hung chain.

its form, must fit somewhere within the mass of the vault (Fig. 8c). Depending on the variation of actions and the intensity of the load, the thrust line can change its shape. Instability occurs if the intensity of a force on the construction of the vault at one point of the extrados or intrados of the arch is too great. In that case, instead of touching the edges of the outer and inner curve at three points, the thrust line also has contact at a fourth point, so instead of a stable three-hinged arch mechanism, an unstable "four-hinged arch" mechanism is created (Fig. 8e–f). Changing the direction of the thrust line outside the arch mass or contact

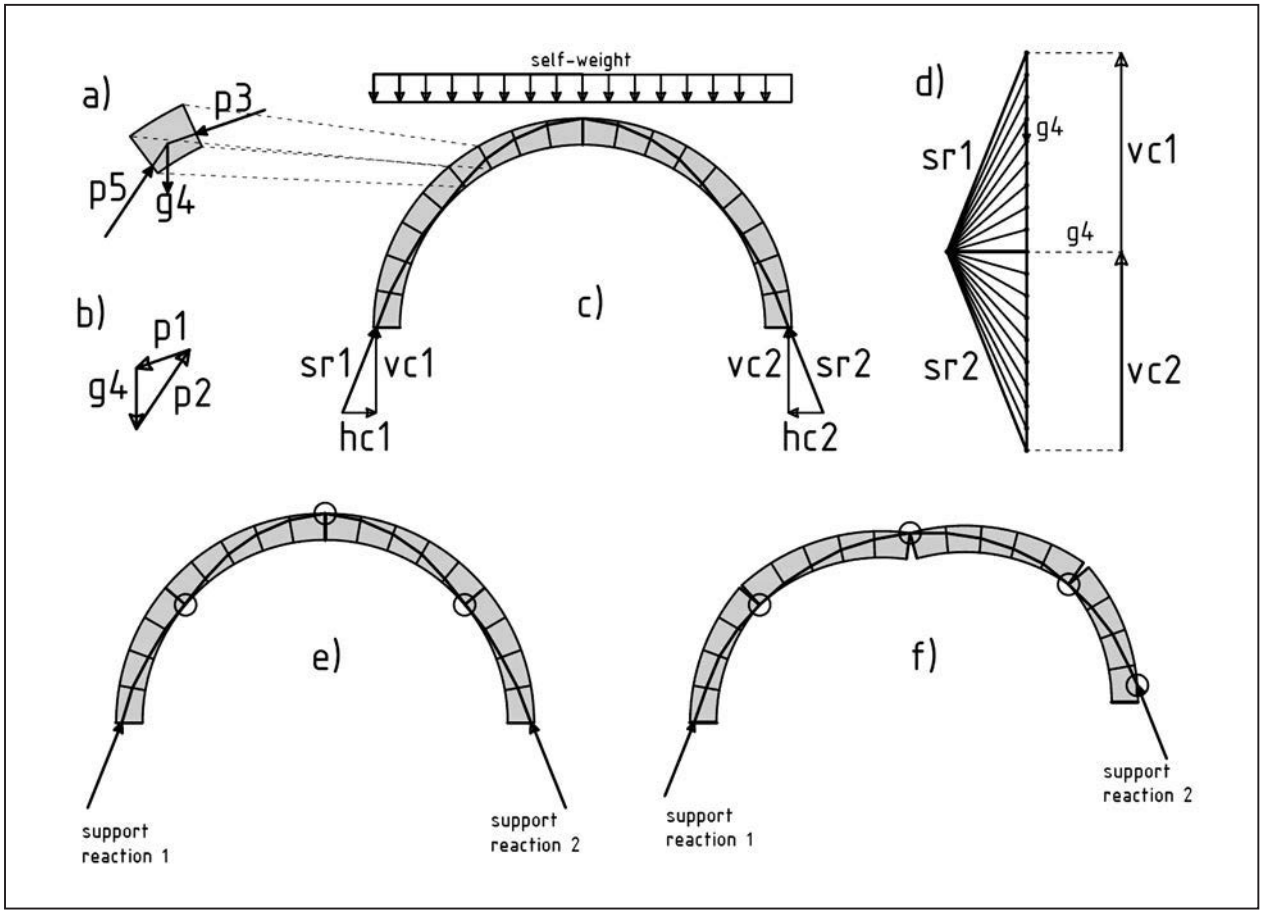

Fig. 8. Graphostatic method for the analysis of thrust-line position within an arch: a) A separated element of the arch (voussoir) with its self-weight and supporting reactions; b) The equilibrium state within one element of the arch; c) The mass of the arch elements „breaks" the thrust-line in certain places along the directions of the vertical axes in which the centroids of gravity of the individual arch elements lie (the supporting reactions (sr) of the whole arch are divided into their vertical (vc) and horizontal (hc) components; d) The polygon of forces where the values of the reactive forces for each element in relation to their individual weights are calculated (the thicker line indicates the support reactions); e) a stable "three-hinged arch" mechanism; f) an unstable structure of a "four-hinged arch".

Сл. 8. Графо-статички метод за анализу положаја потпорне линије унутар једног лука: а) Издвојени елемент лука (своdар) са назначеним гравитационим оптерећењем и силама реакције услед оптерећења унутар лука; b) Стање еквилибријума унутар једног елемента лука; c) Маса елемената лука „прелама" потпорну линију на одређеним местима по правцима вертикалних оса у којима леже тежишта засебних елемената лука (силе реакције у ослонцима (sr) за читав лук су подељене у одговарајуће вертикалне (vc) и хоризонталне (hc) компоненте); d) Полигон сила где су срачунате вредности сила реакција за сваки елемент у односу на њихове појединачне тежине (дебљом линијом су означене потпорне реакције); е) механизам лука „на три зглоба"; f) нестабилна структура лука „на четири зглоба".

of the thrust line with the intrados or extrados of the arch in more than four positions inevitably leads to the collapse of the arch. Thus, the design of the arch depends on how the thickness is determined for a given span (i.e. the stiffness of the arch) and the thrust that the arch should withstand. The proportions of an arch are an important factor in its load-bearing capacity, and these proportions in the form of an arch could only be reached empirically by Roman builders.

According to the data obtained from the archaeological excavations in *Timacum Minus*, a theoretical model was made on the basis of which the proportions of the assembly of walls, vaults and their load-bearing capacity in relation to the load of the entire assembly were analysed. The setting of the theoretical model for the analysis of vaults with the use of terracotta tubes is characterised by some specifics. We can recall here that the tubes were arranged in a radial row by pulling on each other, and that they were filled with mortar. According to the findings from *Timacum Minus*, the composition of the mortar inside the tubes did not differ from the mortar that was poured with coarse rubble aggregate over the vault of tubes.

In the type of vaults made of terracotta tubes in the 3rd century, the concrete was laid radially.[72] The way the rows of tubes and the concrete were laid, as well as the uniform composition of the mortar, meant that the vault can be viewed as a single-layer construction composed of radially arranged elements. The model is conservative in terms of safety since the same value for unit mass per unit volume was taken for the vault layers and load-bearing walls. The conservatism of the model is reflected in the determination of the mass of the vaults greater than it would be in reality in relation to the mass of the walls. In practice, it is more certain that the walls were more massive per unit volume than the vault itself, which positively affected the stability of the vault, especially bearing in mind the partial filling of the tubes with mortar with coarse rubble aggregate. It is also interesting to consider the mass of layers inside the vaults, primarily from the point of view of force transmission. Due to the need to observe the theoretical model in this paper as conservatively as possible, an approximate equalisation of the unit masses of the two layers – terracotta tubes and the poured over mortar, were performed. Namely, it is clear that the top layer had to be more massive than the layer of tubes that had a maximum diameter of 11 cm. In our model, it was adopted that those layers have the same mass, so the thrusts of the entire vault on the walls would be higher. In this way, the model was brought to the fracture limit state in terms of unit masses of its elements – the vaults and walls, in order to examine the optimal dimensional characteristics of the walls and vaults [73] By reducing the mass of the vault layers in *Timacum Minus* to the same value, and equalising that mass with the mass of the walls, the optimal values of the dimensions of the assembly were examined.

The cross-section through the semicircular vault (with the geometrical centre in point O, radius *r,* and the thickness *t*) and load-bearing walls (with the straight height *h* from the level of point B to the point A) was observed, since the transmission of forces through the semicircular vault most closely takes place according to the model of force transmission within one arch to piers of a certain thickness (Fig. 9). The height of the masonry, i.e. the part of the walls above the vault supports (from the level of point A to the level of point C), was determined to fit into the projected slope of the roof planes of 23° above the extrados of the vault. This slope of the roof was common for Roman architecture.[74] In relation to the mentioned height of the masonry, the position of point D was determined, which represents one of the three hinges on which the stability of the remains of the vault construction rests. Theoretically, it is at this point that the appearance of a crack is possible when the supports are spaced apart and the arch geometry is adjusted to the previous circumstance. The second point is symmetrical to the previous one, while the third is determined at the top of the extrados of the vault.

The Rankine factor and the percentage of the abutment were selected as relevant indicators of assembly stability, according to the model used by L. Lancaster.[75] The Rankine factor implies a geometric safety factor that relies on the position of the thrust

[72] Lancaster 2015, 116.

[73] Although in numerous examples in North Africa, terracotta tubes fell from the back of the vaults, the vaults themselves survived. In the case of "the building with a hypocaust" in *Timacum Minus*, according to archaeological finds and situations, it is clear that the tubes were an integral part of the vaults until their general fall. Lancaster pointed out that within vaults of this type, tubes could not be an element that facilitated the mass of the vaults (Lancaster 2015, 116–117; 182–183).

[74] Ulrich 2007, 124.

[75] Lancaster 2015, 182–183.

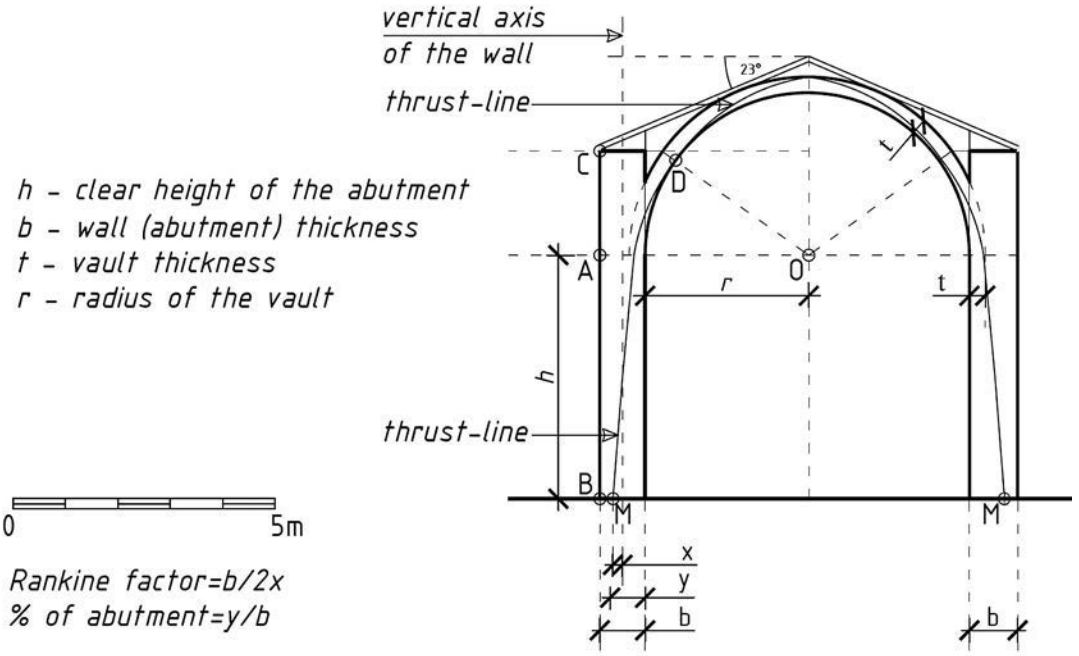

Fig. 9. The basic relationship between load-bearing walls and surcharges to the slope of roof planes and the span of the vault (Drawing: Igor Bjelić)

Сл. 9. Начелни однос носећих зидова и назидака ӣрема ӣаду кровних равни и расӣону свода (Црӣеж: Иӣор Бјелић)

line. According to W. J. M. Rankine,[76] the thrust line must be located within the middle third of the cross-section of the abutment, so that no tensile forces develop in relation to the applied thrusts of the vault.[77] For the Rankine factor, the formula *b/2x* was used, where *b* is the thickness of the load-bearing wall, and *x* is the distance from the vertical axis of the wall to the point of load application M (Fig. 9). In our analysis, the thickness of the wall is constant (0.91 m). This point is in the plane of the wall support, and is affected by the thrust line of the vault and wall. The same point is located on the other side of the vertical axis of the assembly. A Rankine factor of 1 or less defines assemblies whose stability is impossible, while for values above 3, the assembly is considered stable. Between these values, the stability of the assembly is uncertain, which means that any external factor (additional overload of the assembly, earthquake, sinking or sliding of the foundation) can affect it. The closer the thrust line is to the outer edge of the wall, the more pronounced the possibility of assembly collapse. In relation to this possibility, the percentage of abutment is determined, where collapse occurs when the percentage of abutment is equal to the value of 100%. Percentages less than 67% were considered safe according to Rankine's rule. The value of the percentage of abutment is determined as *y/b*, where *y* is determined as the length from the inner edge of the load-bearing wall to the previously defined point M. Cases where these two factors could not be defined, show that the assembly of walls and vaults tends to collapse.

At the beginning of the analyses, a value of 0.30 m was taken for the approximate thickness of the vault, based on examples of damaged vaults of this type or their fallen segments registered in Britain and North Africa.[78] In relation to this value, the first basic group of cases was researched, where subgroups according

[76] W. J. M. Rankin (1820–1872) was a 19th century mechanical engineer. L. Lancaster used his work: Rankine, W. J. 1858 for the development of her model.

[77] This attitude tends to prevent the case where tensile forces would occur, to which the masonry structures of arches and vaults are not immune, according to the second assumption of the boundary equilibrium method presented above.

[78] Lancaster 2015, 109.

to wall height values were defined: a) the height of the walls is 3.08 m, equal to the vault radius (the real measurement taken from the site as the half distance between the walls), b) the height of the walls is 4.50 m, c) the height of the walls is 6.16 m, equal to the vault diameter.[79] The second group of cases involved strengthening the vaults to a thickness of 0.50 m and the mentioned wall heights for examining subgroups of cases. In addition to these cases, the possibilities of force transmission within the assemblies where the thickness of the vault is smaller (for the values of vault thickness 0.11 m, 0.20 m, 0.25 m and 0.30 m) were examined, as well as those cases where the span of the vault is larger (for values of vault diameters of 7.00 m and 7.50 m) (Fig. 10).[80]

For a defined value of the vault thickness of 0.30 m, the first group of cases was analysed. The possibility of approaching point M to the bearing wall axis due to the increase of the bearing wall mass, i.e. the resulting force as a product of the wall mass and gravitational force, was investigated. Within this group, the first case in which the height of the load-bearing walls is equal to the radius of the vault (Fig. 10.1) determines a Rankine factor of 1.43, and the percentage of abutment in the value of 85%. Already with these measurements, it is noticeable that the values of the indicators belong to the group where there is uncertainty about the stability of the whole assembly.[81] By increasing the height of the load-bearing walls to 4.50 m, and having the same vault thickness of 0.30 m, the value of the Rankine factor decreases and the percentage of abutment increases. Finally, for a height value equal to the vault diameter, the position of point M is at the outer edge of the load-bearing wall (Fig. 10.2). Therefore, the Rankine factor and the percentage of abutment could not be defined. It is noticeable that by increasing the height of the walls, the stability of the assembly is increasingly endangered.

In the second group of cases, the mentioned wall height values were tested for a value of the vault thickness of 0.50 m.[82] The possibility of a better load-bearing capacity of the entire assembly was examined, provided that the vault was strengthened with a larger thickness. For a value of wall height equal to the radius of the vault, the Rankin factor is equal to 1.20, while the percentage of abutment is equal to 92% (Fig. 10.3). At the same time, the position of point M is much closer to the outer edge of the wall than was the case for the value of the vault thickness of 0.30 m. For the value of the wall height equal to 4.50 m, or the diameter of the vault, the unfavourable values of the indicators were more pronounced. It is obvious that an increase in the thickness of the vault directly initiates its greater mass and, thus, an increase in the resulting forces of horizontal thrusts, which have a less favourable effect on the supports than was the case with the first group of examined cases. Such a conclusion prompted the examination of the following group of cases.

In the following cases, the load-bearing capacity of the assembly where the thickness of the vault is smaller was examined. From the previous tests, the most favourable possibilities were adopted, where the height of the load-bearing walls is equal to the radius of the vault, since it has been proven for the others how much more unstable they are. The diameter of the tubes themselves, about 11 cm, was taken as the smallest value of the vault thickness (Fig. 10.5). It is noticeable that the thrust line, in that case, extends beyond the boundaries of the vault itself, which would otherwise cause its fracture at the point where the thrust line protrudes most beyond the boundaries of the vault in cross-section. Therefore, the Rankine factor and the percentage of abutment could not be defined.

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[79] Since we cannot talk about static-computational analyses in the period of Antiquity, Roman builders came to them empirically. In doing so, they were tied to the proportions of the architectural elements determined in the plan of the building, which in the case of arches and vaults was primarily their range.

[80] Although the number of examined cases was higher, the cases presented here are only those which, in relation to the entered data of dimensions of thickness and height of the walls and vaults, as well as the diameter of the vaults, give relevant indicators regarding the stability of the assembly.

[81] The values of the indicators are, at the same time, a consequence of the conservatism of the theoretical model because the most unfavourable circumstance was determined for the massiveness of the arches and walls. The validity of the obtained results in this theoretical model can be compared with that of Lancaster, who studied the same type of arches. For the span of the vault (arch) of 5.25 m, the thickness of the load-bearing walls of 0.91 m, and the height of the walls, which is one and a half times larger than the radius of the vault, a Rankine factor of 1.3 and a percentage of abutment of 89% of the base of the wall (pier) were obtained, where the unit masses of the walls and vaults are also equalised (Lancaster 2015, 183).

[82] The dimensions of the elements of Roman architecture were mostly determined according to a foot. Accordingly, the second group of cases should be analysed so that the thickness of the vault is two Roman feet (about 60 cm). According to the results obtained in the second group of tests, it was confirmed that a vault 0.5 m thick adversely affects the stability of the assembly, so the adverse effect of a vault thickness of two Roman feet would be even more pronounced.

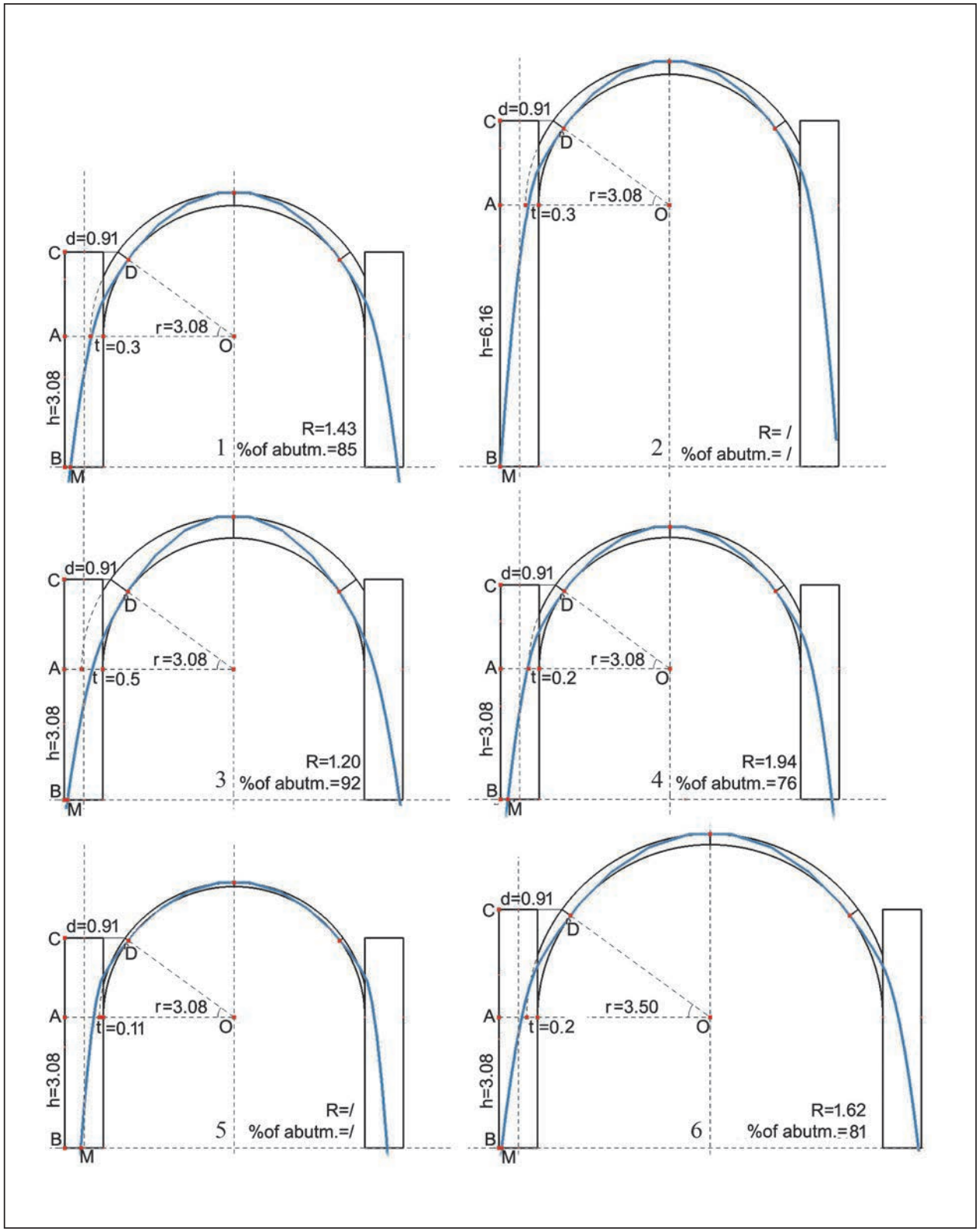

Fig. 10. Analysis of different dimensions of walls and vaults and their mutual relationships (Drawing: Igor Bjelić)

Сл. 10. Анализа различитих димензија зидова и сводова и њихових међусобних односа (Цртеж: Игор Бјелић)

For a vault thickness value of 0.20 m, the thrust line is within the vault boundaries, and the Rankine factor has a value of 1.94, while the percentage of abutment is equal to 76% (Fig. 10.4). For a vault thickness of 0.25 cm, the indicators are characterised by less favourable values.

In the last group of examinations, cases where the span of the vault is larger were considered. Since the previous tests considered the range of values of load-bearing wall height dimensions and vault thickness that adversely affects the stability of the assembly, for further analysis, more favourable options for vault thickness (0.30 m) and load-bearing wall height (3.08 m) were adopted. These factors were selected based on the results obtained so far from the Rankine factor and the percentage of the abutment (Fig. 10.6). In the first case, a radius of 3.50 m was adopted, corresponding to a span of 7.00 m, which affects the value of the Rankine factor to be 1.23, while the percentage of the abutment is 91%. As the span increases, the percentage of the abutment increases, i.e. the Rankine factor decreases.[83] According to the measurements of the indicators, it is noticeable that the factor by which the span is increased also adversely affects the stability of the vault and, thus, the entire assembly, even if the thickness of the vault and the height of the load-bearing walls are the most favourable.

The analysis of the theoretical model of the vault and load-bearing walls assembly gives several important results. During the first and second groups of tests, the unfavourable influence of the increase in the height of the bearing walls and the thickness of the vault was highlighted. The first circumstance indicates that the building could not be extended in height since it had walls 0.91 m thick and a span of at least 6.16 m according to the reconstructed plan. As the most optimal possibility, the analysis singled out the case where the walls are of the same height as the radius of the span above "room 1" and "room 3". Within the examination of the third group of cases, it was proved that the vault could not have been made only of tubes, but mortar together with coarse rubble aggregate was laid over, which increased the thickness of the vault to the minimum required of 0.20 m, in order to transfer the thrust line of forces within the mass of the vault. The analysis, therefore, proved that such a vault could not survive without putting mortar with rubble coarse aggregate over the tubes. Within the last group of tests, it has been proven that by further increasing the span of the vault larger than 6.16 m, its stability is increasingly adversely affected. It is certain that reducing its range would have a more favourable effect on the stability of the assembly, but this was not the case according to the plan of the rooms with the positions of the hypocaust pillars. Therefore, the conclusion of the analysis gives the thickness of the vault from 0.20 m to 0.30 m, the height of the walls of 3.08 m and the vault span of 6.16 m, i.e. shows the probability of the reconstruction of the geometry and dimensions of the vault as shown in Fig. 10.4. With the stated values of the dimensions of the load-bearing walls and vaults, the Rankine factor has a value of 1.94, while the percentage of the abutment is equal to 76%. In this way, the most favourable values of the dimensions of the load-bearing walls and vaults within the conservative model with predetermined strict criteria of the massiveness of the assembly are obtained.

The correctness of the reconstructed plan of "room 1" and "room 3", i.e. the proposal to cover these rooms with a semicircular vault, is best proven by a static analysis of the theoretical model.[84]

Conclusions

South-eastern Europe has so far not been recognised as an area where the use of vaulting tubes was frequent in the late antiquity period. Until now, according to previous international literature, only seven sites in Serbia and the countries with which it borders were known. By researching this topic, we have managed to greatly increase the number of the sites where

[83] This case was also examined for the possibility of increasing the thickness of the vault from 0.30 m to 0.50 m. The result is the same – the indicators are characterized by more pronounced unfavourable values for the stability of the assembly, and the position of the thrust line is even further away from the axis of the load-bearing walls. The span of the vault of "the room 3" certainly could not be more than 8.13 m because, at a greater distance from that, measured from the west wall of this room, there is a trace of the hypocaust columns of "the room 4", as shown in the technical documentation of the Homeland Museum in Knjaževac.

[84] In the previous analyses, the support of a heavy roof cover should also be taken into account. In the presence of factors that adversely affect the stability of the assembly, this factor would further contribute to the endangerment of the entire structure. By adopting a conservative theoretical model at the beginning of the research, a wide range of cases was obtained where the values of the output indicators indicate the initial endangerment of the structure in relation to the registered thickness of the load-bearing walls and the reconstructed vault span. Based on that, in each of the examined cases, a range of values of a certain dimension was singled out, which favourably affects the load-bearing capacity of the vault assembly and load-bearing walls.

the presence of vaulting tubes has been registered. It is important to point out that this research has also included examples of tubes whose real function was not recognised until know, which all indicate that the finds of vaulting tubes may be even more frequent in the area of south-eastern Europe.

The shape of the terracotta tubes in *Timacum Minus* is diverse, but they all belong to the type with a clearly distinguished conical part for insertion into the next tube. The presence of at least three different sorts of the same type indicates that these tubes were not the product of just one master. In shape, they are most similar to the specimens from *Novae* in Bulgaria and *Jidova* in Romania. This indicates that there could have been a connection between these places, either in terms of trade or the transfer of knowledge regarding the manufacture of the vaulting tubes, and even the technique of their construction. At the current level of research at both sites, it is almost impossible to determine if any of these is true.

The dimensions of the vaulting tubes vary at Timacum Minus. In the most numerous group of specimens, the conical part is as long as the cylindrical part. Such a relationship between the two parts of this group of tubes enabled the conical part of one tube to be completely immersed in the cylindrical part of the next tube, which was not the case with most specimens from other provinces of the Empire. Since the span of the vault was defined for "room 1" and "room 3", it was possible to determine, according to the dimensions of the tube, how many elements were used to cover one room with this vault.

Considering that their dimensions varied from 17.5 cm to 22 cm, 73 to 105 terracotta vaulting tubes would have been needed for the construction of one arched row of a 6.16 m span. The number of elements was most probably odd considering that there was a central element. On each side of the central element, from 36 to 52 specimens of the tube with a conical part could fit. Considering that the length of "room 1" in the other direction was 5 m, as well as "room 3", and the maximum diameter of the tube was 11 cm, it was necessary to construct 45 or 46 rows to cover these two rooms. These values should be understood as approximations, since they were calculated assuming the rows were placed next to each other. Also, the diameter of the tube could be 9 cm instead of 11 cm, so in the considered calculation, 4 cm of space would remain for the mortar between each arched row. Between 3,285 and 4,738 tubes would have been needed to construct the vault over one of these two rooms. Considering that there were two more rooms in which their remains were discovered, this number could have been at least three times higher.

The size of the tube is too small for applying a stamp indicating the presence of a certain cohort. However, the bricks and tiles with the cohort *Aurelia II Dardanorum* stamp placed in the lower parts of the walls of "the building with a hypocaust" directly place the construction of this building in the 3rd century. This circumstance has a deeper significance. Older researchers of the construction of vaulting tubes have indicated that the large number of elements required their production near the construction site. Since there was a developed activity of ceramic production in Timacum Minus, it is possible that elements of vaulting tubes could also have been produced here as part of it. This possibility also opens up directions for future research on this topic.

Of special importance is the finding of the central element, which had the role of a "keystone" in the apex of an individual transversal arched row of tubes in the vault. In addition to the fact that such an element is a rare find among the collapsed material of vaults, it directly resolves many issues related to the characteristics of the vaults. In the first place, it shows that the rows of the vaults were built as transversal arched rows on both sides, in the connection of which such an element was located. This resolves the issues of vault construction, the transmission of forces from the apex to the supports and the general constructive role of vaulting tubes. Furthermore, the existence of transversal arched rows indicates that a semicircular vault was most practical above "room 1" and "room 3". In that sense, the architectural analysis using one single building element can provide precious solutions for the reconstruction of the entire structure.

The application of static analysis of the theoretical model can help us to obtain answers to some more questions and further clarify the somewhat unclear archaeological situation. Thus, the approximate value of the height of the load-bearing walls that could carry the vault made of vaulting tubes was examined. It was highlighted that the harmonised proportions of the arch and the dimensions of the load-bearing walls were the basic factors of the stability of the assembly. Determining the height of the load-bearing walls at 1.5 times the value of the radius of the vaults endangered the stability of the assembly, which was even more pronounced at twice the value of the radius, as indi-

cated by the data obtained by the graphostatic method. Therefore, the height of the supporting walls of the vault had to be adjusted to the entire assembly, so they were certainly equal to the radius of the span of the vault.

Finally, by applying the graphostatic method to a conservative theoretical model, it was shown that a vault with the use of terracotta tubes was most stable for a vault thickness value of 20–30 cm, where the thrust line for a given span of 6.16 m (i.e. radius of 3.08 m) can fit within the vault boundaries, and where the value of the height of the load-bearing walls is 3.08 m with a given thickness of 0.91 m. Accordingly, the height of the rooms at the apex of the vault was 6.16 m. Verification of the reconstructed plan of "room 1" and "room 3", considering the degree of damage to the walls and the material remains of the vault, could not be possible without analysing the characteristics of the assembly of the vault and walls. Although a precise reconstruction of these rooms cannot be achieved, the analysis of their static characteristics using the graphostatic method was the most practical way to gain at least a rough insight into their former appearance within "the building with hypocaust".

With this research, we have tried to highlight the importance of findings that are often given little attention, such as terracotta tubes. We have also drawn attention to the importance of architectural analysis in the process of interpreting a series of site problems whose solutions complement the image of a particular structure, its place within the building, and finally the context in which it was applied at a site. In that way, unclear situations can be resolved after archaeological excavations, especially when the buildings have not been fully archaeologically researched, which is the case with "the building with a hypocaust" at *Timacum Minus*. We hope that this case study can be an important reference for future archaeological and architectural research at sites where discoveries of the same type of finds of late antique construction activity, i.e. terracotta tubes for vaults, are possible.

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Translated by the authors

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From an Element to a Composition: Reconstruction of a Vault of Terracotta Tubes from Timacum Minus, Serbia (173–199)

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ОД ЕЛЕМЕНТА ДО КОМПОЗИЦИЈЕ: РЕКОНСТРУКЦИЈА СВОДА ОД КЕРАМИЧКИХ ЦЕВИ ИЗ ТИМАКУМ МИНУСА У СРБИЈИ

Кључне речи. – сводови, цеви за сводове, керамичке цеви, *tubi fittili*, *Timacum Minus*, технике грађења, римска архитектура, касноантичка архитектура, северијански период, југоисточна Европа

Обновом археолошких ископавања античког кастела Тимакум Минус 2019. године створиле су се нове могућности за тумачења његових грађевина које су истраживане пре више деценија. Међу остацима грађевина око античког кастела *Timacum Minus*-а посебну пажњу привлачи делимично истражен „објекат са хипокаустом", нарочито у погледу његових конструктивних карактеристика. Поред иначе честих античких конструкција хипокауста и зидног грејања, међу остацима ове грађевине уочена је и посебна врста грађевинских елемената – керамичке цеви за сводове. Велика количина откривених цеви указала је на то да је ова грађевина заиста имала сводове израђене од њих.

Иако је појава цеви за сводове приликом истраживања античких локалитета на тлу југоисточне Европе регистрована, она није довољно документована, као што ни сама функција цеви често није препозната. Један од разлога за то јесте недовољна упућеност истраживача у специфичне карактеристике цеви за сводове и њихову функцију, услед чега се оне мешају са водоводним цевима, тубулусима или калемовима везаним за зидно грејање – будући да сваки од тих елемената припада керамичким производима који су намењени грађевинарству.

У раду су разматране карактеристике цеви за сводове на Тимакум Минусу, као и контекст у коме су пронађене унутар „објекта са хипокаустом". На основу налаза печата кохорте Аурелије II Дараданорум одређено је да „објекат са хипокаустом" и конструкција сводова од керамичких цеви потичу из III века – у коме је и иначе појава тих сводова широм Римског царства била честа.

Приликом систематизације врста керамичких цеви на Тимакум Минусу посебно је издвојена она које је било највише у „објекту са хипокаустом". У склопу ње је препознат и сасвим специфичан централни елемент који је омогућавао да се два низа цеви на истом правцу, али из супротних смерова, међусобно споје. Тај елемент је дефинисао облик свода којим су биле покривене просторије чију је реконструкцију основе било могуће извршити.

Архитектонске анализе „објекта са хипокаустом", као и карактеристике уочене на самим цевима указале су на то да су просторије биле покривене полуобличастим сводом, изграђеним од лучних вертикалних низова цеви које су у темену биле „закључане" централним елементом. Реконструкција изгледа цеви и начина њиховог ређања уклапа се у хронологију извођења објекта и свода током III века. Даљим статичким анализама дошло се до још неколико сазнања. Показало се да је преко свода морао бити нанесен одређен слој малтерне масе да би дебљина свода досегла оптималну вредност у опсегу 20–30 cm. На основу пропорција објекта које су одређене у његовој основи испитана је висина објекта, где је група случајева такође дефинисана пропорционално. Према нашим анализама, зидови просторија „објекта са хипокаустом" у којима су цеви регистроване могли су досезати висину до 3,08 m, док је висина просторија у темену свода могла бити 6,16 m.

Овим истраживањем покушали смо да укажемо на велики значај појединачних архитектонско-грађевинских елемената, а међу њима и керамичких цеви за сводове, којима се често не придаје довољна пажња. Налази керамичких цеви за сводове у Тимакум Минусу, уз извршене архитектонске анализе, употпуњују слику откривеног „објекта са хипокаустом" из више аспеката. Посебно је значајно дефинисање његове висине, које је веома тешко за античке грађевине профане архитектуре на нашем тлу будући да су најчешће сачуване у приземној или темељној зони. Значај налаза керамичких цеви за сводове у Тимакум Минусу велики је стога што је он омогућио како конкретно дефинисање контекста њиховог налаза тако и реконструкцију облика одређених делова грађевине помоћу тог елемента, што до сада није истраживано приликом анализа античке архитектуре на тлу југоисточне Европе.

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ROMAN SARCOPHAGUS FROM TITEL[1]

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Abstract. – The unusual Roman sarcophagus of green volcaniclastic rock that was found in Titel, a small town in Vojvodina (SRB), and is now kept in the Muzeul Național al Banatului, in Timişoara (RO), caused considerable unease among scholars in the past as it could not be convincingly connected with any of the productions in Pannonia and Moesia Superior. Only Silvio Ferri, albeit a long time ago, correctly identified its connection with the sarcophagus production in Sirmium and with the sarcophagus of Asclepiodota in particular, made of Dardagani limestone. Sarcophagi of volcaniclastic rock have only been recorded in the region of Srem and its immediate vicinity, and were all produced in *Sirmium*. The material most likely arrived there from the south, quarried near the village of Rajići, ca 25 km west of *Domavia,* in the valley of the River Drina. The structure and decoration of the sarcophagus from Titel reveal it as essentially the type produced by the workshops at *Salona* using models from Prokonessos. Having said that, its decorative details reveal a more complex picture. The decoration of narrow strips of plant motifs indicates a close relationship between the sarcophagus workshops at Sirmium and the workshops active in the middle and upper valley of the River Drina with its tributaries, with the centre at Skelani (*municipium Malvesiatium*), which, in turn, had close ties with the Salona production. The use of the Norico-Pannonian volute of Type 6 (after Pochmarski) on the inscription panel frame of the sarcophagus from Titel shows another area of influence – the travertine sarcophagus production of *Aquincum* – on the appearance of the sarcophagi from Sirmium that freely use these motifs (including Type 7) to form the frames of the inscription and figural panels. Available evidence clearly shows that the sarcophagus from Titel can be attributed to the Sirmium sarcophagus production of the 3rd century, more precisely its second half.

Key words. – Titel, sarcophagus, volcaniclastic rock, Salona workshops, Sirmium, Aquincum travertine production

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One of the most mysterious sarcophagi discovered in the area of modern-day Pannonia is certainly the one now kept in the Muzeul Național al Banatului in Timişoara (RO) (Fig. 1),[2] brought there from Titel, a town in the region of Vojvodina (SRB), together with other monuments. The monuments came to the museum as a gift from Baron Anton von Scudier, general of the Imperial and Royal Army who was in command of the Banat region between 1871 and 1878 and military commander of the city of Timişoara from 1872 on.[3] In connection with the original place of their use, Theodor Mommsen presumed[4] the sarcophagus and other stone monuments

[1] The text is written with the help of my friend, Velika Dautova Ruševljan, who presented the sarcophagus at the symposium on Roman sarcophagi in Pannonia and Moesia Superior (Ljubljana, 10 March 2005); I am sincerely grateful for her contribution. I would also wish to thank Jasmina Davidović for providing all the needed data on the Sirmium sarcophagi.

[2] Inv. no. 6348. I would like to thank Nicoleta Demian and Alexandru Flutur from the Muzeul Național al Banatului for their help in the examination and in providing valuable information on the sarcophagus.

[3] He was field marshal and commander of the 17th Division at Timişoara from 1867 onwards and remained in civil service after the Banat general command (Banater Militärgrenze) had been dissolved. Mannhard 2005.

[4] CIL III 420, 454.

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Fig. 1. Sarcophagus from Titel (photo M. Erič)

Sl. 1. Sarkofag iz Titela (foto: M. Erič)

were brought to Titel as building material for the construction of the medieval fort on the Titel Plateau. Prior to the medieval period, there are numerous hypotheses that the Roman fort *contra Acumincum* may have been located in the area of Titel;[5] in spite of the absence of Roman habitation remains in the area, the predominant opinion among Serbian scholars is that was located on this very spot. Although part of the Roman monuments kept in Timişoara and Novi Sad (SRB) may have arrived in Titel from elsewhere,[6] the bulk is, nevertheless, believed to have been used here.[7] The latter monuments include two sarcophagi, one undecorated and still located in Titel,[8] and the other in Timişoara. Supporting the hypothesis of the existence of the *castrum contra Acumincum* is a marble stela found in a field in the area of the village of Vilovo,[9] west of Titel.

The latter sarcophagus was first mentioned and illustrated with a drawing in 1877 (Fig. 2).[10] Silvio Ferri included it in his overview of Roman art along the Danube, published in 1933.[11] Aleksandrina Cermanović-Kuzmanović did not, however, include it in the overview of the sarcophagi from Noricum and Pannonia.[12] In her discussion on the Roman sculpture in the province of Lower Pannonia, Velika Dautova Ruševljan

[5] For a summary, see Dimitrijević 1996, 152–154; for the discussion on the formulation *contra Acinco et Bononia*, see Becker et al. 2016, 71–73.

[6] Primarily the milestones CIL III 6470+10638, 6470+10633.

[7] One of the main pieces of evidence is presumably the now lost statue of Valerian, of which only the pedestal survives, kept in the Vojvođanski muzej in Novi Sad (previously in Budapest). For this find, see Gavrilović S. 1970. For the monuments from Titel, see Dimitrijević 1975, 43–51.

[8] Standing in front of the Mileva Ajnštajn secondary school.

[9] Falkenstein 1998, 338, pl. 75, 2.

[10] Iványi 1877, 110–111, pl. 1.

[11] Ferri 1933, 246–254, fig. 306–307.

[12] Cermanović-Kuzmanović 1965.

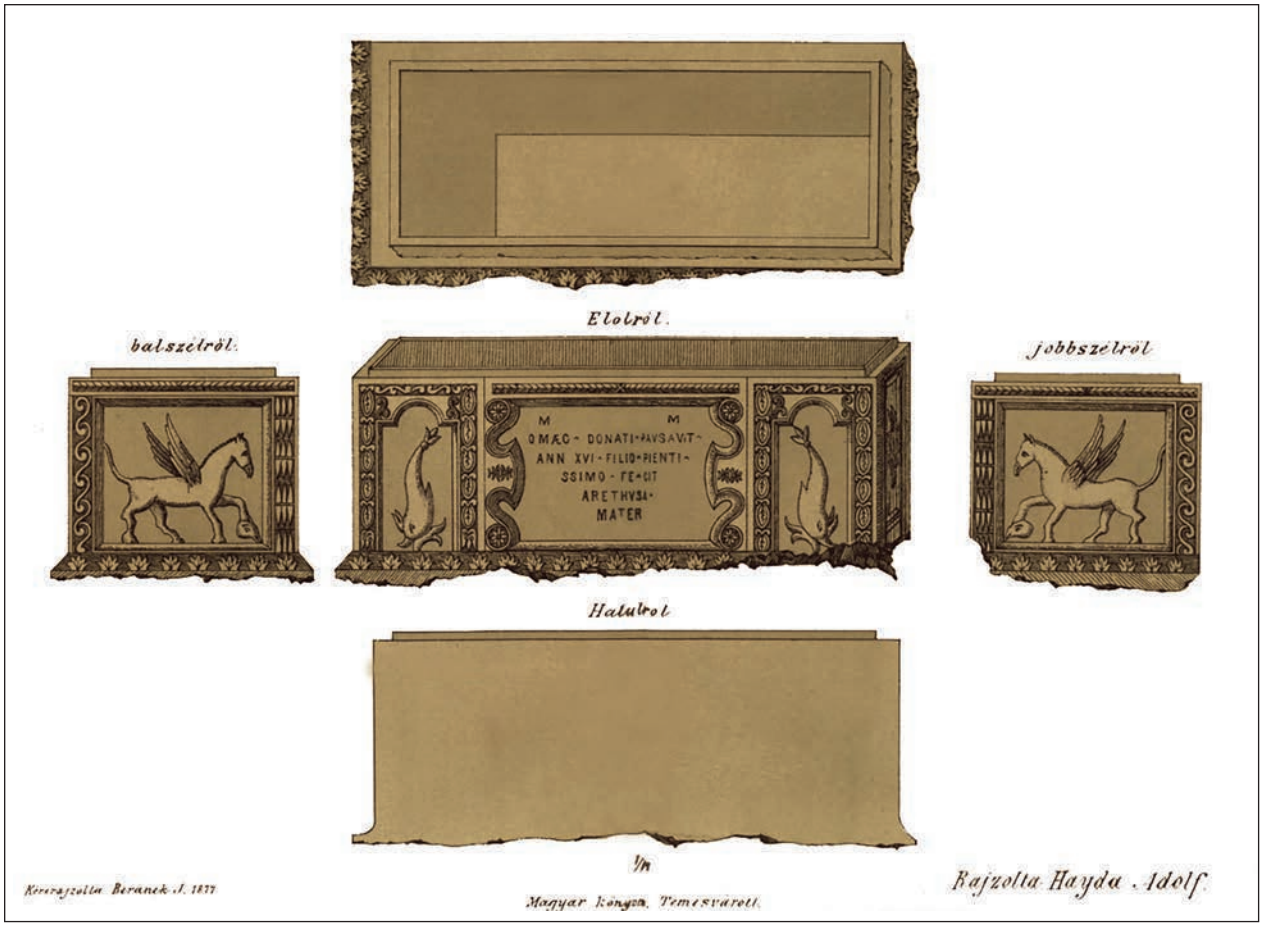

Fig. 2. Sarcophagus from Titel – drawing of the sarcophagus (published in: Ivánfi 1877, pl. 1)

Sl. 2. Sarkofag iz Titela – crtež sarkofaga (Ivánfi 1877, pl. 1)

only presented it with a photograph.[13] It was mentioned by Guntram Koch and Hellmut Sichtermann in their major book on Roman sarcophagi as coming from Tibiscum,[14] and Koch briefly mentioned it in a later paper.[15] In 1996, Sorin Pribac discussed the sarcophagus in a paper specifically dedicated to it.[16]

The 'unique sarcophagus', as Koch describes it,[17] stands out among the sarcophagi from Pannonia and Moesia and its unusual features caused quite some difficulties in the scholarly interpretation. Silvio Ferri saw parallels in style and decoration with the sarcophagus of Asclepiodota from Sirmium,[18] in his opinion dating to the second half of the 3rd century, and with a particular, as yet unstudied, group of Sirmium sarcophagi. Sorin Pribac saw the decoration and style as evidence of a strong Greek and Egyptian influence, dating the sarcophagus to the end of the 2nd or beginning of the 3rd century. Koch tied its decoration to the sarcophagi of Moesia Superior or Pannonia, but without offering exact parallels.

Description

The sarcophagus is made of volcaniclastic rock.[19] Only the chest has survived, without the lid. The chest is missing the lower right of its protruding base and part of the bottom of the chest. At the level of the interior

[13] Dautova Ruševljan 1983, pl. 32, 4.

[14] Koch, Sichtermann 1982, 333, 342.

[15] Koch 2015, 371.

[16] Pribac 1996.

[17] Koch 2015, 371.

[18] Dautova Ruševljan 1983, 17, no. 47; Cermanović-Kuzmanović 1964; Ninković 2015, 157–158; Lupa 4355.

[19] Pribac identifies it as granite.

bottom of the sarcophagus, there is a roughly horizontal crack visible on all sides and connected with a vertical crack running across the left side of the inscription panel.

The rectangular chest[20] has a projecting base on all four sides[21] with a plain lower part and a moulded upper part in the shape of a decorated cyma reversa. The chest is decorated only on the front and two short

Fig. 3. Sarcophagus from Titel: a) inscription field with the Norico-Pannonian volute of Type 6; b) dolphin in the left panel of the front side; c) beast on the left short side (photo M. Erič)

Sl. 3. Sarkofag iz Titela: a) natpisno polje sa noričko-panonskom volutom tipa 6; b) delfin u levom polju prednje strane; c) životinja na levoj kraćoj strani (foto: M Erič)

Fig. 4. a) pattern of acanthus leaves; b) ivy tendril; c) laurel garland; d) pattern of acanthus leaves on the base; e) pattern of acanthus leaves tied with a cord; f) wave pattern

Sl. 4. a) motiv listova akantusa; b) vitica bršljana; c) girlanda od lovora; d) motiv listova akantusa na bazi; e) motiv vrpcom povezanih listova akantusa; f) motiv talasa

sides, the back is roughly carved. The front is tripartite, with narrower figural side panels that have semicircular upper terminals, and a wider inscription panel in the centre. The short sides have a single figural panel with a moulded frame on all four sides, the same as in all other panels. The inscription panel has a volute of the Type 6 of Pochmarski[22] on both vertical sides (Fig. 3a), while the side panels on the front are missing the bottom part of the frame.

The side panels on the front bear a dolphin in each, facing down and outward. The short sides are decorated with a winged beast facing the front of the sarcophagus.

The dolphins (Fig. 3b) have a pronounced and open beak, a triangular fin on the head and a large almond-shaped eye dominating the head, a double fin just behind the lower jaw and a smooth sinuous body that terminates, via a spherical element, in a triple tail fin.

The beasts on the short sides (Fig. 3c) are formally almost identical. Both have the body of a horse with legs terminating in hooves, the thin and upturned tail of a lion ending in a hairy tuft, a neat mane, as well as a bird head with pointed ears and a large hooked beak. They are shown in motion, partly on the bottom edge of the panel and partly in the empty space of the panel. Their inner front leg is raised and bent, resting on a ram's head that floats in space.

All the surfaces between the frames of the panels that are usually left plain on sarcophagi are here completely covered with strips of rather stylised and sharply carved plant motifs.[23] On the front, the panels with dolphins are flanked on both sides with a vertical pattern of five pairs of double acanthus leaves growing out of small leaf calyces, as the main motif of the front (Fig. 4a). The drill was used exceptionally on this

[20] Length 206.5 cm, height 76.5 cm, width 88.5 cm.

[21] Base size: length 219.5 cm, width 96 cm.

[22] Pochmarski 2014.

[23] "… *tutto è geometricamente e freddamente concepito ed eseguito*, …", Ferri 1933, 247.

Fig. 5. Part of the sarcophagus lid kept in the Archaeological Museum, Zagreb (photo author)

Sl. 5. Deo poklopca sarkofaga koji se čuva u Arheološkom muzeju u Zagrebu (foto: autor)

motif. The strips above the side panels are decorated with a stylised ivy tendril in two variants, one with circular shoots and leaves, the other only with elongated and curved heart-shaped leaves (Fig. 4b). The triangular spaces on either side of the semicircular upper frames of the side panel frames bear a double spiral tendril. Above the inscription panel is a strip with a geometric laurel garland, running from the centre to either side (Fig. 4c). Carved inside the Norico-Pannonian volutes flanking the inscription panel is a double palmette in the centre and an eight-petal rosette in the corners (Fig. 3a).

The surface around the frames on the short sides is identically decorated. Above is a horizontal laurel garland, also running from the centre toward either end. The vertical strip at the front edge has a pattern of four double acanthus leaves tied with a cord, carved with the use of a drill (Fig. 4e). The vertical strip on the back edge bears a wave pattern (Fig. 4f).

The cyma of the sarcophagus base is decorated with stylised acanthus leaves (Fig. 4d).

Analysis

Material. The green volcaniclastic rock used for the production of Roman sarcophagi in Pannonia has, thus far, only been recorded at Sirmium[24] and its vicinity.[25] The Muzej Semberije in Bijeljina (BiH) also holds a large *labrum* made of this rock, while pieces of the rock came to light among the ruins of the Late Roman complex at the Kamenica site near Vinkovci (*Cibalae*).[26]

It is a hyaloclastite, a rock that forms on the margins of a lava flow, where it comes into contact with water. A macroscopically very similar rock was used in the past for Muslim gravestones or '*nišani*', which still stand around the villages in the hinterland of the medieval fortress at Zvornik (BiH). In the area of the Rajići village, located some 23 km south of Zvornik and ca 25 km west of Bratunac, the locally quarried rock is still used for the exterior revetments of houses. The rock of this modern quarry has been sampled to establish whether it is the same as the one used for the sarcophagi. The analysis has shown that the two rocks are not identical and that the one from the modern quarry was formed by the sedimentation of volcanic particles during eruption. The fine-grained tuffitic matrix makes it of a lower quality in comparison with the hyaloclastites and prone to quicker weathering. However, both rocks belong to the same volcanic complex. In nature, hyaloclastites usually occur in very limited bodies as thin margins of lava extrusions, frequently followed by other types of volcanites, hence both rock types can easily occur in the same quarry.

The known sarcophagi and their fragments made of hyaloclastite that was most likely quarried in the area of the modern-day village of Rajići comprise a sarcophagus chest with wreaths kept in the Muzej Srema in Sremska Mitrovica,[27] an unpublished sarcophagus with lid from the eastern cemetery of Sirmium,[28]

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[24] Djurić et al. 2006.

[25] Davidović 2007a. The known piece of the sarcophagus lid kept in the Arheološki muzej in Zagreb (CRO), which Josip Brunšmid (1908–09, 216–217, no. 480) conditionally identified as originating from Topusko, should doubtless be seen as a product of a Sirmium workshop, very likely discovered in Sremska Mitrovica and brought to Zagreb (see Migotti et al. 2018, 204).

[26] Vulić H. 2016.

[27] Inv. no. A/1183; Cermanović-Kuzmanović1965, 103, no. 37; Koch, Sichtermann 1982, 330; Dautova Ruševljan 1983, 17, pl. 30/4; Davidović 2007a, 52, no. 9, fig. 9; Davidović 2007b, 11, fig. 7; Lupa 4356.

[28] Sremska Mitrovica, private ownership. I thank Jasmina Davidović for providing the information.

Fig. 6. Sarcophagi from: a) Sremska Mitrovica; b) Belgrade; c) Indjija; d) Zasavica

Sl. 6. Sarkofazi iz: a) Sremske Mitrovice; b) Beograda; c) Inđije; d) Zasavice

the sarcophagus chest from Titel kept in the Muzeul Național al Banatului in Timişoara, part of a sarcophagus lid kept in the Arheološki muzej in Zagreb[29] (Fig. 5), a sarcophagus with lid from Zasavica,[30] a sarcophagus with lid in Indjija,[31] a sarcophagus with lid from Belgrade,[32] a sarcophagus chest from Titel,[33] a sarcophagus chest from Zemun[34] and a sarcophagus lid in Sremska Mitrovica[35] (Fig. 6).

The rock of these products is macroscopically easily identifiable and differs very clearly from the other rocks used for the sarcophagi of Sirmium. For the purposes of a petrographic analysis,[36] samples were taken from the sarcophagus with wreaths in the Muzej Srema, the lid piece kept in the Arheološki muzej in Zagreb and the sarcophagus kept in the Muzeul Banatului in Timişoara (Fig. 7).

A comparison of the microfacies of the samples has shown that the rocks are nearly identical, classified as hyaloclastites with a local gradual transition into peperites. The chemical composition of the volcanic rocks has been assessed by phenocryst mineralogy as dacitic: plagioclases and biotite predominate, while hornblende and quartz occur in a subordinate amount. The alteration of rocks is very significant and comprises analcime, clay minerals, chlorite and carbonate minerals. Analcime replaces plagioclase phenocrysts and forms the cement; its morphology indicates low-temperature hydrothermal conditions during crystallisation, which probably coincides with

[29] Inv. no. 480. Brunšmid 1908–9, 216–217, no. 480; Cermanović-Kuzmanović 1965, 99, no. 13, fig. 12; Dautova Ruševljan 1983, 98, pl. 32/2; Davidović 2007a, 54, no. 15, fig. 15; Lupa 4286.

[30] Šabac, in the court of the secondary school; Davidović 2007a, 54, no. 16, fig. 16; Davidović 2007b.

[31] Indjija, in front of the cultural centre.

[32] Narodni muzej Beograd, inv. no. 3346. Found in 1927 in Belgrade; Pop-Lazić 2002, 25, 48, fig. 8/3; Ninković 2015, 153, fig. 7.

[33] Titel, in front of the Mileva Ajnštajn secondary school; Davidović 2007b, 14.

[34] Zemun, town park along Nemanjina Street; Brunšmid 1895, 169; Davidović 2007b, 13;

[35] Behind the building of the Istorijski arhiv Srem, previously the Gradski park; Davidović 2007a, 53, no. 13, fig. 13; Davidović 2007b, 10, fig. 5.

[36] My sincere thanks to Polona Kralj, Ljubljana, who performed the analyses.

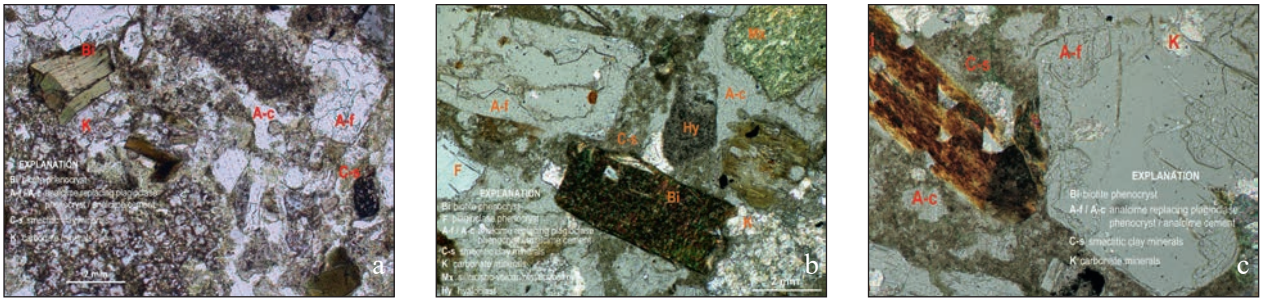

Fig. 7. Thin sections: a) sarcophagus with wreaths, Muzej Srema;
b) sarcophagus lid kept in the Archaeological Museum, Zagreb; c) sarcophagus from Titel
(Explanation: Bi – biotite phenocryst, F – plagioclase phenocryst, A-f/A-c – analcime replacing plagioclase phenocryst / analcime cement, C-s – smectitic clay minerals, K – carbonate minerals, Mx – siliciclastic-volcaniclastic matrix, Hy – hyaloclast)

Sl. 7. Tanki preseci: a) sarkofag sa vencima, Muzej Srema;
b) poklopac sarkofaga u Arheološkom muzeju u Zagrebu; c) sarkofag iz Titela
(Objašnjenje: Bi – fenokristal biotita, F – fenokristal plagioklasa, A-f/A-c – analcim koji zamenjuje fenokristal plagioklasa/analcimski cement, C-s – smektitska glina, K – minerali karbonata, Mx – siliklastično-vulkanoklastični matriks, Hy – hijaloklast)

Fig. 8. Sarcophagi from: a) Salona of Type 5 in the quarry state of completion; b) Asclepiodota,
National Museum Belgrade; c) Reconstructed sarcophagus with dolphins, Archaeological Museum, Zagreb
(photo: a, c – by author; b – M. Erič)

Sl. 8. Sarkofazi iz: a) Salone tipa 5 u kamenolomskoj kondiciji; b) Asklepiodote, Narodni muzej u Beogradu;
c) rekonstruisani sarkofag sa delfinima, Arheološki muzej u Zagrebu
(foto: a, c – autor; b – M. Erič)

the formation of hyaloclasts and hydrothermal conditions related to the cooling of the parent dacitic lava flow. Hyaloclastites formed *in situ* along the lava margins as an envelope layer.

Although dacitic volcanic rocks are encountered at several localities in the southern Pannonian Basin and the Vardar Fault System, the availability of outcrops and their accessibility, the very specific conditions for the formation of the hyaloclastites that controlled the extent of deposits, and the very specific alteration indicate the target deposits were very possibly quite rare. The formation of analcime in such an extent as observed in the studied volcanic rocks critically influences their physical and chemical characteristics; the rock became more porous and brittle, but still sufficiently compact and homogenous and, in comparison to calcarenites, more resistant to weathering and dissolution by meteoric waters.

Structural scheme of the sarcophagus and its characteristics. One of the key structural differences that the sarcophagus from Titel shows in comparison with most sarcophagi in Pannonia and Moesia Superior is its base, which is carved on all four sides of the chest. The base has a vertical lower and an obliquely moulded upper section, such as is known on half-finished products of the Prokonnesos quarries (Type C after Asgari)[37] and the sarcophagi made of local limestone in the quarry that supplied the workshops in Salona (Type 5 after Cambi)[38] (Fig. 8a). A further two examples of such a base are also known from the interior of Dalmatia,[39] either imported from Salona or closely imitating the Salona production. The only known example in Pannonia is the sarcophagus of Asclepiodota from Sirmium[40] (Fig. 8b), made of Dardagani limestone,[41] which has the upper oblique section simply moulded rather than formed into a composite cyma reversa. Of the Metropolitan workshops, such a base is extremely rare, known e.g. on the sarcophagus with a young girl on her deathbed, kept in the British Museum,[42] made of Carrara marble[43] and dated to around 200–220.

The front side of the sarcophagus from Titel is conceived as a series of three equal squares with the sides measuring 69 cm that reach from the upper edge of the chest to the middle of the base, i.e. the lower edge of the cyma. The central square is intended for the inscription panel; the lateral squares are mirror images of one another and comprise a Norico-Pannonian volute of the inscription panel frame and a narrow figural panel.

Such a tripartite division is characteristic of sarcophagi produced in Sirmium of green volcaniclastic rock (e.g. the sarcophagus with wreaths)[44] and Dardagani limestone (e.g. sarcophagus with rosettes,[45] sarcophagus with dolphins[46]) (Fig. 8c). In Salona, an example of such a form is the sarcophagus of Iulia Aurelia Hilara, made of limestone in the early 4th century,[47] which is a typical representative of the local production imitating the Prokonnesian model with a base (Fig. 9).

Above the base, the front side of the sarcophagus chest from Titel is divided lengthwise into four equal parts. The central two parts comprise the inscription panel and its moulded frame, the left and right sides of which are in the shape of a Norico-Pannonian volute of Type 6, while the lateral parts consist of the centrally designed figural panel within a moulded frame and decorative strips around it. The Norico-Pannonian volute of Type 6 also occurs on the unpublished sarcophagus from Sremska Mitrovica, where it decorates the frame of the side front panels in a manner known on the sarcophagus of Asclepiodota decorated with the volute of Type 7 (after Pochmarski). This volute form is also present on the sarcophagus with dolphins kept in Zagreb in the same manner as that of Type 6 on the sarcophagus from Titel, i.e. flanking the inscription panel. These are the forms and uses of moulded frames enclosing inscription fields typical of the travertine sarcophagi[48] produced at the quarries for Aquincum and Brigetio,[49] from where they came into the Sirmium production.

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[37] Asgari 1990, fig. 3, type C.

[38] Cambi 2010, fig. 11, type 5.

[39] Paškvalin 2012, 445, nos. 7, 8; Lozić 2018, 146, nos. 117, 118.

[40] See note 18.

[41] For the Dardagani Quarry, see Djurić et al. 2012.

[42] The British Museum, inv. no. 1805,0703.144; Walker 1990, 17–18, no. 6.

[43] Walker, Matthews 1990, 130–131.

[44] See note 26.

[45] Vulić N. 1931, 96, no. 277 with illustration; Cermanović-Kuzmanović 1964, 101; Cermanović-Kuzmanović 1965, 102, no. 31, fig. 26; Koch, Sichtermann 1982, 330; Dautova Ruševljan 1983, 16, pl. 30/3; Davidović 2007a, 50, no. 5; Ninković 2015, 159, fig. 13.

[46] Djurić 2020 (in print); Lupa 22799.

[47] Arheološki muzej Split, inv. no. 313D; Cambi 2010, 125, no. 144, pl. 84/1; Lupa 24893.

[48] Djurić et al. 2018.

[49] Pochmarski 2014.

Fig. 9. Sarcophagi with a tripartite division of the front: a) sarcophagus from Titel; b) sarcophagus with wreaths from Sremska Mitrovica; c) sarcophagus with rosettes from Sremska Mitrovica; d) sarcophagus of Iulia Aurelia Hilara from Solin

Sl. 9. Sarkofazi sa trodelnom podelom prednje strane: a) sarkofag iz Titela; b) sarkofag sa vencima iz Sremske Mitrovice; c) sarkofag sa rozetama iz Sremske Mitrovice; d) sarkofag Julije Aurelije Hilare iz Solina

Fig. 10. a) Short sides of the sarcophagus from Voganj, Srem Museum (photo M. Erič);
b) Dolphin on the composite funerary monument from the cemetery at Kolovrat, Prijepolje Museum (photo author)

Sl. 10. a) Kratke strane sarkofaga iz Vognja, Muzej Srema (foto: M. Erič);
b) Delfin na kompozitnom nadgrobnom spomeniku sa groblja u Kolovratu, Muzej u Prijepolju (foto: autor)

Figural decoration. The side front panels depict dolphins, a motif otherwise almost unknown on the sarcophagi of Pannonia, Moesia Superior and Dalmatia. The only known example of such a use of the dolphin motif is the fragmented sarcophagus of Dardagani limestone from Sremska Mitrovica, now kept in Zagreb.[50] Dolphins also occur on the short sides of the sarcophagus from Voganj near Sremska Mitrovica[51] (Fig. 10a), again made of Dardagani limestone. On other forms of monuments, dolphins occur as complementary decoration of inscription or figural panels, on some of the funerary monuments in Aquincum[52] and Sopianae.[53] In the eastern part of the province of Dalmatia, it is a motif popular in the valley of the Drina and east of it on the pyramidal upper parts of funerary monuments with a cuboid body, from the 3rd century in Skelani (*municipium Malvesatium*),[54] Rutoši,[55] Prilipac,[56] Zvornik.[57]

The form of the dolphin with a spherical element separating the sinuous body and the triple tail fin is specific and, presumably, characteristic of the stonemasonry workshop that produced it. Such a spherical element is also carved on the two dolphins on the sarcophagus with rosettes from Voganj, in an almost identical form with the triple fin also on the left and right sides of the composite funerary monument from the cemetery at Kolovrat near Prijepolje[58] (Fig. 10b) and the monuments from Aquincum and Sopianae.[59]

The short sides of the sarcophagus from Titel show unusual identical beasts in motion (Fig. 3c). They are not classic griffins with the body of a lion and the wings and head of an eagle, as Silvio Ferri saw them, but rather beasts that may, reservations notwithstanding,[60] be identified as hippogryphs.[61]

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[50] See note 44.

[51] Muzej Srema, inv. no. A/1163; Cermanović-Kuzmanović 1964, 102; Cermanović-Kuzmanović 1965, 102, no. 35, fig. 30; Dautova Ruševljan 1983, 16, no. 43, pl. 29/1; Davidović 2007a, 47–48, no. 2, fig. 2; Lupa 4328.

[52] Lupa 10757.

[53] Burger 1991, 24; Lupa 641, 643.

[54] Patsch 1907, 456, fig. 61; Petrović 1986, 33, fig. 37; Zotović R. 1995, 129, fig. 154.

[55] Vulić N. 1941–1948, 119; Petrović 1986, 33, fig. 38 (under Nova Varoš); Zotović R. 1995, 127, fig. 140.

[56] Petrović P. 1986, 33, fig. 36; Zotović R. 1995, 126, fig. 134. In front of the church of the Birth of Virgin Mary, Prilipac.

[57] In front of the building of the Narodna biblioteka and the museum collection in Zvornik.

[58] Muzej u Prijepolju, inv. nos. 4, 6; Zotović M. 1975, 81, fig. 13, 15; Lupa 29935.

[59] Fragment of a sarcophagus (?) in Budapest: Lupa 10757 and a fragment of a stele in Pécs: Burger 1991, 24; Lupa 641.

[60] See e.g. Reinach 1920.

[61] Pribac presumed the combination of a griffin and Pegasus. Roscher (1890, 2664 with illustration) erroneously identified a similar creature on a cylindrical seal of Assyrian style (Lajard 1847, fig. XXIX 5) as a hippalektryon.

Fig. 11. a) sarcophagus of Caius Albucius Menippus, AM Split;
b) sarcophagus of Petronia, Sofronia and Nereus, Solin (photo author)

Sl. 11. a) sarkofag Gajusa Albucijusa Menipusa, Arheološki muzej u Splitu;
b) sarkofag Petronije, Sofronije i Nereusa, Solin (foto: autor)

A griffin with a raised inner front paw placed over the head of a ram is a motif that does occur on sarcophagi, on their short sides in either a sitting or recumbent position, but is almost absent from the sarcophagi in Pannonia and Dalmatia.[62] The only standing griffin, with a winged lion's body and a bird's head is known on a sarcophagus with portraits from Sremska Mitrovica,[63] but without additional attributes.

Plant decoration. The surface around the figural and inscription field is completely covered over with strips of plant ornament. This manner of total decoration is unknown in either Pannonia or Moesia, with the exception of Sirmium, though it can be observed on the sarcophagi of the Salona workshops. At Sirmium, three sarcophagi made of Dardagani limestone[64] and the unpublished sarcophagus of volcaniclastic rock are decorated in this manner, while at Salona there are five such sarcophagi made of local limestone[65] (Fig. 11) and at least one of marble,[66] dating between the end of the 1st and the first half of the 4th century. Salona also yielded five stelai[67] (Fig. 12a) thus decorated, made in the 2nd and 3rd centuries of local limestone.

Such decoration in the area between Sirmium and Salona is mainly known in the valley of the River Drina and its tributaries, wider in the area between Rogatica[68] and Čačak, as well as between Berane and Bratunac, with a great concentration of monuments from the 3rd century in the territory of *municipium Domavianorum* (*colonia Domavia*) and *municipium Malvesiatium*. Most of these numerous monuments are pieces of composite altars (mainly known under the term *cippus*) and stelai: shafts of composite altars from Rogatica, Klašnik, Skelani,[69] Berane[70] (Fig. 12b), Otanj,[71] Tučkovo;[72] stelai from Vrba, Osatica, Bosanska Crvica,

[62] A motif that is popular is a pair of lions with paws on rams' heads, which crown funerary stelai.

[63] Muzej Srema, inv. no. A/14; Garašanin 1951, pl. XI b; Cermanović-Kuzmanović 1964, 100; Cermanović-Kuzmanović 1965, 102, no. 33, fig. 28a; Dautova Ruševljan 1983, 16, pl. 26/1; Davidović 2007a, 46, no. 1, fig. 1; Lupa 4344.

[64] Muzej Srema, inv. no. A/14; sarcophagus of Asclepiodota; sarcophagus from Voganj.

[65] Cambi 2010, cat. no. 14 (first half of the 4th c.), 41 (mid-2nd c.), 82 (late 2nd – early 3rd c.), 162 (end of 2nd c.), 189 (late 1st – early 2nd c.).

[66] Cambi 2010, cat. no. 150 (early 3rd c.).

[67] Lupa 24193, 24518, 24526, 24834, 30960.

[68] Šačić Beća 2018.

[69] Paškvalin 2012, 256, no. 7 (Rogatica, 3rd c.), 259, no. 10 (Klašnik, 3rd c.), 259, no. 11 (Skelani, 3rd c.).

[70] Polimski muzej in Berane; Ćulafić s.a., 72–73. I wish to thank Violeta Folić for her help.

[71] Zotović R. 1995, 115, no. 75 (late 2nd – early 3rd c.).

[72] Ferjančić et al. 2008, 64–66, no. 16.

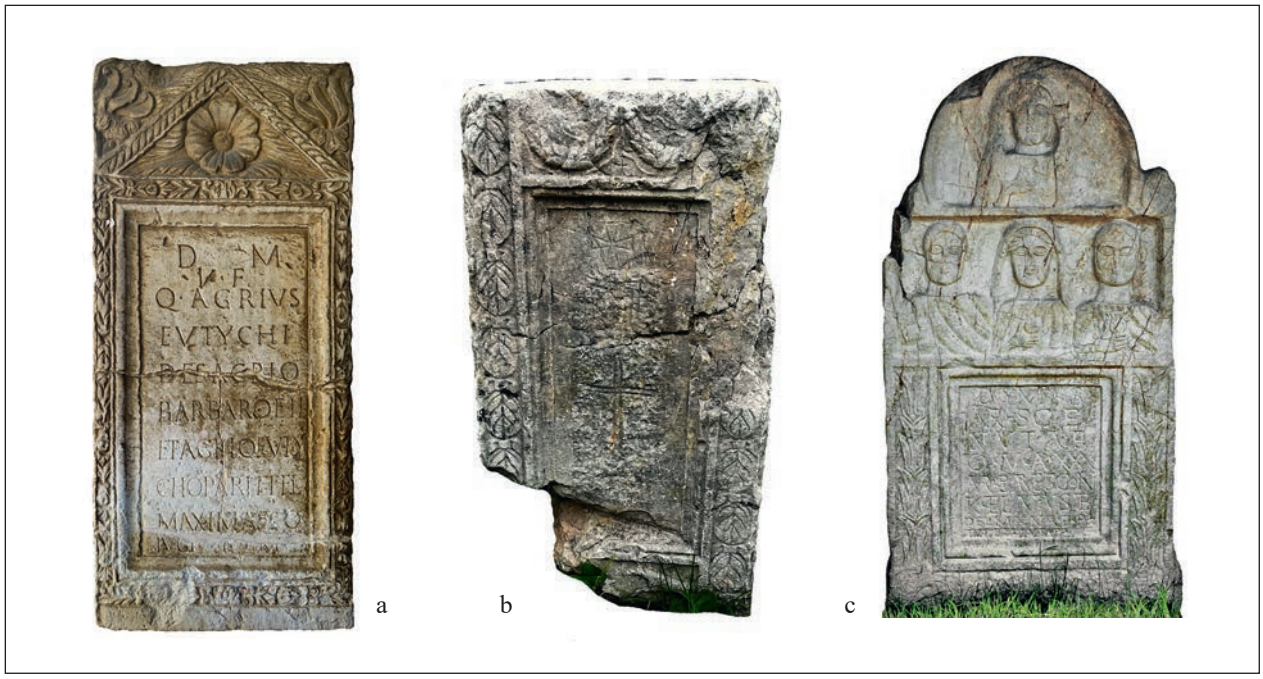

Fig. 12. Plant decoration on: a) funerary stele of Quintus Agrius Barbarus, AM Split; b) shaft of a composite altar from Berane, Polimlje Museum, Berane; c) funerary stele of Aurelia Scenuta from the cemetery at Kolovrat, Prijepolje Museum (photo: a, c – by author; b – V. Fotić)

Sl. 12. Vegetabilni motivi: a) nadgrobna stela Kvintusa Agrijusa Barbarusa, Arheološki muzej u Splitu; b) telo kompozitnog oltara iz Berana, Polimski muzej Berane; c) nadgrobna stela Aurelije Skenute sa groblja u Kolovratu, Muzej u Prijepolju (foto: a, c – autor; b – V. Fotić)

Vlasenica, Bratunac, Mihaljevići, Fakovići, Tegare,[73] Komini,[74] Kolovrat[75] (Fig. 12c), Kovačevac,[76] Đurovo[77] and Ražana.[78]

The decoration in these strips is sharply carved, quite diverse and fairly stylised, exactly the same as the decoration on the sarcophagus from Titel.

The pattern of pairs of acanthus leaves in the shape of petals growing out of a calyx (Fig. 4a) is one of the decorative motifs most characteristic of the workshops in Salona,[79] which can be found in its original form on one of Corinthian capitals at Tusculum (*Salona*) (Fig. 13a). It is frequently carved on funerary altars and stelai in the valley of the Drina and its tributaries. A stylistically identical motif, combined into a vertical pattern on the sarcophagus from Titel, can be found on a composite altar from Berane (Fig. 13b); also close is the motif on the stela from Đurovo.

A similar motif, joined into a pattern, is the double bunch of (acanthus?) leaves tied with a cord (Fig. 4e). On the monuments of Salona[80] (Fig. 13c), it occurs in only half of the form as the terminal of linear garlands, in which the cord is actually the manchette.

[73] Paškvalin 2012, 124–125, no. 64 (Vrba, 2nd-3rd c.), 144–145, no. 78 (Osatica, 2nd-3rd c.), 145, no. 79 (Bosanska Crvica, 3rd c.), 160, no. 94 (Vlasenica, 3rd c.), 159–160, no. 93 (Bratunac, 2nd-3rd c.), 168, no. 102 (Mihaljevići, 3rd c.), 168–169, no. 103 (Fakovići, 3rd c.), 169, no. 104 (Tegare, 2nd-3rd c.).

[74] Cermanović-Kuzmanović 1981, 75. no. 2; Lupa 29966.

[75] Cermanović-Kuzmanović 1978–79; Lupa 29937.

[76] Lupa 29938.

[77] Vulić N. 1931, 137, no. 331; Lupa 29942.

[78] Zotović R. 1995, 108, no. 33 (3rd c.).

[79] E.g. on the stele for Agrius Barbarius from the 3rd c. (AM Split, inv. no. A 855; Lupa 24518); ossuarium for Marcus Aurelius Varro, 200–250 (AM Split inv. no. 1262; Lupa 24687); sarcophagus for Caius Albucius Menippus from the second half of the 3rd c. (AM Split, inv. no. A 300; Lupa 24507); sarcophagus for Marcia Nigella from the second half of the 2nd-3rd c. (AM Split, inv. no. A 2559; Lupa 24540); sarcophagus for Valerius Dines and Attia Valeria from the 3rd c. (AM Split, inv. no. A 1634; Lupa 24900).

[80] Sarcophagus for Caius Albucius Menippus

Fig. 13. Acanthus motifs: a) corinthian capital, Tusculum, Solin; b) a pair of acanthus leaves on the composite altar from Berane, Polimlje Museum, Berane; c) leaves tied with a cord on the sarcophagus of Caius Albucius Menippus, Archaeological Museum, Split; d) leaves tied with a cord in the center of a garland on a composite altar from Berane, Polimlje Museum, Berane (photo: a, c – by author; b, d – V. Fotić)

Sl. 13. Motivi listova akantusa: a) korintski kapitel, Tuskulum, Solin; b) kompozitni oltar iz Berana, Polimski muzej Berane; c) povezani vrpcom na sarkofagu Gajusa Albucijusa Menipusa, Arheološki muzej u Splitu; d) povezani vrpcom u centru girlandena na kompozitnom oltaru na kompozitnom oltaru iz Berana, Polimski muzej Berane (foto: a, c – by autor; b, d – V. Fotić)

The double form can be found, for example, on the funerary altar from Berane (Fig. 13d), where the garland runs from the central motif of tied leaves to either side; it also occurs in the same position on the funerary altar from Skelani.[81]

The motif of a stylised, sinusoid ivy tendril with rounded triangular leaves inside the curves of the tendril is very common. On the sarcophagus from Titel it is shown in two variants, one with spiral shoots and leaves, the other with leaves only. The combination with shoots and leaves can be observed, for example, on the stele for Suricina from Podstrana[82] (Fig. 14a), the variant with leaves carved tightly against the inside of the tendril curve, only on the unpublished sarcophagus from Sremska Mitrovica and the stele for Aelius Ingenuus (Fig. 14b), also from Sremska Mitrovica.[83]

The motif of a laurel garland[84] is also common. It occurs on monuments such as the large marble sarcophagus for Valerius Dines and Attia Valeria from Salona as the decoration of the corner column shafts (Fig. 14c), on the stele from Podstrana, the stele from Mihaljevići, the sarcophagus with wreaths from Sremska Mitrovica and elsewhere.

The wave band consisting of conjoining S-shaped elements has not been recorded in the area between Salona and Sirmium. It is common in another form, often associated with vegetal tendrils, for example, on the sarcophagus for Petronia, Sofronia and Nereus from Solin,[85] almost identical on the lid of a sarcophagus also

[81] Paškvalin 2012, 260–261, no. 14, 3rd c.

[82] Lupa 24240.

[83] Muzej Srema, inv. no. A 762–764; Dautova Ruševljan 1983, 13, no. 2; Lupa 4335.

[84] Paškvalin 2012, 196 describes it as 'herringbone-like leaves.'

[85] Cambi 2010, 99–100, no. 14; 4th c.

Fig. 14. Ivy tendril motif: a) on the stele of Suricina from Strožanac in Podstrana; b) on the stele of Aelius Ingenuus, Srem Museum; c) laurel garland on the sarcophagus of Valerius Dines and Attia Valeria from Salona (photo: a, b – O. Harl; c – by author)

Sl. 14. Motiv vitice: a) bršljana na steli Suricine iz Strožanca u Podstrani; b) bršljana na steli Elijusa Ingenuusa, Muzej Srema; c) lovorova girlanda na sarkofagu Valerijusa Dinesa i Atije Valerije iz Salone (foto: a, b – O. Harl; c – autor)

from Solin[86] (Fig. 15a), on the stele for Gentius from Kovačevac[87] and on a portrait stele from Tegare.[88]

The motif of a spiral tendril, used on the sarcophagus from Titel to fill the corner space above the arched upper frames of the side panels on the front, is also fairly common, used to decorate different surfaces of stone monuments. The most unusual of such motifs is certainly the one that adorns the side panels of the front side of a small sarcophagus or ash chest from Rogatica.[89] It also frequently decorates the surface between the inscription and portrait panels on stelai and funerary altars, for example on the stele for Aurelius Gallus and Aurelia Madusa from Donje Štitarevo,[90] or the funerary altar for Titus Aelius Victor from Karan[91] (Fig. 15b).

We should also mention the cyma reversa on the base of the sarcophagus from Titel. It is covered by a pattern of stylised acanthus leaves without exact parallels, though very similarly shaped leaves occur on a large composite altar from Belgrade,[92] dated to the 3rd century, and on the now lost epistyle of a funerary aedicula from Šipovo,[93] dated to the 4th century (Fig. 15c).

[86] Cambi 2010, 122, no. 126; 4th c.

[87] Muzej u Prijepolju; Lupa 29938; 150–230.

[88] Zemaljski muzej Sarajevo, inv. no. 262. Paškvalin 2012, 67–68, no. 18.

[89] In the park in front of the Rogatica health centre. Illustration on https://bs.wikipedia.org/wiki/C._Ris_(Rogatica) accessed 18.3.2020).

[90] Lozić 2018, 194, no. 190; Lupa 23734.

[91] Petrović P. 1986, 18–19, no. 6; Lupa 29919.

[92] Vulić N. 1933, 5–8, no. 3; Petrović J. 1933, 313–317; Gavrilović N. 2020.

[93] Illustration of the surviving epistyle that is now missing, in Truhelka 1892, fig. 5.

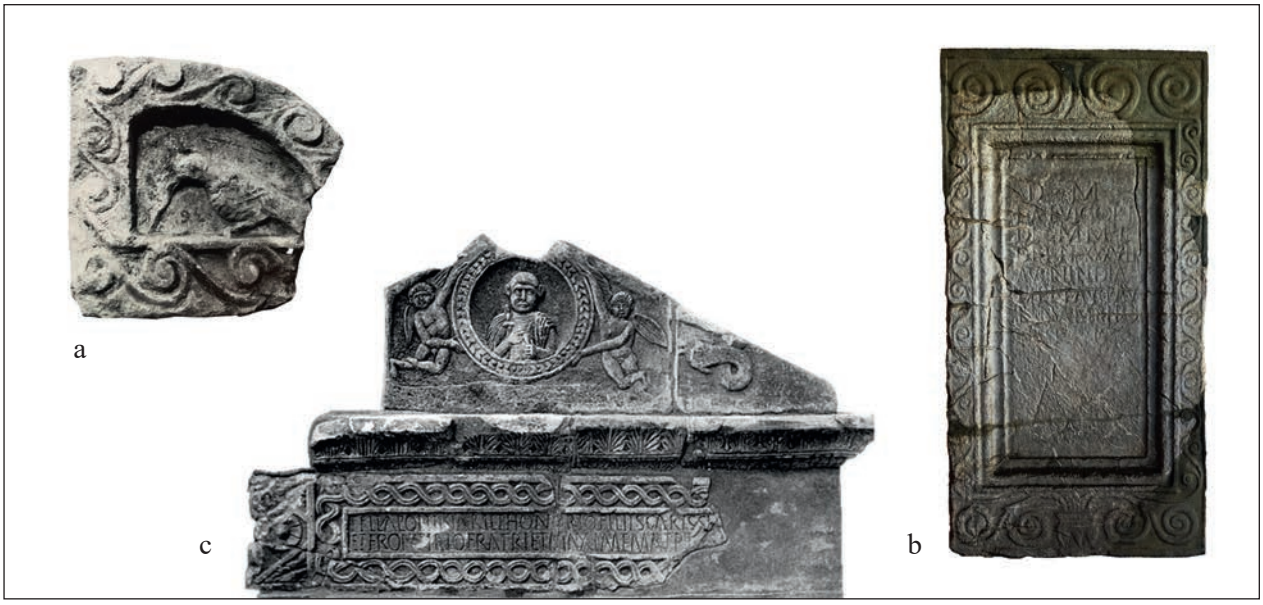

Fig. 15. a) wave band on the acroterion of a sarcophagus, Archaeological Museum, Split; b) spiral tendril motif on the composite altar of Titus Aelius Victor, Karan; c) fragments of the funerary aedicula from Šipovo, National Museum, Sarajevo (photo: a – Cambi 2010; b – by author; c – Truhelka 1892)

Sl. 15. a) Motiv talasa na akroteriji sarkofaga, Arheološki muzej u Splitu; b) motiv spiralne vitice na kompozitnom oltaru Tita Elijusa Viktora, Karan; c) fragmenti nadgrobne edikule iz Šipova, Zemaljski muzej u Sarajevu (foto: a – Cambi 2010; b – by autor; c – Truhelka 1892)

Discussion

The analysis of the material, the architectural structure and the decoration clearly reveals the sarcophagus from Titel as a product of a Sirmium workshop. According to available evidence, the green volcaniclastic rock of which the sarcophagus is made was only used at Sirmium and its products distributed across its wider surroundings. There are two kinds of sarcophagi made of this rock, for which it is, as yet, impossible to know whether they are chronologically parallel or not. One with numerous examples consists of undecorated and very meticulously made sarcophagi with lids that bear the characteristic form of corner acroteria composed of two narrow ridges joined at a 45º angle (Fig. 16a).[94] The other kind is richly decorated with reliefs[95] and shows a close connection with another group of Sirmium sarcophagi, made of Dardagani limestone. Almost all the decorated sarcophagi of both rocks share the basic division of the front side into three square fields. The sarcophagus for Asclepiodota, of Dardagani limestone, is almost identical in the shape of the chest with its base, structure and decorative technique to the sarcophagus from Titel.

The above allows us to conclude that the Sirmium workshops of sarcophagi used half-finished products of two different rocks from two different quarries (Rajići?, Dardagani), but both located in the valley of the River Drina. In contrast to the half-finished products of eastern Alpine marble and Budakálasz travertine, the half-finished products coming from these two quarries do not come with a previously defined basic structure. The most likely reason for this difference in the degree of quarry finish should be sought in the more brittle nature of the volcaniclastic rock and Neogene limestone, i.e. their greater proneness for damage during transport from the quarry to the workshop that gave it its final appearance. The part of the lid kept in

[94] Zasavica, Indjija, Beograd, Zemun, Titel, Sremska Mitrovica; Davidović 2007a; 2007b.

[95] Two in Sremska Mitrovica, Titel, the lid in Zagreb.

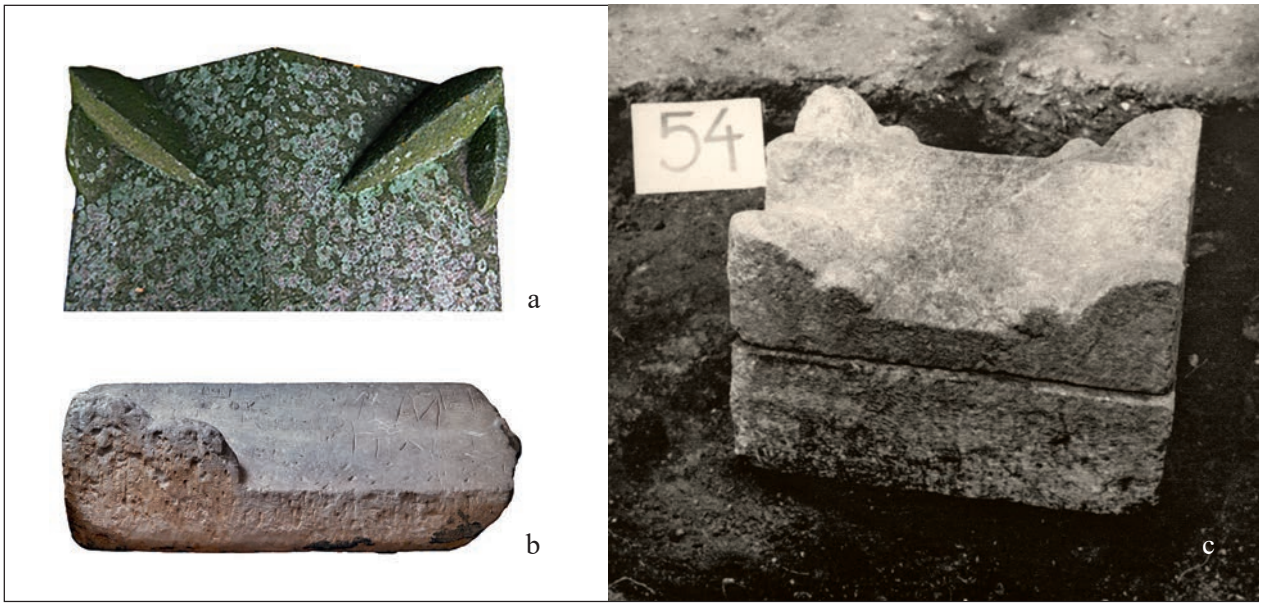

Fig. 16. a) acroteria on the sarcophagus lid from Zasavica, National Museum, Šabac;
b) piece of a sarcophagus lid with a double acroterion, Srem Museum;
c) ossuarium with double acroteria from Grave 54 of the cemetery at Kolovrat, Prijepolje Museum
(photo: a – NM Šabac; b – M. Erič; c – A. Cermanović-Kuzmanović)

Sl. 16. a) akroterije na poklopcu sarkofaga iz Zasavice, Narodni muzej Šabac;
b) deo poklopca sarkofaga sa duplim akroterijama, Muzej Srema;
c) urna s duplim akroterijama iz Grobnice 54 sa groblja na Kolovratu, Muzej u Prijepolju
(foto: a – Narodni muzej Šabac; b – M. Erič; c – A. Cermanović-Kuzmanović)

Zagreb, with the decoration in high relief, suggests that the lids of these sarcophagi were carved at least in their final shape at the end workshops.

All the lids of these sarcophagi have specifically shaped double corner acroteria, as do the richly decorated piece of a sarcophagus lid kept in Zagreb and the unpublished sarcophagus from Sremska Mitrovica. The double acroterion is certainly one of the most characteristic features on the sarcophagi of the Sirmium production and represents their distinctive feature (Fig. 16b). It is reasonable to speculate that the lid of the sarcophagus from Titel also had such acroteria on its lid.

If the shape of the chest with its base clearly indicates an origin in the Salona sarcophagus production, related to Prokonnesian models, this is by no means certain for the lids with double corner acroteria. The sarcophagus lids from Salona include a single example,[96] made of Prokonnesos marble, that has a corner acroterion associated with a small segment of a smaller acroterion. The only known example of a lid with double acroteria outside Sirmium is that of a small ossuarium–cinerary urn from the cemetery at Kolovrat near Prijepolje (Fig. 16c).[97] On the other hand, acroteria of such form are widespread on the altars from the wider valley of the Drina and its tributaries, with

[96] Cambi 2010, 103, no. 32, pl. 21.

[97] Grave 54, Muzej Prijepolje, unpublished. I thank Deana Ratković for the permission to publish the photo from the archives of A. Cermanović-Kuzmanović and Zvonko Mandić from Prijepolje museum for his help.

[98] Skelani: Mesihović 2011, 214–215, no. 9; 222–223, no. 17; 223–224, no. 18; 241–242, no. 36; 246–247, no. 42; 282–283, no. 11; 283–284, no. 12; 289, no. 19; Babić 2008, 57. Sase: Mesihović 2011, 187–188, no. 22; 188–189, no. 23. Ustikolina: Mesihović 2011, 292–293, no. 23. Rogatica: Bojanovski 1967, 152–153, no. 7, fig. 11; Mesihović 2011, 123–124, no. 2. Plešević near Rogatica: Ferjančić, Samardžić 21014, no. 2, 474–475. Bajina Bašta: Glavaš 2016, 21, fig. 10; Kolovrat: Mirković 1975, 98, no. 2; Lupa 29932; Zotović M. 1975, 181, no. 17; Lupa 29934; Užice: Vulić N. 1941–48, 247, no. 485; Gradina on Jelica: Ferjančić et al. 2008, 44–45, no. 3; Čačak: Ferjančić et al. 2008, 49–50, no. 6; 60, no. 14; Jezdina: Ferjančić et al. 2008, 54–55, no. 10.

Fig. 17. Altars with double acroteria from: a) Skelani; b) Čačak; c) Karan; d) Kolovrat (photo: a – Patsch 1907; b – Ferjančić et al. 2008; c–d – by author)

Sl. 17. Oltari s duplim akroterijama iz: a) Skelana; b) Čačka; c) Karana; d) Kolovrata (foto: a – Patsch 1907; b – Ferjančić et al. 2008; c–d autor)

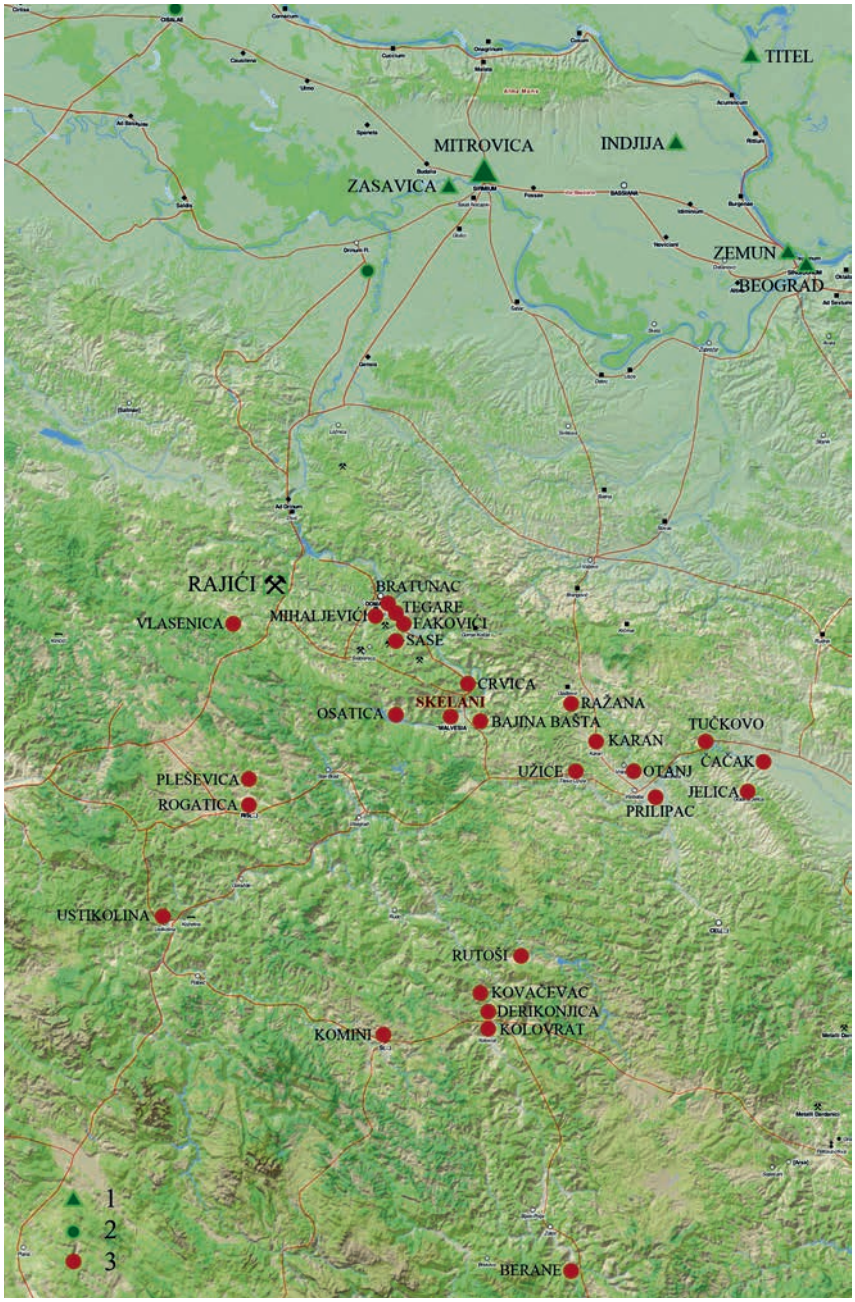

Fig. 18. Map of sites:
1) sarcophagi of green volcaniclastic rock;
2) other objects made of green volcaniclastic rock;
3) monuments mentioned in the text as parallels (DARE Creative Commons, adapted by author)

Sl. 18. Mapa lokaliteta:
1) sarkofazi od zelene vulkanoklastične stene;
2) drugi objekti napravljeni od zelene vulkanoklastične stene;
3) spomenici spomenuti u tekstu kao paralele (DARE Creative Commons, dopunjeno od strane autora)

the centre in its middle reaches, in *municipium Malvesiatium* (Skelani)[98] (Fig. 17).

The close connection of the Sirmium sarcophagus production with the stonemasonry production of the middle and upper reaches of the Drina and its tributaries (Fig. 18), which is, in turn, closely related to the Salona stonemasonry production, is also reflected in the array of decorative motifs, the manner of their use by covering all surfaces with ornamental strips and the manner of carving the almost two-dimensional, stylised and geometricised forms. Having said that, some details of the figural decoration on the sarcophagus from Titel show that the workshops of Sirmium also adopted certain Pannonian decorative elements, such as the spherical element between the body of the dolphin and its tail fin, which does have a parallel in the stonemasonry production in the Drina Valley, but is much more common in Pannonia,[99] more precisely

[99] Fragment of a sarcophagus(?) in Budapest: Lupa 10757 and a fragment of a stele in Pécs: Burger 1991, 24; Lupa 641.

in the Aquincum travertine production, from where the motif was most likely adopted. Other characteristics of the figural decoration on the sarcophagus from Titel, such as the figures of hippogryphs against an empty background of the figural panel, have formal parallels only in the Sirmium production.

In order to correctly understand the Sirmium production of sarcophagi, it is also important to note that the workshops in Sirmium adopted the Norico-Pannonian volutes that are typical of the Budakálasz travertine sarcophagus production, using them not only to shape the frames of the inscription panels, as is the case of the sarcophagus from Titel, but also to form very decorative frames of figural panels. These forms are unknown in the stonemasonry productions in the valley of the Drina and in Salona.

All of the observations above render the dating of the sarcophagus from Titel a task less daunting than it seemed at the beginning of the analysis. Sorin Pribac dates its creation to the end of the 2nd or beginning of the 3rd century.[100] Silvio Ferri, who was the first to correctly parallel the sarcophagus to that of Asclepiodota, dates it '… *non oltre la seconda metà del III secolo* …', adding that the decoration may even allow a dating into the 5th or the 6th century.[101] The analysis of the decoration on the sarcophagus in connection with the locally produced Salona sarcophagi and the monuments from the valley of the Drina place its production to the 3rd century, which would correspond with Ferri's observation on '… *un passo in avanti* …' in comparison with the decoration on the sarcophagus of Asclepiodota. The new dating of the latter sarcophagus to the mid-3rd century or shortly thereafter[102] allows the sarcophagus from Titel to be seen as the product of a Sirmium workshop from the second half of the 3rd century.

Translated by A. Maver

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[100] Pribac 1996, 266.
[101] Ferri 1933, 247.
[102] Djurić 2020.

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Bojan ĐURIĆ
Roman Sarcophagus from Titel (201–223)

Rezime: BOJAN ĐURIĆ, Filozofski fakultet Univerziteta u Ljubljani

RIMSKI SARKOFAG IZ TITELA

Ključne reči. – Titel, sarkofag, vulkanoklastična stena, radionice Salone, Sirmium, proizvodnja travertina, Akvinkum

Među rimskim sarkofazima Panonije posebno mesto zauzima sarkofag koji je pronađen u Titelu i posle 1871. godine prenet, po naređenju Antona fon Skudijera (Anton von Scudier), tadašnjeg vojnog komandanta Temišvara, zajedno s drugim kamenim spomenicima, u današnji Muzej Banata (Muzeul Național al Banatului) u Temišvaru. Sarkofag je, zajedno sa crtežom, prvi put objavio E. Ivanfi (Iványfi) još 1877. godine, a kasnije ga je u svoj pregled o rimskoj umetnosti područja uz Dunav uključio i Silvio Feri (Silvio Ferri). A. Cermanović-Kuzmanović ga u svoj posleratni pregled sarkofaga Norika i Panonije nije uključila, dok je V. Dautova Ruševljan u svom radu o rimskoj plastici na području Donje Panonije objavila samo njegovu fotografiju. U velikom pregledu rimskih sarkofaga G. Koha (Koch) i H. Zihtermana (Sichtermann) pojavljuje se pogrešno kao sarkofag iz Tibiscum-a (Jupa, RO), a detaljnu obradu doživljava 1996. godine ispod pera Sorina Pribaka (Sorin Pribac).

Svi navedeni autori slažu se u tome da je sarkofag iz Titela dosta enigmatičan i neobičan, i to kako za produkciju sarkofaga s područja Panonije tako i za onu Gornje Mezije, dok ga S. Feri, na osnovu dekorativnih motiva, jedini vezuje za sirmijumsku proizvodnju sarkofaga i posebno za sarkofag Asclepiodotin.

Osim formalnih karakteristika, za razumevanje sarkofaga iz Titela od bitnog je značaja vrsta kamena od kojeg je napravljen. Radi se o zelenoj vulkanoklastičnoj steni koja je poznata u okolini sela Rajići, zapadno od Srebrenice, a od koje je izrađen veći broj sarkofaga vezanih isključivo za Sirmijum (dva sarkofaga iz Sremske Mitrovice: jedan u Muzeju Srema i drugi u privatnom vlasništvu; poklopac sarkofaga u Arheološkom muzeju u Zagrebu; sarkofazi iz Zasavice, Inđije, Šapca, Zemuna i Beograda).

U formalnom smislu posredi je sarkofag sa tripartitnom podelom prednje strane i sa centralnim natpisnim poljem i užim bočnim poljima za dekoraciju. Takva podela je karakteristična ne samo za panonske mermerne i travertinske sarkofage već i za salonitansku domaću proizvodnju u regionalnom krečnjaku. U tom pogledu značajna je njegova baza sa *Cyma reversa* ukrasima, po kojoj se razlikuje od svih panonskih sarkofaga, a čije se paralele nalaze u salonitanskoj proizvodnji koja polazi od prokoneških modela. Dekorativna polja prednje i obe bočne strane uokvirena su profilacijom, koja je na natpisnom polju sa obeju bočnih strana oblikovana u vidu noričko-panonske volute tipa 6 po Pohmarskom, karakteristične za proizvodnju travertinskih sarkofaga vezanih za Aquincum.

Titelski sarkofag obiluje dekorativnim motivima koji prekrivaju sve uske površine između ivica sanduka i pojedinih polja. To su različiti i dosta stilizovani vegetabilni motivi bršljanove loze, lovorove girlande, palmeta, kao i posebno značajni: vrpca čašolikih duplih listova akanta i vrpca malih povezanih snopova akantovih listova. Način ukrašavanja tih uskih površina kao i sami dekorativni motivi uporedivi su jedino sa salonitanskim proizvodima, kako sarkofaga tako i sepulkralnih stela, a nalazimo ih i na kamenim spomenicima poznatim sa nalazišta iz srednjeg i gornjeg toka Drine kao i na prostoru između Rogatice i Čačka. U Sirmijumu takav način ukrašavanja pokazuju sarkofazi napravljeni od dardaganskog krečnjaka (npr. sarkofag iz Vognja i sarkofag Asclepiodotin).

Figuralni motivi titelskog sarkofaga – po jedan delfin sa obeju strana prednje površine i po jedan hipogrif na bočnim stranama – dosta su specifični. Delfini na sarkofazima u Panoniji nisu poznati, a s takvim motivom jedino je u Sirmijumu pronađen sarkofag koji je napravljen od dardaganskog krečnjaka (čuvan u Arheološkom muzeju u Zagrebu). Motiv hipogrifa je jedinstven i nema paralela, ali način njihovog prikazivanja na praznoj površini u vrlo šematskom reljefu i šturom modeliranju nalazi paralele jedino u sirmijumskim sarkofazima izrađenim od krečnjaka.

Iako je pronađen bez poklopca, njegov oblik bi se mogao pretpostaviti na osnovu sirmijumskih paralela. Naime, kod sirmijumskih poklopaca sarkofaga tipičan je oblik njihovih akroterija. To su duple akroterije – s jednom većom i do nje s jednom manjom akroterijom, poznate najviše na raznim oltarima na širem prostoru srednjeg toka reke Drine, sa središtem u Skelanima (*municipium Malvesiatium*). Sa tog prostora poznat je i mali osarijum sa nekropole Kolovrat kod Prijepolja koji ima karakteristične duple akroterije na poklopcu.

Analiza materijala, oblika i motiva titelskog sarkofaga pokazala je da je njegov izvor u sirmijumskoj radionici, koja je radila u regionalnom kamenu – kako zelenom vulkanoklastitu tako i u dardaganskom krečnjaku. Njen repertoar oblika i motiva bio je usko vezan za dugu tradiciju podrinskih radionica, za koje se zna da su bile pod jakim uticajem salonitanskih radionica, ali da su u svom repertoaru imale i neke motive preuzete iz panonske produkcije. Visok kvalitet nekih od njenih proizvoda omogućuje i pretpostavku o dolasku majstora direktno iz Salone. Titelski sarkofag se u hronološkom smislu pokazao kao proizvod druge polovine 3. veka.

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RE-CONSERVATION AND REINPRETATION OF A ROMAN FRESCO FROM SIRMIUM

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Abstract. – This paper deals with the re-conservation of an old conserved unit and the new iconographic analysis of a wall painting that was kept in the Museum of Srem's (Sremska Mitrovica, Serbia) storage depot. Experts from the Provincial Institute for the Protection of Cultural Monuments started but did not finish the reconstruction in the 1990s, which has led to its further deterioration. Their conservation and restoration work on these fragments were extensive and offered a wealth of extraordinary technological and iconographic information.

Key words. – re-conservation, wall painting, gypsum, iconography, maenad, Sirmium

The majority of wall painting fragments from various buildings on the territory of the present-day Serbia come from the Roman town of *Sirmium* (Sremska Mitrovica, fig. 1). This large urban centre kept its artistic continuity throughout a long period, from the 2nd until the end of the 4th century.[1] Sirmium was one of the capitals of the Roman Empire and was among the biggest metropoles of its time. The urban expansion of the city began at the end of the 3rd century and lasted until the beginning of the 5th century. The remains of the imperial palace, surrounded by walls and trenches, parts of the hippodrome, public baths, horreum, several villas and houses decorated with wall paintings and mosaics, as well as cemeteries, were found in the city.[2] The fragments of wall painting analysed here were discovered during the archaeological excavations within structures of a residential character in 1990. The fragments of wall paintings were not found in situ, they were found in layers of soil, dating back to the 4th and 5th century.[3] Their conservation started during the 1990s but was not finished. Since then, the fragments have been moved to the storage depot of the Museum of Srem. In recent years they deteriorated, as it did not receive a new support.

It was assumed that the depicted figure on this piece represented the goddess Diana,[4] and later Atalanta, or the personification of Macedonia.[5] The re-conservation of the painting gave a different analysis of the iconographic content.

Original condition of the wall painting

The painting was broken into 24 parts, and its overall dimensions are 55 × 50 cm (fig. 2). The background of the assembled unit was cast in gypsum (fig. 4a) and was not reinforced with a new support. During the process, gypsum poured over the edges of some fragments (fig. 3), making that level of the fragment higher than it originally was. The edges that were

[1] Rogić 2018, 905.
[2] Mirković 2008, 84–85.
[3] Popović 2008, 43–45.
[4] Milošević 1994, 49.
[5] Popović 2008, 43–45.

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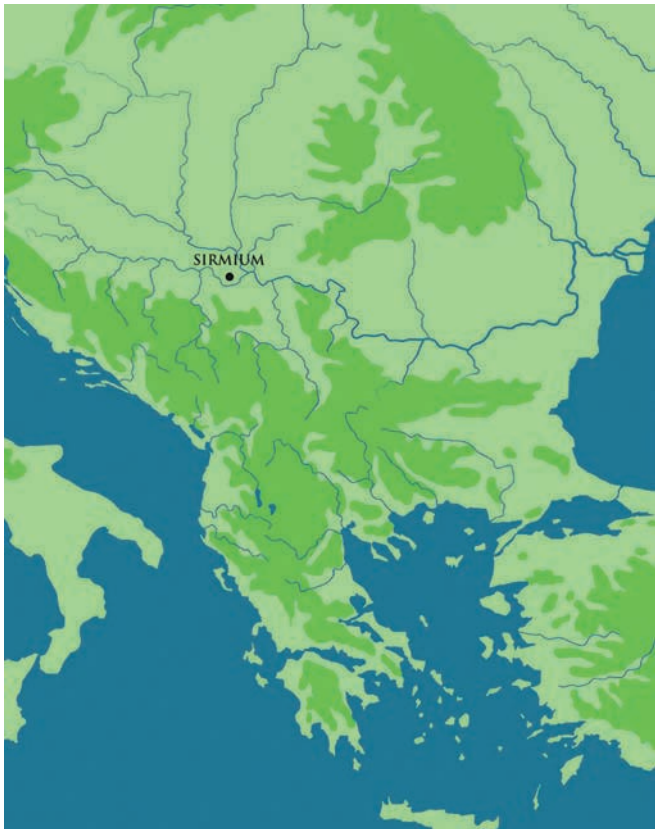

Fig 1. Geographical position of Sirmium

Сл. 1. Геоīрафски īоложај Сирмијума

covered in gypsum gained a lighter colour and some fragments have moved as a result of this process.

When the unit was broken, the original appearance of the plaster was seen (fig. 4). The size and the thickness of the plaster fragments were different. There was a visible difference between two plaster layers, but it is assumed that there were more, as the plaster was levelled (making it thinner by removing a major part of arriccio) during a previous conservation process. The intonaco aggregate is made of fine sand, while the arriccio contains sand of coarser granulation, with visible traces of straw (fig. 4b). The intonaco surface was smoothed over.

The wall painting was executed using the fresco technique, which can be deduced based on the visibility of the hairs of the brush that was used for painting. These brush traces on the surface of the coloured layer were of great help when determining the position of the fragments. On the coloured layer, some surface dust and occasional calcification are present. There were some mistakes during the previous assembling of the fragments, the most visible of which is a fragment with a foot set next to a face with the sole turned upwards (fig. 5).

The conservation and restoration work[6]

As there were many inconsistencies with the earlier assembling of the fragments, the gypsum had to be removed, so that the fragments could be set correctly. Wet compresses were used to soften the gypsum. The gypsum removal process itself was a long one, and performed carefully so as to prevent the original fragments from breaking (fig. 6). After the removal of the gypsum, the fragments were classified according to their pictorial content and set in a large wooden case with sand to make the assembling and levelling easier (fig. 7a–b). In this case, only those parts whose edges were clearly linked to one another were placed together. The remaining parts were set some distance apart, with an assumption made regarding their correct position.

The coloured layer was consolidated using a 3% solution of Paraloid B72 in acetone. The fragments were stuck together with acrylic glue, and the lacunes

[6] The re-conservation and restoration of the unit was performed by Kristina Ponjavić, Sanja Blagojević and Dragana Gavrilović.

Fig 2. Found state of the wall painting

Сл. 2. Затечено стање зидне слике

between the fragments were filled in with a layer of temporary plaster (fig. 8). The face of this unit was secured with the application of facing[7] in order to secure its successful move to a new support.

The levelling of the background, or thinning of the plaster from the original fragments, was necessary as the thickness of the plaster varied, after which the fragments were consolidated.[8] The original plaster was reinforced with new plaster, made of sand and slaked lime. After drying, the unit was set on a new support – an aluminium honeycomb panel (43.5 × 65 cm).

The advantage of an aluminium honeycomb composite support in comparison to other supports is its durability, solidity and ease of handling. Before this, in conservation works on wall paintings in Sirmium, wooden supports were used.[9] Based on the processed conserved material from the Museum of Srem, we can conclude that gypsum or marble powder were most commonly used for the new plaster.

[7] An application of protective paper or fabric with an appropriate adhesive to the face of a painting.

[8] Primal WS 24 was used for consolidation.

[9] The Provincal Institute for the Protection of Cultural Monuments, Novi Sad.

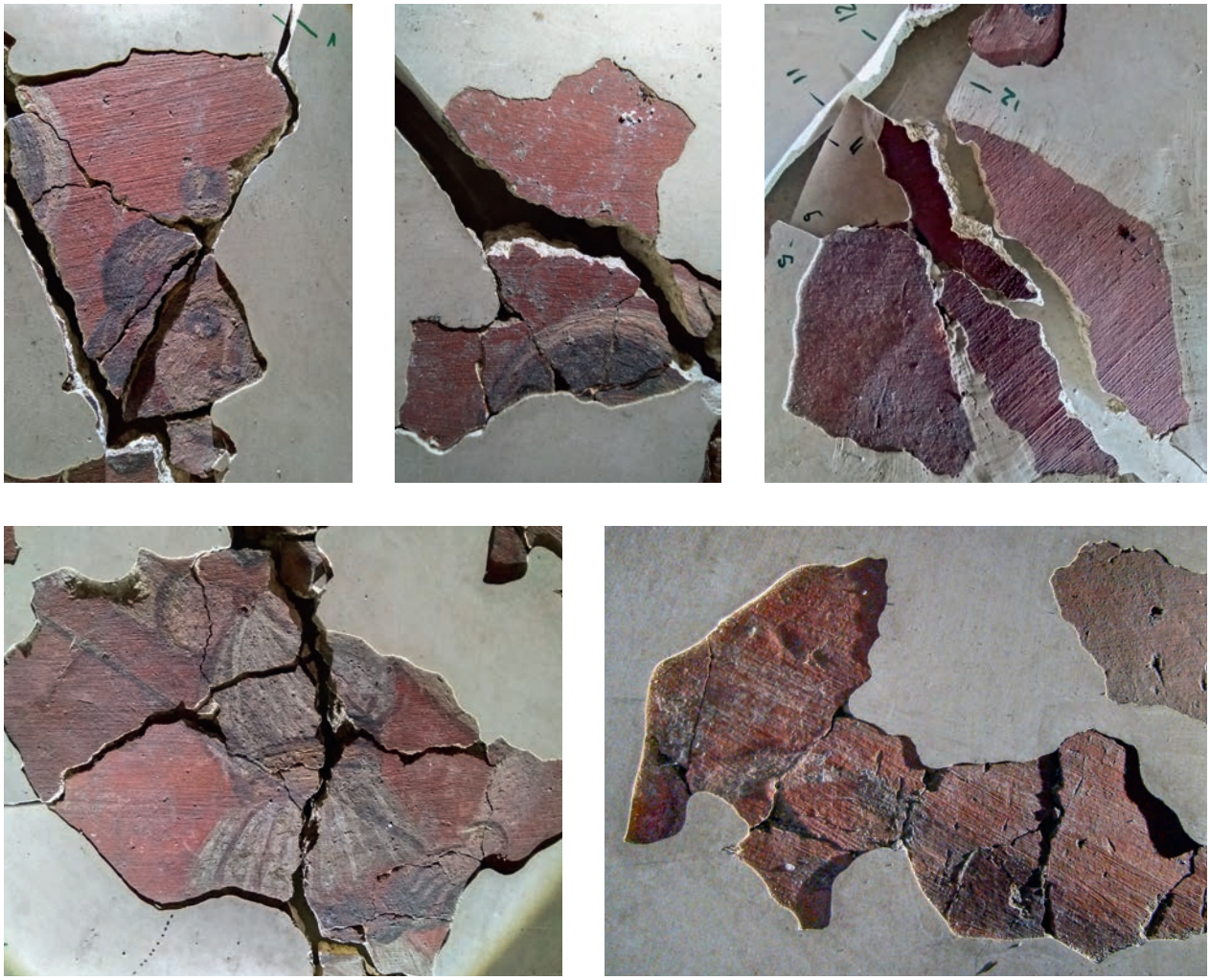

Fig 3. Appearance of the fragments in raking light

Сл. 3. Изглед фрагмената под бочним осветљењем

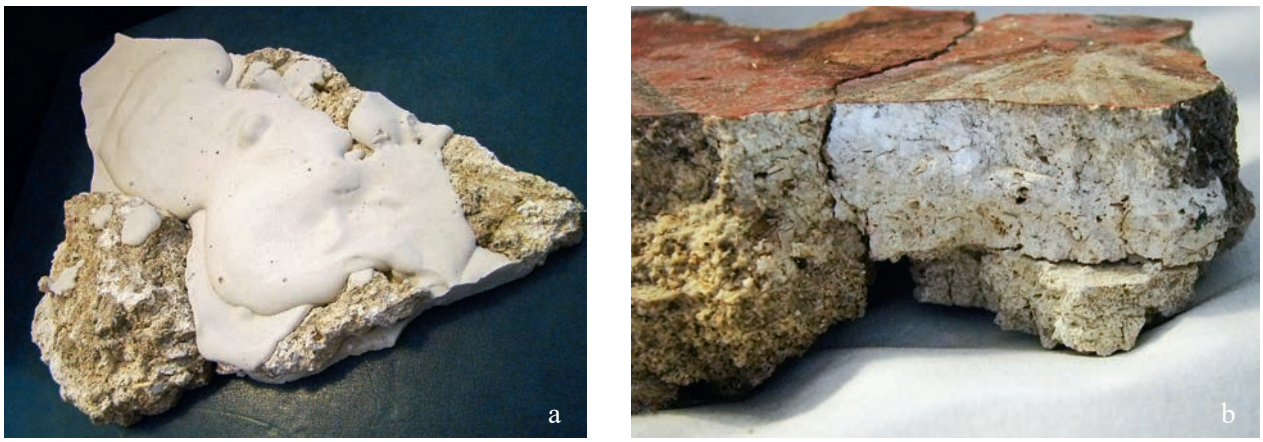

Fig. 4. a) Appearance of the back of the fragment; b) Appearance of the original plaster

Сл. 4. а) Изглед полеђине фрагмента; b) Изглед оригиналног малтера

Fig. 5. Fragment showing the foot turned upwards, set next to the face

Сл. 5. Стопало које је окренуто наопако и које се налази поред лица

When the entire unit was turned around, the temporary facing was removed, then the decorative plaster was applied.[10] For the filling of the missing parts in the painted layer, slaked lime and finely sifted marble powder were used. After this process, the surface was retouched with aquarelle using the tratteggio technique (fig. 9).

Iconographical interpretation

The iconographic analysis of the re-conserved fresco has given us a reinterpretation of the preserved motifs. Since the figure is fragmented and the majority of the composition is missing, it is not possible to comprehend it in its entirety. On the red background there are parts of a graceful looking standing figure. The face is turned to the viewer and is not completely preserved. The eye on the left is visible, and the figure is looking to the right. Above the eye, a short, thin eyebrow is painted. The nose is modeled with a mixture of ocher and white and the shadow and contour are brown. The hair is curled beneath the ears and slightly below the chin line, while there is a bun on the top of the head, wrapped with a white band. The hair was painted in brown lazure, with black brush strokes used to render the curves of the hair. The lighter parts were painted using short brush strokes of ochre.

Carnation on the face and body is made using a pastose mixture of colours giving them a pink nuance, while the modelling of the facial forms was done by addition white, and accented with white. The drawing of the nose, eyes, eyebrows, lips, chin, arms and legs is in brown while the lines of the eyelids, irises, nostrils and the corners of the mouths are accentuated with short black strokes.

The figure is wearing a long white dress, with a wide ochre belt emphasising the thin waist. The dress is pinned on the right shoulder with a fibula. The dress shows gentle light and dark wrinkles in thin strokes that follow the upper body line, while the lower part is depicted as swaying, which gives the effect of a smooth, light cloth.

[10] For the decorative plaster and edges, sand and stone aggregate of finer granulation were used as filler, while slaked lime was used as a binder.

Fig. 6. Gypsum removal process

Сл. 6. Уклањање гипса

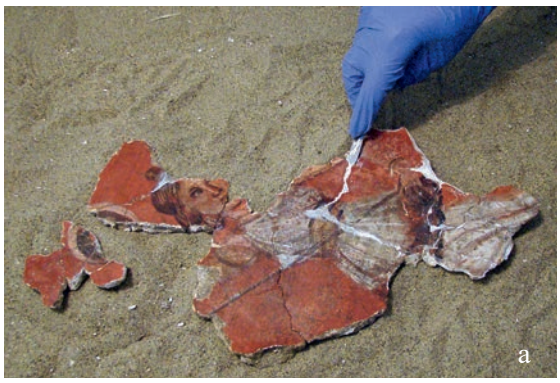

Fig. 7. a) Fragments set in a sand-filled tub; b) Fragment with a painted foot

Сл. 7. а) Постављање фрагмената у корито са песком; b) Фрагмент са насликаним стопалом

Fig. 8. Connecting the fragments using temporary plaster

Сл. 8. Повезивање фрагмената у целину помоћу привременог малтера

Fig. 9. Wall painting appearance after conservation work
Fig. 10. Top of the stick on the wall painting

Сл. 9. Изглед зидне слике након конзерваторских радова
Сл. 10. Врх штапа на зидној слици

The right arm is raised and bent at the elbow, holding a partially preserved round object. The item is painted in brown with a white rim and suggests a drum or a tambourine (fig. 9). Diagonally across the figure there is a stick with shape on the top that cannot be precisely defined, because the ochre paint has fallen off considerably, but it could represent a small pinecone (fig. 10). The lower part of the stick is covered by an arm, with a golden bracelet on the forearm. The same type of jewellery is seen on the right upper arm.

Although it was assumed that the figure represented Diana or Atalanta,[11] the re-conservation of this female figure opened the possibility for further interpretation. Atalanta was not a common motif in Roman wall painting. Atalanta and Maleager were represented on the fresco from the House of Centaur (Pompeii, 1st century AD, north tablinum wall).[12] Atalanta was depicted with a helmet, spears and a quiver, whereas the head of the Calydonian Boar lies on the ground. On a mosaic from Halicarnassus, Atalanta is shown on horseback (found in a Roman villa in Halicarnassus, present day Bodrum, 3rd–4th century AD) [13] in a short dress (chiton), holding a spear and a quiver on her shoulder. A Greek sculpture of Atalanta from the Vatican Museum[14] shows her as a young girl in a chiton, with a palm branch next to her (1st century BC).

The representations of Diana in Roman paintings are numerous, and the most common one is of her in a short chiton. She is depicted with a quiver, bow and

[11] Milošević 1994, 49; Popović 2008, 43–45.

[12] Bragantini, Sampaolo 2013, 226.

[13] The fresco is in the British Museum, catalogue no. 1857, 1220.439.

[14] Vatican Museum, inv. no. 2784.

arrow, a torch, a deer and a small altar. On a fresco found in the Villa Arianna (Pompei, 1st century BC), Diana is shown with a bow and arrow, wearing a long dress,[15] while Diana on a pedestal in the painting in the National Archaeological Museum in Naples (1st century BC) [16] is depicted with a bow and arrow, wearing a short dress and boots.[17] On the north wall of the Via Livenza hypogeum in Rome, Diana is seen hunting, in a short tunic.[18] In sculpture and mosaic, she is commonly shown in short dresses, with a bow and arrow.[19]

Thus, another similarity was noticed when analysing the figural representation from Sirmium – the similarity with Dionysus seen on a mosaic from the House of the Masks (Delos, 2nd century BC).[20] The main points of comparison were the dress, patera and thyrsus. Dionysus is wearing a two-coloured chiton, tied under the chest. He is holding a patera in one hand and a thyrsus in the other.[21] The thyrsus is a stick that, according to the myth, was used by Dionysus and his entourage to revive nature.[22] However, as the representation from Sirmium has undoubtedly female attributes and decorative jewellery characteristic of women, the research of the iconography was pointed towards someone from Dionysus' entourage.

What causes doubt in determining the Sirmium representation is the stick ending in a very specific ornament. Dionysus' (Bacchus') thyrsus is presented in so many different ways, both in painting and mosaic. It can be seen as a stick with a pinecone on the top; a stick with twigs and bands; or as a spear decorated on both ends with floral motifs, as in the mosaic "The triumph of Bacchus", from Tunis.[23] It can further be seen as a golden spear with a circle and bands beneath it – as is the case with the mosaic from Algiers, "Dionysus' Triumph" (3rd century AD);[24] or simply as a spear with a star-shaped ornament and bands, as in the mosaic "Dionysus' Triumph" from The House of Poseidon, in Zeugma.[25] It is quite possible that the decorative bands existed on the figure from Sirmium's staff and that these fragments were not preserved. Furthermore, we should consider artistic freedom in the presentation.

If we assume that the figure from Sirmium represents a female deity, the staff in her hand might be a sceptre. Sceptres of such a shape are found on the mosaic "The Judgment of Paris", from the Roman villa in Antioch (2nd century AD), where Athens, Hera and Aphrodite are shown.[26] Aphrodite and Hera hold sceptres similar to those from Sirmium. On a medallion in The House of Marcus Fabius Rufus, in Pompeii, there is Aphrodite with a tiara and sceptre (1st century AD). Juno is presented in sculpture in a hieratic pose, with a sceptre in one hand and a libation dish in the other – as is visible on the marble sculpture from The Louvre (2nd century AD).[27]

The figure from the Sirmium fresco is too playful to be any of the goddesses, the figure is characterised by a specific movement of the arms, which is further extended to the long and breezy dress. Such a playful motion is seen in depictions of maenads in painting, mosaic and the decoration of objects. According to the myth, the maenads are Dionysus' followers, frenzied women in trance, strong, violent and sexually deviant. Their eccentric craze was explained as being influenced by the use of alcohol and drugs. They are seen crowned with ivy, shrouded with fawn or panther skin, often wearing elegant dresses. Their attributes are a fawn, a thyrsus, a torch and a tambourine,[28] but they are also seen with other musical instruments.

In the case of Cicero's villa, playful maenads were shown, some carrying a thyrsus, and some tambourines and hand cymbals (fig. 11).[29] Another maenad with an instrument – a double flute – is seen on a mosaic from a house in Antioch.[30] She is entertaining Dionysus and Heracles during a drinking competition. The maenad is wearing a long tunic, gathered below the chest, then falling freely to the ground.

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15 Valladares 2007, 75.

16 The fresco is in the Naples, National Archaeological Museum, inv. no. 9301. It was found in *Casa di Diana* or *Casa della Danzatrice*.

17 Bragantini, Sampaolo 2013, 191.

18 Baldassarre et al. 2002, 375.

19 Examples are a sculpture of Diana from the Louvre – Inv. MR 152 and from the Vatican Museum Inv. no. 42; Diana on a mosaic from Tunis, 2nd century AD, Bardo National Museum. Inv. No. 2384.

20 Dunbabin 1999, 37

21 Janićijević 2019, 127–130.

22 Cermanović, Srejović 1996, 971.

23 Fradier 2007, 155.

24 Blanchard-Lemee 2001, 537.

25 Önal 2003, 19.

26 Dunbabin 2010, 163.

27 Louvre, Inventaire CP 6409 (n° usuel Ma 2283).

28 Cermanović, Srejović 1966, 343.

29 Ciardelo 2012, 140–149; Now in Naples, National Archaeological Museum, inv. no. 9297.

30 Talgram, Weis 2004, 51.

Fig 11. Maenads from Cicero's Villa (After: Bragantini, Sampaolo 2013, fig. 20b)

Сл. 11. Менаде из Цицеронове виле (преузето из: Bragantini, Sampaolo 2013, fig. 20b)

Fig 12. a) Mosaic from Stara Zagora (After: Камишева 2014, 19); b) Maenad from Murecine (The photo is used by kind courtesy of the Archaeological Park of Pompeii; su concessione del Ministero per i Beni e le Attività Culturali e per il Turismo – Parco Archeologico di Pompei)

Сл. 12. а) Мозаик из Старе Загоре (преузето из: Камишева 2014, 19); b) Менада из Murecine (Фотографија се користи љубазношћу Археолошког парка Помпеји)

A segment of Dionysus' procession is seen on a floor mosaic in a residential unit from Stara Zagora (Augusta Traiana-Beroe) in Bulgaria. On the preserved part of an emblem, a figural scene of the procession is depicted, with Maenads led by a satyr in ecstasy (fig. 12a). The maenad on the left side is wearing her hair in a bun on the top of her head. Her arms are raised, and she is holding castanets (*crotalum*). The other Maenad, leaning towards the satyr, wears an ivy crown, with long hair and carries a rattle. They both have long dresses, pinned on one shoulder. The mosaic dates to the third quarter of the 4th century.[31] These Maenads are, both in style and iconography, closest to the representation from Sirmium.

In triclinium C of the complex found on the site Murecine or Moregine, outside the walls of Pompeii (1st century AD), a maenad is painted in a whirling dress and a cloak, a thyrsus in one hand and in the other a round object, probably a drum, on a red background (fig. 12b).[32] A similar example is a maenad dancing in a breezy ochre dress with a white cloak, also carrying a thyrsus and a tambourine (*tympanum*). It was found on a wall of the triclinium in Pompeii (1st century BC and 1st century AD).[33]

Dionysus' triumph over India is depicted on a mosaic from Neos Paphos,[34] where his entourage consists of two maenads on the left. The maenad on

[31] Kamisheva 2014, 18–19.

[32] Ciro Nappo 2008, Fig 16.

[33] The House of Nevillius, Pompeii. The wall painting is now kept in Naples, National Archaeological Museum, inv. no. 9298.

[34] Dunbabin 2010, 227.

the far-left has a thyrsus in one hand, and a Dionysian casket and religious objects, whereas the other one carries a libation bowl. The central part is Dionysus' triumph over India, with slaves and leopards. The maenad on the left is standing next to a kneeling slave and she carries hand cymbals. On the mosaic from Kissamos (3rd century AD), a maenad is depicted with a tambourine, standing behind Dionysus.[35] Dionysus and his entourage were represented on a mosaic from Cologne, where the maenads are half naked and playful, with an instrument in their hands.[36]

A dancing bacchante leading Dionysus in a tiger-chariot managed by Nike is shown on a mosaic "Dionysus' return from India" (Euphrates villa, Zeugma, 2nd–3rd century AD).[37] The mosaic from Sousse (Tunis) shows a glorious procession of Dionysus, with a maenad in front of him and the goddess Nike, dancing and carrying tambourine.[38]

The identification of the thyrsus and the tambourine of the Sirmium wall painting were of paramount importance for the correct interpretation of the figure as a maenad.

Conclusion

Extensive works on conservation and restoration jobs are usually parts of big conservation projects, but often, due to the lack of funds, it often happens that the archaeological treasures in museum depots remain hidden from the eyes of both the public and researchers, or that conservation procedures start with insufficient funds and are not finished in time. The conservation of the wall painting from Sirmium described in this paper started at the end of the last century but was not finished, and it was subsequently broken. Its re-conservation was completed in 2018.

The importance of this re-conservation is in the prevention of further damage to the unit and that appropriate protection was used. It is also important that certain fragments have been now moved to their proper places, as was the case with the foot set next to a face, this significantly narrows the composition.

With the correct conservation and restoration of the whole wall painting, a reinterpretation of the iconographic content was enabled. The painted figure is refined and with plenty of details, as is seen with the facial lines, the hair style, jewellery and the hand. All this suggests that it was probably painted in the central panel, as it is small in dimensions and the painter could easily deal with the details, or the figure could have been a part of a larger composition.

The plaster that serves as a base is smoothed over and was painted using the fresco technique. This can be concluded based on the visibility of the brush strokes on the red background and in the fine layers in the representation itself.

Previously, with the interpretations of this painting, it had been suggested that this figural representation is wearing a short tunic, but with the newly set material we have concluded that she is wearing a long dress. A band around her head is also mentioned, which cannot be seen as such with more careful analysis; the band is actually around her hair bun. The foot that was placed next to her face was assumed to be a crescent moon.[39] The figure in the painting was seen as the goddess Diana, Atalanta or a personification of Macedonia.[40] The circular object in her hand was characterised as a shield.[41] This object is far too small in circumference to serve as a shield, and even its position is questionable, given that shields are not usually held so high.

Following the iconographic analysis in this work, we have reached a different interpretation of the shown figure. Atalanta is mostly shown with a bow and arrow, a quiver, a spear and in a short tunic, which is also the case with Diana.[42] Both are mythological figures linked specifically with hunting and nature, which is not seen in the case of the Sirmium figure. The figure from the Sirmium representation could rather be associated with maenads.[43] This female figure could hold a stylised thyrsus, or a decorated staff in one hand, and a drum in the other[44] or a tambourine while dancing, which is suggested by her arm and dress movement, but also by other attributes.

Chronologically, stylistically and territorially, the closest parallel is with the mosaic from Stara Zagora. One of the maenads had a hair bun just like the figure from Sirmium. She has a long dress, her arms are raised, holding castanet-like objects.[45] Another analo-

[35] Markoulaki 2011, 54.
[36] Dunbabin 2010, 83.
[37] Darmon 2011, 40.
[38] Fradier 2007, 155.
[39] Popović 2008, 43–45.
[40] Милошевић 1994, 49; Popović 2008, 43–45.
[41] Popović 2008, 43–45.
[42] Simon, Bauchhenss 1984, 792–855.
[43] Simon, Simon 1997, 780–803.
[44] Di Giulio 1991, 2–7.
[45] Камишева 2014, 18–19.

gous example is the representation from the site of Murecine or Moregine (1st century). On the red background, a maenad is painted, also wearing a long dress, with a swaying robe, holding a thyrsus in one hand and a drum in the other.[46]

Based on the analogies, the red background, drums or tambourine, stylised thyrsus and the playful movement depicted, the representation from Sirmium has a Dionysian character. This leads to the conclusion that the female figure is most likely a member of Dionysus' entourage, a maenad. The composition probably had more figures, however that cannot be confirmed due to the lack of (preserved) fragments.

The re-conservation process has, once more, proved the importance of multidisciplinary work in archaeological science. The practical conservation of the Sirmium fresco allowed its new interpretation, showing the necessity of careful conservation of an archaeological find following its iconographical content.

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[46] Ciro Nappo 2008, Fig. 16.

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Re-Conservation and Reinpretation of a Roman Fresco from Sirmium (225–237)

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РЕКОНЗЕРВАЦИЈА И РЕИНТЕРПРЕТАЦИЈА РИМСКЕ ФРЕСКЕ ИЗ СИРМИЈУМА

Кључне речи. – реконзервација, зидно сликарство, гипс, иконографија, менада, Сирмијум

Рад се бави реконзервацијом фрагмената римске зидне слике као и новом интерпретацијом њеног иконографског садржаја. Конзервација ових фрагмената започета је током деведесетих година прошлог века и тада није била завршена. У међувремену је целина поломљена, јер није имала потпорни носач, те је поновна конзервација изведена 2018. године. Значај ове реконзервације огледа се не само у томе што је спречено даље пропадање експоната извођењем адекватне заштите већ и у томе што су поједини фрагменти враћени на своја места, попут стопала које је било постављено поред лица, што је композиција знатно сужена и што су делови хаљине распоређени у логичну целину.

У литератури је наведено да је фигурална представа у краткој туници, а поновном обрадом материјала дошло се до закључка да је она у дугој хаљини. Такође, поменута је трака која иде око главе, али пажљивом анализом она није уочена. За стопало које је било постављено поред лица претпостављено је да је у питању месечев срп. Иако се за ову представу до сада сматрало да приказује Дијану или Аталанту, она би у ствари могла да представља Менаду – која би могла држати елегантни тирс и даире у рукама док игра, на шта сугерише вртлог покрета руку и хаљине.

Најближе паралеле налазимо у мозаику из Старе Загоре, као и на фресци са локалитета *Murecine* или *Moregine.*

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EARLY MEDIEVAL BURIAL OF WOMAN AND FOX AT THE SLOG NECROPOLIS IN RAVNA (*TIMACUM MINUS*) IN EASTERN SERBIA*

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Abstract. – On the eastern slope of Slog Hill in Ravna, some 400 m to the west of the Roman fortification of *Timacum Minus*, a multilayered necropolis was investigated from 1994 to 1996 and from 2013 to 2015. There are two main horizons of the necropolis – Late Roman and Early Medieval. The late Roman necropolis has three phases dated from the middle of the 4th to the middle of the 5th century. The early medieval necropolis, according to the new excavations, has two phases, the earlier dated to the 8th – 9th centuries and the later from the end of the 9th to the beginning of the 11th century. An interesting grave (G 159), belonging to the earlier medieval phase of necropolis, was discovered in 2014. It is a unique burial of a woman and a fox, which has its only analogy in a disturbed woman and fox grave (grave 16) at the early Avar necropolis in Bečej. The burial with a fox could be interpreted in two ways – that the animal has a cult – ritual – magic meaning or that the fox was a pet of the deceased.

Key words. – Early Medieval period, necropolis, woman and fox burial, physical anthropology, archaeozoology

Since 1975, the Institute of Archaeology in Belgrade, in collaboration with the Homeland Museum in Knjaževac, has been continuously conducting systematic archaeological investigations of the Roman fortification and civil settlement of *Timacum Minus*, situated in the village of Ravna, 10 km to the north of Knjaževac (Fig. 1).

Archaeological investigations of the fortification of *Timacum Minus* within an area of approximately 2 ha at the site of Kuline revealed remains of a Roman fortification, the dimensions of which are 144 x 112 m (Fig. 2). The earliest earthen western rampart with a palisade and square timber towers and a defensive trench, *fossa*, along the eastern rampart were dated to the middle of the 1st century AD. This earliest fortification was garrisoned by the *Cohors I Thracum Syriaca*. The first stone fortification of a rectangular plan with rounded corners and internal square towers was built in the first half of the 2nd century AD.[1]

There are three more phases of construction of *Timacum Minus*: the first dated to the middle of the 3rd century, the second in the first half of the 4th century and the last at the end of the 4th century. From the time of construction of the stone fortification, the garrison of *Timacum Minus* consisted of the *Cohors II Aurelia Dardanorum,* until the Late Roman period, i.e. the last decades of the 4th century, when they were replaced

[1] Petrović 1995, 40–41; Petković *et al.* 2005, 13–15.

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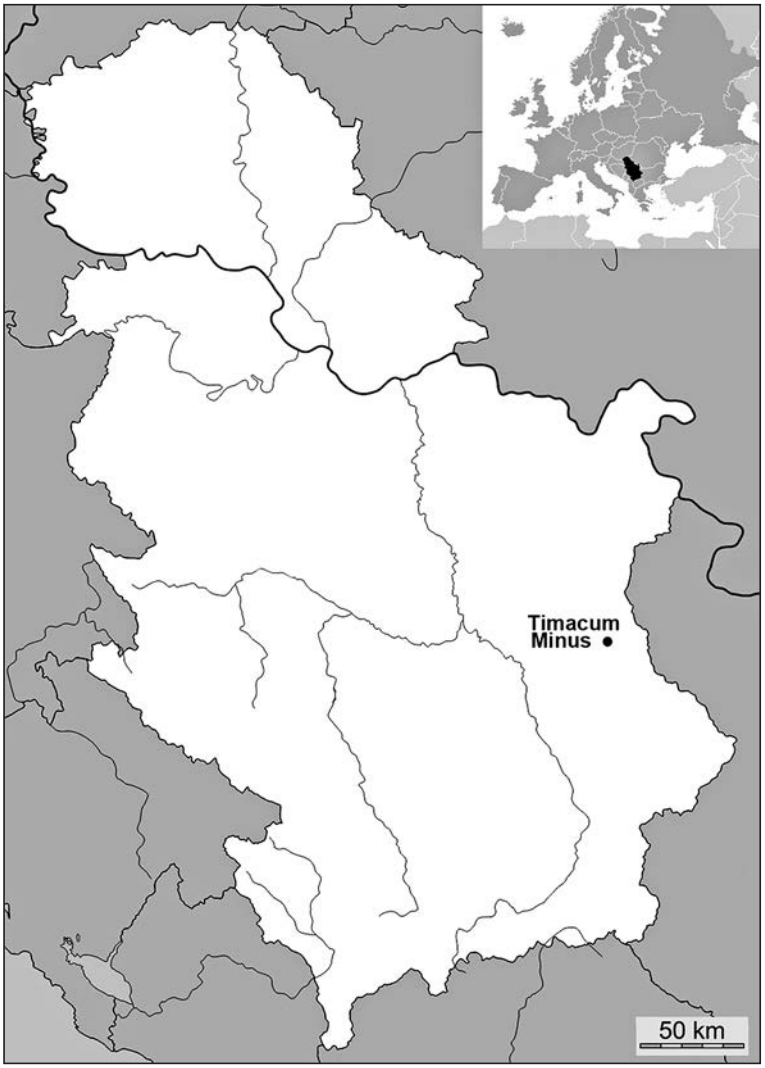

Fig. 1. Map of Serbia with the position of the Roman fortification and the settlement of Timacum Minus

Сл. 1. Карта Србије са положајем римског утврђења и насеља Timacum Minus

by the *pseudocomitatenses Timacenses auxiliarii*. This fortification was destroyed by a conflagration in the middle of the 5th century, as is suggested by the layer of burning in the southern gate sector.[2]

Investigations in the southern gate sector confirmed building activities in the first half of the 5th century, including the construction of a building complex of dry masonry leaning on the southern rampart and the towers of the south gate. There are three phases of reconstruction confirmed in the sector of the southern gate, dating from the end of the 4th to the mid-5th century.[3] In this sector, life was interrupted in the middle of the 5th century as a consequence of the mass destruction in a conflagration, probably during the Hunnish invasion of the Lower Danubian provinces (441–443 AD).

To date, the archaeological investigations have not confirmed that the fortification of *Timacum Minus* was restored after the Hunnish devastation. Even though Procopius mentions two fortresses in the *Aquis* region that include the hydronym *Timacum* in their name – the restored Timakiolon (Τιμακιολον) and newly built Timathohiom (Τιμαθοχιωμ), neither of them could be identified with any certainty as *Timacum Minus*.[4] Also, no traces of Justinian's restoration of the ramparts and towers have been ascertained and there were no findings dated to the 6th century discovered in the fortification or in its surrounding.[5]

[2] Петковић, Јовановић 2001.

[3] This was revealed in the latest campaign of excavations led by Sofija Petković in 2019.

[4] *Procop. De aedif.* B. IV. iv. 3.

[5] Petković *et al.* 2005, 16.

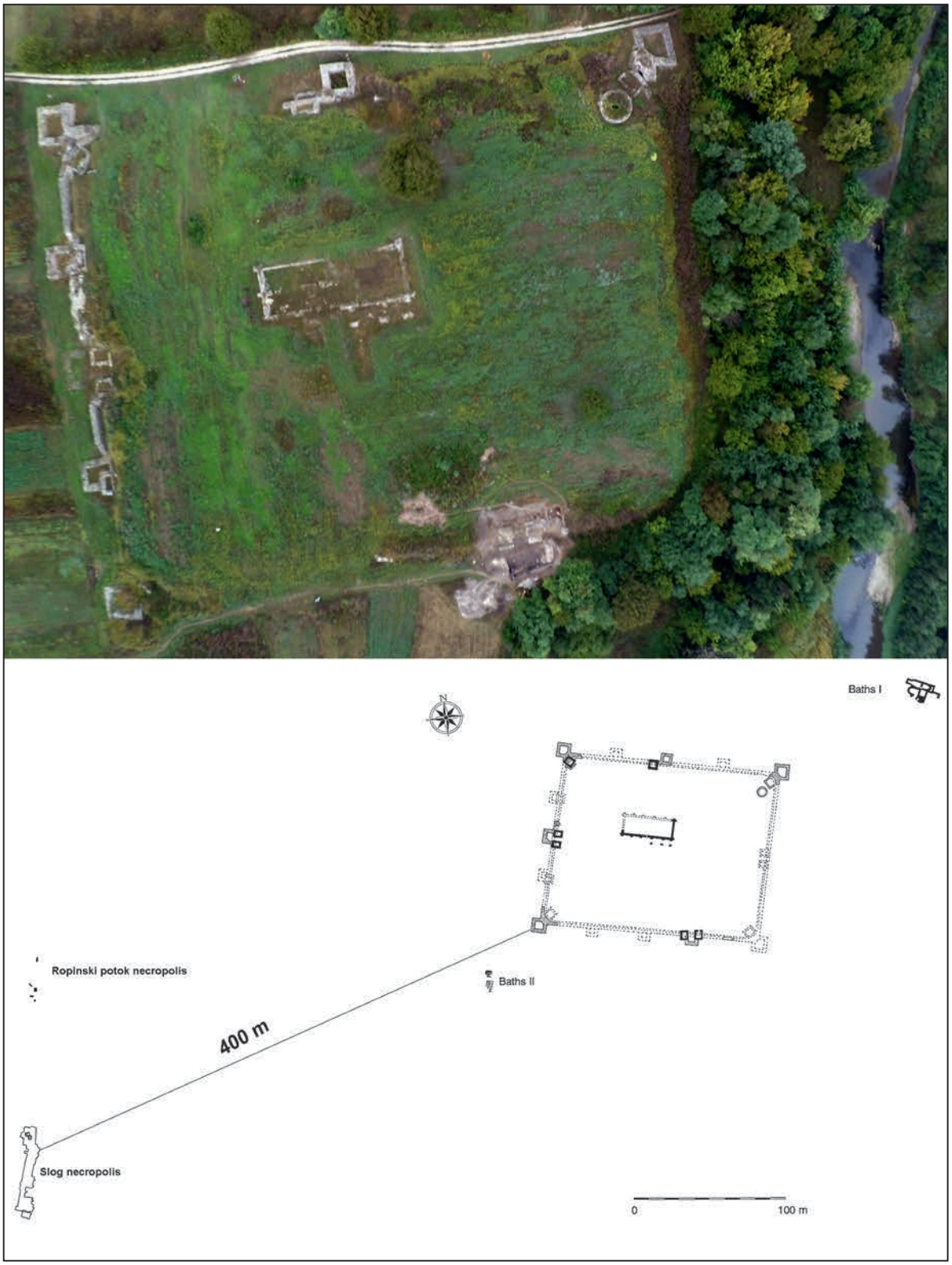

Fig. 2. Aerial view of the Timacum Minus *fortification (2019)*
and the plan of the fortification and explored parts of the necropolis of Slog and Ropinski potok

Сл. 2. Аероснимак утврђења Timacum Minus *(2019. године)*
и план утврђења и истражених делова некропола Слог и Ропински поток

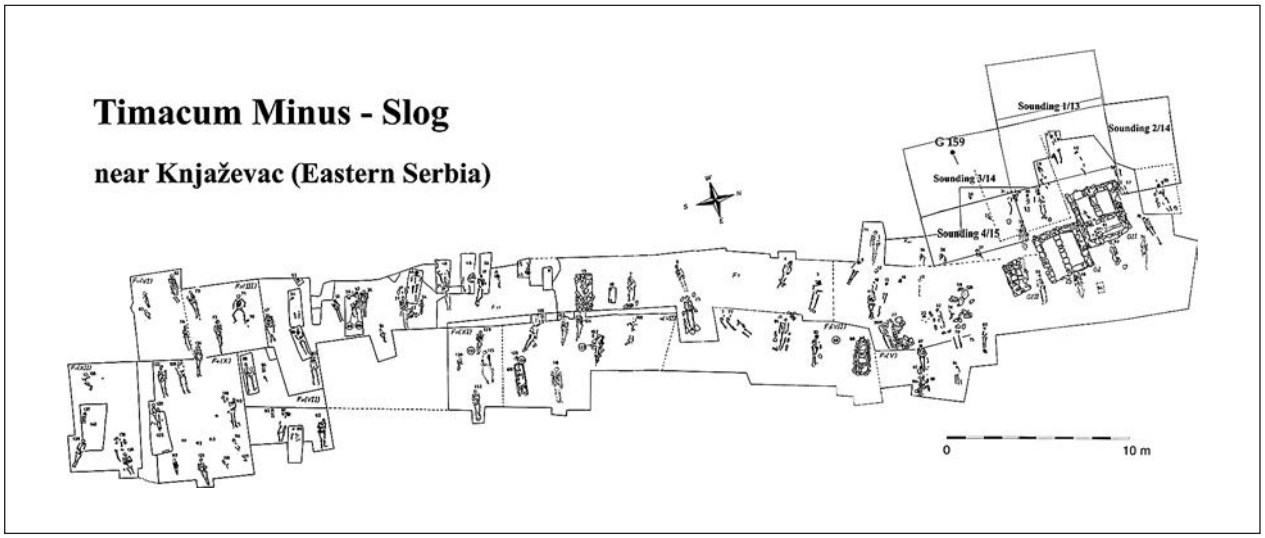

Fig. 3. Plan of the Slog necropolis, researched in 1994–1996 and 2013–2015

Сл. 3. План некрōполе Слоī, истраживања из 1994–1996. и 2013–2015. īодине

Traces of a civil settlement were confirmed by prospecting and test trenching in the area to the south of the fortification, where the buildings from the period of the 2nd–4th centuries had been investigated.[6]

Also, to the northeast of the fortification, on the bank of the Timok river, the baths (*thermae I*) built in the 2nd century and abandoned in the 4th century were completely excavated. Next to the south-western corner of the fortification, the structure of composite plan with a hypocaustum heating system (*thermae II*) was partially explored. The existence of temples within the civil settlement dedicated to Jupiter Dolichenus and Diana was established, based on the finds of altars and fragments of stone sculptures, while a temple dedicated to Mars was most probably within the fortification itself.[7]

So far, traces of the medieval settlement have not been detected at the site of Kuline, or in the surroundings of fortification, although there have been sporadic finds of medieval pottery, dated to the 10th–11th centuries, in the surface layers at the site.

The best evidence about the population of *Timacum Minus* is the necropolis, which extends to the north and west of the site of Kuline. The area it occupies is limited to the west at the summit of Slog Hill. On the fairly steep eastern slope of the hill and at its foot, a rescue excavation from 1994 to 1996 unearthed part of a Late Roman necropolis from the second half of the 4th and the early 5th century and an Early Medieval necropolis dated to the 9th–10th centuries. On the occasion of these archaeological investigations, a total of 140 graves and three masonry tombs were discovered (Fig. 3).

Protective excavations of the necropolis continued in 2013–2015, when another 53 Late Roman and Early Medieval graves were discovered. In addition to confirming the earlier research results, recent excavations have identified an earlier phase of the medieval necropolis, which could be dated, according to the grave-goods, to the period of the 8th–9th centuries. This is a very important discovery, testifying the continuity of burials in the necropolis and life in today's Ravna during the Late Roman and the Early Medieval period (Fig. 3).

The funeral ritual at the medieval necropolis was characterised by inhumations in simple grave-pits, sometimes with the sides reinforced with large stones or pebbles. The graves were mostly oriented in an west-east direction, with the exception of some graves of the earlier phase of the necropolis. The deceased were laid in a supine position with their arms extended

[6] Петковић, Илијић 2013.

[7] Petković *et al.* 2005, 16–17. In the campaign of 2019, a limestone capitol of a pillar with a votive inscription dedicated to Jupiter was discovered in the interior of the Late Roman tower in front of the southern gate (tower S_4).

along the body or with their arms bent or crossed with the hands placed on the pelvis. Grave finds consisted of pieces of garments of the deceased, such as jewellery, belt-buckles, shoe-pegs, and, rarely, ceramic vessels. It was concluded that the funeral ritual of the medieval necropolis was generally Christian, which dated the necropolis from the end of the 9th century.[8] On the other hand, some of the graves, dated to the earlier horizon of the necropolis, had rich grave-goods, consisting of pottery, mostly pots, hand-made or manufactured on a slow potter's wheel, amphorae, a wooden bucket, iron tools and weapons, etc.[9] The hand-made pots or those made on a potter's wheel had analogies in ceramic from the Late Avar period (680–820 AD).[10]

Also, there is an interesting ritual of laying snakes in the graves – obviously dead reptiles were placed around the neck or waist of deceased young women (G 11, G 24, G 73 and G 120) and in a stretched out position in a child's grave (G 37).[11] In a different form, this ritual was also ascertained in graves of the Late Roman necropolis at Slog.[12] Apart from snake skeletons, fragments of animal bones (pig and poultry) were found in grave G 133, belonging to an earlier phase of the medieval necropolis.[13] In our opinion, there was a strong pagan influence on the funeral ritual of the earlier phase of the medieval necropolis at Slog, which is basically Christian. In the period of the 8th–9th centuries, this could be assumed as the usual funeral practice of the Central Balkans.

The medieval population buried at Slog is significantly different from the one that used this necropolis in the Late Roman period. In addition to a different physiognomy, the medieval population is marked by a sharp fall in living standards reflected in a very high rate of child mortality, which number c. 50% of the excavated individuals. Furthermore, a higher incidence of blood and metabolic disorders and badly treated traumas is evident in the medieval period, indicating meagre living conditions and a lack of quality food and poor medical practice.

Grave G 159

To the early phase of the medieval necropolis at Slog belongs an interesting funeral of an adult woman, buried in grave G. 159 (Fig. 3–4).

The female individual was buried in a simple, oval grave-pit, in a supine position with arms extended along the body. It seems that the left hand was placed below the left pelvic bone. The grave was oriented west-east, with a deviation of less than 5º to the south. The upper bones of the left arm are missing and the lower bones of the right arm are displaced, but the hand is in place. Also, the bones of the left side of the chest are missing or dislocated. The whole skeleton is poorly preserved and the skull is fragmented.

The most interesting detail of this burial was the discovery of the skeleton of a canine west of the head of the deceased, laid in a bent supine position, so that the animal's head was leaning against the left side of the head of the woman. Below the animal's skeleton, a small, olive-green enamelled, ceramic jug (oinochoe) was discovered. This jug could be dated from the last third of the 4th until the end of the 6th century and was probably secondarily used (Fig. 4).[14]

The grave was damaged in its north-western part by an oval pit, with a diameter of about 0. 90 m, which destroyed the left side of the woman's skeleton in the chest area and a part of the animal skeleton. Also, the hand bones of the deceased female were dislocated. It could not be determined whether this was as a result of burial looting or recent earthworks.

The deceased was buried with jewellery. She had seven bronze earrings, of which six were loop-earrings of an unusual type, decorated with three biconical beads made of bronze sheet and spirally wound bronze strips, imitating bronze wire, and one small loop-earring with two cast oval beads. The earrings were found around the skull of the deceased, so they were probably attached to a band or a cap. The buried woman had a necklace of glass beads of different shapes and colours. Also, she had a bronze ring with an oval plate head engraved with a motif of an eagle, on a finger of the right hand (Fig. 4).

The six earrings have no analogies, as far as we are aware. Similar earrings with four beads derive from the same necropolis at Slog, from graves of an earlier phase (G 8 and G 138).[15] Also, they are similar

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[8] Petković *et al.* 2005, 234–237.

[9] Petković *et al.* 2005; 2014.

[10] Herold 2014, 220–223, Fig. 3, Group 1–3, Fig. 4, Group 3.

[11] Petković *et al.* 2016, 69, Pl. VI.

[12] Petković *et al.* 2016, 60–65.

[13] Petković *et al.* 2005, 235, Pl. XIII.

[14] Кузманов 1985, 35–36, К 59, К 60, К 69; Цвијетићанин 2006, 72–73, КАГ 111, фото 6.
Fiedler 1992, 222–224.

[15] Petković *et al.* 2005, 211, type VIII A; Bikić 2010, 46–47, sl. 18, 4–5.

to the unique type of loop earrings with three beads, again found in a medieval grave of an earlier phase at the Slog necropolis (G 39).[16] These types of earrings were generally dated to the 9th–10th centuries, but, considering other grave finds from the earlier phase of medieval necropolis, especially pottery made by hand or on a slow (hand) potter's wheel, we assume that they are earlier, probably dating to the 8th–9th centuries. It should be noted that the manufacture of the earrings from G 159 was specific – the beads were made of bronze sheet, formed into a cylinder and pressed on both ends to form a biconical shape. Also, it is rather unusual to coil a thin strip of bronze sheet around the loop of the earring between the beads. Finally,

Fig. 4. Grave G 159, probe 3/2014, Slog necropolis

Сл. 4. Гроб G 159, сонда 3/2014. їодине, некройола Слої

three beads positioned at the loop in an asymmetrical way have no analogies. Probably, the bead at the end of the loop had a decorative significance, as the hook at the other end of the earring had a functional role to attach it to the band or to the cap.

A small loop earring with two oval beads is usual jewellery of the Early Medieval period, deriving from the Avar culture and later accepted by Slavs and Bulgars, dated to the 8th–9th centuries.[17]

Glass beads of various shapes and colours are not chronologically sensitive finds, except two cylindrical specimens decorated with spirally applied glass string. One is brown with yellow string and another is black with white string. They were manufactured in south-eastern Europe in the Byzantine tradition and could be dated from the 7th to the 9th century.[18]

The finger ring with oval plate head engraved with the representation of an eagle belongs to the same group of jewellery. It has a Byzantine origin and was favoured through the entire medieval period. It is interesting that such seal rings, with engraved eagles, were discovered only in women's graves in the medieval necropolis at Slog (G 78, G 109, G 115 and G 159).[19]

The jewellery from grave G 159 could be dated from the 8th–10th century, but, based on the archaeological context, it belongs to the 8th–9th centuries.

In this grave, at the pelvis, remnants of an iron knife were also discovered. The knife was probably attached to a belt. This type of women's costume is characteristic of the Early Medieval period in the Balkans.[20]

Anthropological Analysis

The human skeleton discovered in the grave underwent detailed anthropological analysis which included: determining the degree of preservation of the skeletal material, sex and age determination, paleopathological and dental analysis, and the recording of markers of occupational stress and epigenetic characteristics and metrics.

The preservation degree of the skeletal material is determined on the basis of the descriptive scheme proposed by Ž. Mikić. This scheme consists of five categories: I – complete, well preserved skeleton; II – incomplete, well preserved skeleton, III – moderately preserved skeleton; IV – partially preserved skeleton; V – poorly preserved skeleton.[21]

Sex determination of this individual was made by combining morphological and metrical methods. Using the methodology proposed by Ferembach et al.,[22] and Buikstra and Ubelaker,[23] during the analysis, particular attention was paid to the morphological features of the preserved fragments of the skull (*glabella*, *processus mastoideus*, *planum nuchale, arcus supercilialis* and *protuberantia occipitalis externa*), mandible (*corpus mandibulae*, *ramus mandibulae* and *angulus mandibulae*) and pelvic bones (*sulcus praearicularis*, *incisura ichiadica major*, *arc compose*, *crista iliaca* and *fossa iliaca*). Metric elements relevant for sex determination were monitored on the scapulae, clavicles and the long bones of the upper and lower limbs.[24]

The individual age of the deceased was determined based on: obliteration of the cranial sutures, attrition of the occlusal surfaces on the maxillary teeth and morphological changes on the joint surface of the pubic symphysis and sacroiliac region.[25]

Based on the acquired metrical values, indices for the left and the right side of the body were calculated and are presented in table 1.

Twenty-six epigenetic variations on the cranial and 11 on the postcranial part of the skeleton were observed.[26]

The stature of this individual was calculated based on the formulae established by Trotter and Gleser.[27]

In the grave, the partially preserved skeletal remains of a female adult individual, aged 40–45, were discovered.[28] The body height of this individual was 160 ± 4 cm.

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[16] Petković *et al.* 2005, 210–211, Pl. IV; Bikić 2010, 70, sl. 45, 3.

[17] Григоров 1999, 22, тип I F.

[18] Fiedler 1992, 190–191, Abb. 42, 19–21, Taf. 114, 22; Јанковић 2007, 199–201.

[19] Petković *et al.* 2005, 217–218, Fig. 16, 1–3, Pl. VIII, Pl. X; Bikić 2010, 93–94, 120, sl. 63, sl. 91, 1.

[20] Fiedler 1992, 224.

[21] Mikić 1978.

[22] Ferembach *et al.* 1980.

[23] Buikstra, Ubelaker 1994.

[24] Miladinović 2006.

[25] Todd 1920; 1921a; 1921b; Vallois 1937; Brothwell 1981; Lovejoy 1985; Lovejoy *et al.* 1985; Bass 1995.

[26] Hauser, De Stefano 1989; Ђурић-Срејић 1995.

[27] Trotter, Gleser 1952.

[28] Degree of bone preservation: a skeleton is partially present in the grave; bones are very brittle and cannot be easily lifted, packed and transported. – Mikić 1978.

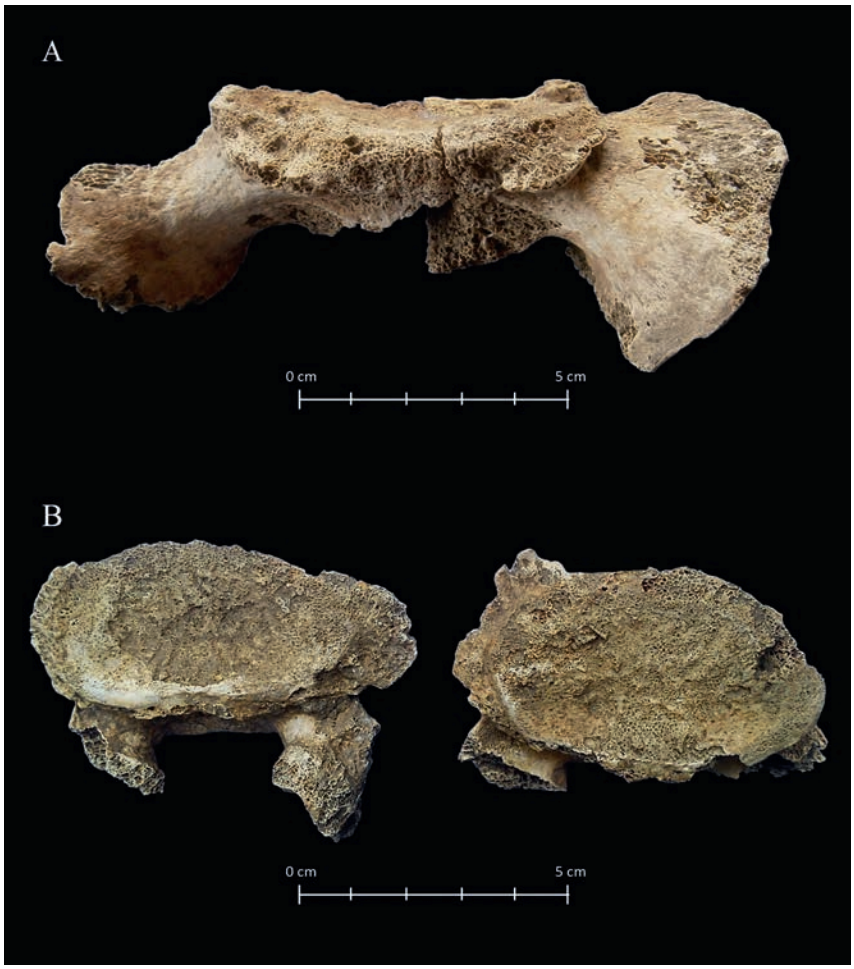

Fig. 5. Paleopathological changes in the osteological material of the person buried in G 159

Сл. 5. Палеопатолошке промене на остеолошком материјалу особе сахрањене у G 159

Noticeable paleopathological changes are degenerative lesions, which are the result of osteoarthritis. They are visible on: the glenoid cavities (the right is more degenerated), vertebrae L4 and L5, sacral bone and tarsals (tali and calcanei) (Fig. 5). The 1st and the 2nd segments of the sacral bone failed to fuse. On the right femur, one additional nutrient foramen was noted.

Markers of occupational stress in the form of hypertrophy are visible on the muscle attachment points of the right and left clavicles (*m. deltoideus*), right scapula (*m. triceps brachii – C. longum*), ribs (*Mm. levatores costarum*), pelvis (*m. rectus femoris, m. quadratus femoris, m. biceps femoris – C. longum, m. semitendinosus*), right and left humeri (*m. subscapularis, m. latissimus dorsi, m. deltoideus, m, brachioradialis, m. extensor carpi radialis longus, m. extensor carpi radialis brevis, m. extensor digitorum, m. extensor digiti minimi, m. supinator, m. brachialis*), right and left radii (*m. biceps brachii*), right and left ulnae (*m. brachialis*), right and left femur (*m. gluteus medius, m. gluteus minimus, m. iliopsoas, m. vastus lateralis, m. gastrocnemius – C. mediale, m. gastrocnemius – C. laterale*), and right and left tibiae (*m. soleus*). Markers of occupational stress in the form of hypertrophy were also noted on the ligament attachment points of the pelvis (*lig. iliofemorale*) and right and left femur (*lig. capitis femoris, lig. pubofemorale, lig. iliofemorale, lig. cruciatum anterius, lig. cruciatum posterius*). Markers of occupational stress and osteoarthritic changes on the bones of this individual are a clear indication of preforming heavy physical activities during her lifetime.[29] In this case, however, these cannot be linked with any specific profession.

Dental analysis indicated the presence of the following teeth in the jaws: 13, 15, 16, 26 and 27. Teeth 23, 24 and all the mandibular teeth were lost *antemortem* (Fig. 6). Teeth 22 and 25 were lost *post-mortem*.

[29] Миладиновић-Радмиловић 2008.

Fig. 6. Mandible of the person buried in G 159

Сл. 6. Мандибула особе сахрањене у G 159

Abrasion of the 1st degree (in enamel) was noted on tooth 27, of the 2nd degree (exposed dentin) on teeth 16 and 13, of the 3rd degree (to the bottom of the fissure) on tooth 15, and of the 4th degree (pulp exposure) on tooth 26. Caries was noted on teeth 15 (mesial, carious stain, 0.20 cm in diameter) and 16 (mesial, 0.65 cm in diameter). No other paleopathological traces on the maxilla and maxillary teeth were observed. The occlusion type could not be determined.

The *ante-mortem* loss of all the mandibular teeth in this individual represents a very interesting and, as yet, unsolved problem that needs to be approached from different perspectives. Alternatively, it could be interpreted as a result of conditions such as periodontal disease.[30] However, this condition is not noted on the maxilla. It may also be the result of mutilation, although this hypothesis should be taken with a degree of caution, due to the fact that we still have no adequate analogy for this kind of practice.[31]

Archaeozoological Analysis

The animal skeleton discovered in grave 159 belongs to a fox, based on its morphological characteristics[32] (Fig. 7). The fox was laid on its left side with its head oriented towards the north (Fig. 4), and, given its position in relation to the deceased, it can be assumed that it was deliberately placed in the grave (Fig. 4).

The fox skeleton was subjected to detailed archaeozoological analysis. The bones were sorted, classified and examined. Age and sex determination was conducted by comparison, utilising the morphometric characteristics of modern samples of red foxes.[33] Measurements were taken following the methodology of Driesch.[34] For the calculation of the withers height, the factors suggested by Harcourt[35] were used. Traces of taphonomic processes (if present) in the fox remains were also recorded.

The fox skeleton is almost completely preserved (Fig. 8). The unpreserved parts, some vertebrae, ribs,

[30] Hillson 1996.

[31] Pinchi *et al.* 2015, 3–6.

[32] Schmid 1972; Larivière, Positschniak-Arts 1996.

[33] Ginsberg, Macdonald 1990; Roulichova, Andera 2007; Beuković, Popović 2014.

[34] Driesch 1976.

[35] Harcourt 1974.

Fig. 7. Fox bones from grave G 159:
a) skull – right lateral view, b) right mandible, c) right humerus, d) radius right, e) right ulna

Сл. 7. Кости лисице из гроба G159 :
а) лобања – десна латерална пројекција, b) десна мандибула, c) десни хумерус, d) десни радијус, e) десна улна

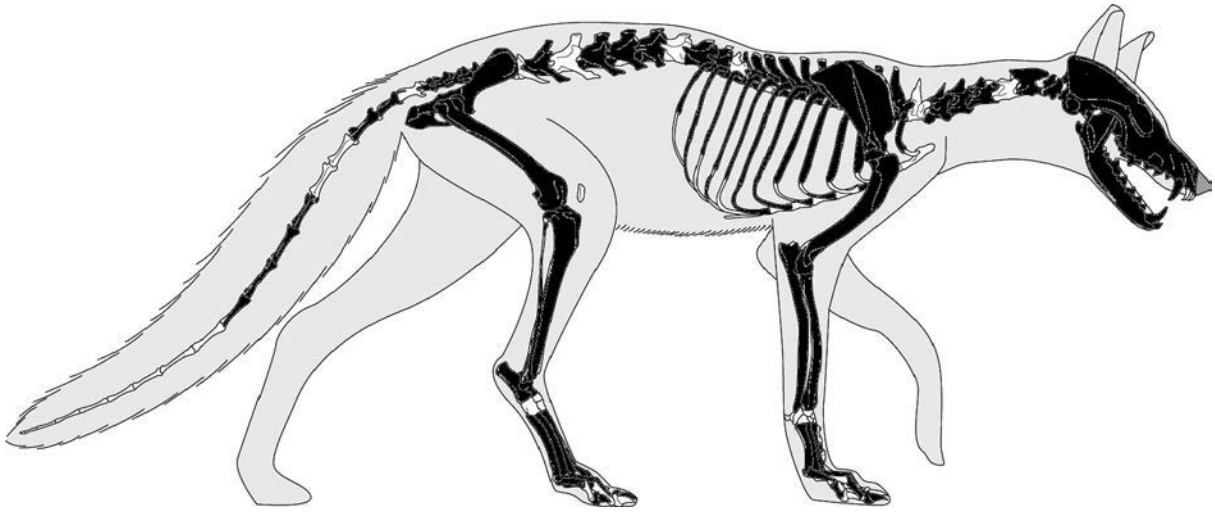

Fig. 8. Preserved parts of the fox skeleton from grave G 159

Сл. 8. Очувани делови скелета лисице из гроба G 159

and carpal and tarsal bones, could be explained as being the result of taphonomic factors, such as excavation methodology and bone recovery (which is less likely, given that a dry sieving was conducted on the soil from the grave), or the already mentioned pit digging in the north-western part of the grave, which is probably the main reason why some bones are missing. Plant root traces can be observed in the surface of the bones, while butchery, gnawing and burning marks are not evident at all. There are no traces on bones that would indicate the cause of death, but it can be presumed that the animal was killed for a purpose, and it retained a special relationship with the deceased in the afterlife. The absence of gnawing and weathering marks indicate that the fox was buried shortly after death, and, taking into account its position in relation to the deceased, it can be concluded that the fox burial was simultaneous. Pathological changes in the skeleton are not present. The first right lower premolar was lost *ante-mortem*; its alveolus is completely closed.

All teeth are erupted and epiphyses are fused, indicating that this was a fully grown, adult fox. More precisely, based on the degree of the first, upper molar wear,[36] it is estimated that the fox was most likely between two and four years of age. The fox's withers height was calculated for three whole long bones (humerus GL = 129.6 mm, radius GL = 122.2 mm, ulna GL = 146);[37] the average withers height was estimated at around 41.3 cm, which falls in the upper range of fox size,[38] and it can be presumed that the skeleton belongs to a male fox.

What was the nature of the relationship between the woman and the fox? What was the role and meaning of the fox in the funerary ritual at the necropolis? These are difficult questions to answer, especially the second, given this is a unique case in the whole necropolis. Placing the whole fox in the grave and its position in relation to the deceased definitely imply the existence of a special connection between them.

Discussion

Placing whole animals in human graves is a common practice worldwide, known from prehistory. However, more frequently, domestic animals are involved in funerary rituals.[39] The earliest human-fox burial was discovered at the 'Uyun al-Hammam, Pre-Natufian (15,250–12,200 cal BC) cemetery in Jordan, where the whole fox was first placed in one grave and, later, when the grave was re-opened and the human skulls were moved and placed in another grave, the same was done with the fox skull, indicating its special treatment.[40] At the Pre-Pottery Neolithic B mega-site of Motza (7600–6000 BC), in central Israel, a human double burial (an adult male over 60 years old, and an unsexed adolescent) with two foxes was discovered. The fox bones were dismembered, except for one found in articulation, and scattered among the human remains.[41] At the Pre-Pottery Neolithic B ritual site of Kfar Hahoresh, in Israel, human skulls were also found with numerous fox mandibles, while partly articulated fox bones were excavated from two child burials.[42] Additionally, two skulls and a large number of skeletal bones belonging to a minimum of five adult foxes were discovered together with human remains in burial chamber M4 of the Van-Yoncatepe necropolis, in eastern Anatolia, dated to the beginning of the first millennium BC.[43]

The discovery of four foxes and a large number of dogs at the Early-Middle Bronze Age (the end of the 3rd and the beginning of the 2nd millennium BC) site of Can Roqueta (one fox) and Minferri (three foxes) in the northeast of the Iberian Peninsula also stands out among exceptional and generally rare examples of placing foxes in human graves.[44] The foxes at both sites represent fully articulated skeletons.[45] The Can Roqueta skeleton belongs to an old female fox with a broken leg; its fracture was still healing and showed signs of having been immobilised by humans.[46] A female and a male, between two and four years of age, were placed next to a women in one burial at the site of Minferri, while a third, 18-month-old male fox was placed next to the isolated femurs of a woman.[47] The isotopic signature of the Minferri foxes shows that they consumed various types of food. One of these foxes, a female, exhibited signs of the consumption of

[36] Habermehl 1985; Roulichova, Andera 2007, 57–58.
[37] According to Harcourt 1974.
[38] Ginsberg, Macdonald 1990; Onar *et al.* 2005; Beuković, Popović 2014.
[39] Morris 2011; Russell 2012.
[40] Maher *et al.* 2011.
[41] Reshef *et al.* 2019.
[42] Horowitz, Goring-Morris 2004, 176.
[43] Onar *et al.* 2005, 252, 257.
[44] Grandal-d'Anglade *et al.* 2019.
[45] Grandal-d'Anglade *et al.* 2019.
[46] Grandal-d'Anglade *et al.* 2019.
[47] Grandal-d'Anglade *et al.* 2019.

a more carnivorous diet. However, in all three cases, they cluster together with human females and dogs.[48] The old fox at Can Roqueta revealed a diet with an important input of vegetal protein, similar to that of the dogs and closer to two puppies and a young dog. According to the researchers, this raises the possibility that the fox could have been fed by humans (most likely women) for a period before its death at old age.[49]

The motives behind these early (aforementioned) burials are subject to various interpretations, but it seems reasonable to speculate that the decision to bury the animal with the person implies an awareness of a special relationship between these individuals during their lives.[50] The idea that past communities may have kept tamed wild animals as pets is entirely consistent with the observed behaviour of more recent societies. According to numerous reports by explorers and anthropologist, pet keeping among hunter-gatherers and subsistence horticulturalist is (or was) the norm rather than the exception.[51] These pets are typically captured as young animals, and then adopted and cared for, especially by women and children.[52] These animals are the objects of intense emotional attachments, they are well cared for during their life, and sometimes mourned and buried formally when they die.[53]

At the Slog necropolis there are no other burials with animals or animal burials ascertained. Although the human and fox burials are practically unknown at necropolises of historical periods in Europe and Asia, there is a close analogy of such a funeral ritual in the necropolis of the Early Avar period (the First Khaganate) in Bečej, northern Serbia (Vojvodina). In a disturbed grave (grave 16) of an adult woman (?), a whole skeleton of a fox was discovered,[54] together with some other finds, such as two fragments of an antler comb, a glass bead, some fragments of decorated bronze plating and two fragments of an iron item.[55] Generally, this grave is dated from the end of the 6th to the beginning of the 7th century (until 626 AD). Our grave from Slog necropolis in Ravna is about a hundred years later. The burials from the earlier phase of the medieval necropolis at Slog could have begun at the end of the 7th century, but most of the graves belong to the 8th and the 9th centuries. The only connection with these two burials of a woman and a fox are the Early Medieval nomadic cultures from the Central Asian steppes, whether Hunnic (Kutriguri and Utiguri), Avar or Bulgar. In these cultures shamanism was practiced by men and women. Every shaman had an animal allie which accompanied him/her on celestial or underworld journeys (a reindeer, a horse, a wolf, a bear, a hawk, a falcon or an owl, etc.).[56] These beliefs could explain the strong connection between the woman and fox buried together in grave G 159. It should also be mentioned that Bulgars buried their dead with "sacred animals".[57]

Conclusion

Considering all the gathered data, archaeological, anthropological and archaeozoological, regarding the Early Medieval burial in grave G 159 at Slog, in Ravna, eastern Serbia, we could make some general conclusions:

– A middle-aged woman, who had a prominent position in the society of the Early Medieval settlement in Ravna, which is ascertained by her jewellery, especially the seal ring, was buried in this grave;
– This woman had an uncommon pathological condition of *ante-mortem* loss of all the mandibular teeth, which could have been the result of mutilation, but still with no adequate analogy for this kind of practice;
– The deceased was buried with a grown male fox in good health, except that its first right lower premolar was lost *ante-mortem*;
– The deceased woman had a special relationship with the fox, the interpretation of which is uncertain and vague;
– The fox was probably killed in order to be buried simultaneously with the deceased women as a part of a funeral ritual;
– The only analogy of such a burial comes from the Avar necropolis of Pionirska Ulica, in Bečej, northern Serbia, which indicates the possible in-

[48] Grandal-d'Anglade *et al.* 2019.
[49] Grandal-d'Anglade *et al.* 2019.
[50] Serpell 2015.
[51] Serpell 2015.
[52] Serpell 2015; Ståhlberg, Svanberg 2011, 365.
[53] Serpell 2015.
[54] There are no informations about the method and author of anthropological analysis at the necropolis Pionirska ulica – Bečej (Микић-Антонић 2012, 79–80).
[55] Микић-Антонић 2012, 14–15, 44, Pl. VIII.
[56] Golden 1992, 250; Fiedler 2008, 208; Sophoulis 2011, 86–88.
[57] Fiedler 2008, 157; Sophoulis 2011, 67.

fluence of the steppe-nomadic cultures of the 6th–10th centuries on this funeral ritual;
– The woman and fox burial could be connected to shamanism, practiced in the above mentioned cultures;
– The most probable cultural attribution of the burial in G 159, considering the position, stratigraphy and chronology of the medieval necropolis at Slog, is Bulgar.

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Sofija PETKOVIĆ, Dragica GOJKOVIĆ, Jelena BULATOVIĆ
Early Medieval Burial of Woman and Fox at the Slog Necropolis in Ravna (*Timacum Minus*) in Eastern Serbia (239–255)

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РАНОСРЕДЊОВЕКОВНА САХРАНА ЖЕНЕ И ЛИСИЦЕ НА НЕКРОПОЛИ СЛОГ У РАВНИ (*TIMACUM MINUS*) У ИСТОЧНОЈ СРБИЈИ

Кључне речи. – раносредњовековни период, некропола, сахрана жене и лисице, физичка антропологија, археозоологија

На источним падинама брда Слог у Равни, око 400 m западно од римског утврђења *Timacum Minus*, у периоду између 1994. и 1996. и између 2013. и 2015. године, на вишеслојној некрополи спроведена су археолошка истраживања. Два главна хоризонта коришћења некрополе хронолошки су опредељена у касноримски и раносредњовековни период. Касноримска некропола са три фазе датована је у период од средине 4. до средине 5. века, док је за раносредњовековну некрополу, на основу нових археолошких ископавања, утврђено да је имала две фазе: ранију – датовану у период 8–9. века, и каснију – од краја 9. до почетка 11. века.

Током ископавања 2014. године, у старијем раносредњовековном хоризонту некрополе откривен је један занимљив гроб (G 159), који представља јединствен налаз на читавој некрополи. Жена у овом гробу (G 159) била је сахрањена у једноставној овалној раки, на леђима и с рукама испруженим поред тела. Гроб је био оријентисан у правцу запад–исток, са девијацијом мањом од 5º ка југу. Цео скелет жене био је слабо очуван – неке кости су биле дислоциране, а неке су недостајале. Посебно занимљив налаз јесте скелет животиње који је пронађен западно од женине главе, у савијеном положају, тако што је глава животиње била наслоњена на леву страну главе жене. Жена је била сахрањена са бројним гробним прилозима, на основу којих је та сахрана опредељена у период 8–9. века. Антрополошка анализа је показала да је жена у тренутку смрти имала између 40 и 45 година. Уочене патолошке промене на њеним костима сведоче да је патила од остеоартритиса. Те остеоартричине лезије, заједно са наглашеним припојима мишића, упућују на то да се током живота бавила тешким физичким активностима. *Ante-mortem* губитак свих зуба из њене доње вилице представља веома занимљиву и још увек неразјашњену појаву. С једне стране, могуће је да је то стање последица неког денталног обољења, док је, с друге, можда и резултат мутилације – намерног сакаћења покојнице. Међутим, ово тумачење треба узети са дозом резерве будући да адекватне аналогије такве праксе још нису пронађене.

Археозоолошка анализа је показала да скелет животиње сахрањене у гробу са женом припада одраслој лисици, старој између две и четири године. Будући да се израчуната висина гребена ове јединке од 41,3 cm налази у горњем опсегу висина гребена лисица, може се претпоставити да скелет припада мужјаку лисице, а непостојање трагова глодања и распадања на скелетним остацима указује на то да је животиња похрањена брзо после смрти. Ако се има у виду положај лисице и њено место у гробу у односу на сахрањену жену, може се закључити да се ради о истовременом догађају, то јест сахрани.

На основу свих података као и детаљне археолошке, антрополошке и археозоолошке анализе гроба 159 (G 159) на некрополи Слог у Равни, може се закључити следеће: да је ова средовечна жена била истакнутог друштвеног статуса у раносредњовековном насељу у Равни, да је имала *ante-mortem* губитак свих зуба из доње вилице (мутилација ?), да је била сахрањена са одраслим мужјаком лисице, с којим је вероватно имала неку посебну врсту везе, и да се ова погребна пракса можда може повезати са шаманизмом. Једина аналогија за такву погребну праксу код нас до сада је забележена на аварској некрополи Пионирска улица – Бечеј (гроб 16) у Војводини и датује се у раноаварски период. Сахрана у гробу 159 са некрополе Слог млађа је једно столеће и указује на могуће утицаје степско-номадских заједница, пре свега Бугара.

КРИТИЧКИ ПРИКАЗИ – COMPTES RENDUS CRITIQUES

Csanád Bálint, THE AVARS, BYZANTIUM AND ITALY.
A STUDY IN CHOROLOGY AND CULTURAL HISTORY, Varia Archaeologica Hungarica 31,
Institute of Archaeology, Research Centre for the Humanities, Hungarian Academy of Sciences, Archaeolingua,
Budapest 2019, 372 pp, 82 figs

У новије време објављене су три важне монографије о Аварима на енглеском језику. Поред значајно осавремењеног превода чувене књиге Валтера Пола из 1988. године (Pohl 2018) и рада Георгиоса Кардараса о односима Византије и Авара од 6. до 9. века (Kardaras 2019), који су пре свега историјске синтезе, пажњу привлачи и иновативно осмишљено остварење Чанада Балинта чији приказ следи. О значају неке књиге говоре и прикази које је она завредела у домаћој и иностраној научној литератури. Колико ми је познато, до сада је најновију Балинтову монографију представио мађарски стручњак Левенте Саму (Samu 2019), док о месту аутора у европској археологији сведоче и бројни прикази његових претходних књига, међу којима и два опширна на страницама *Старинара* (Димитријевић 1993; Бугарски 2013).

Најновија књига Чанада Балинта одштампана је у А4 формату, у квалитетној црно-белој техници. Излагање тече у 11 поглавља, иза којих следи пословично опширан списак коришћене литературе (pp. 289–372). Међу добро репродукованим илустрацијама, које су распоређене у 82 прилога, налазе се и бројне карте дистрибуције одређених врста налаза, на којима аутор заснива тумачења феномена којима се посветио. У уводу књиге (1) дају се основни подаци о аварској историји и култури, при чему се истиче да аварску одредницу треба схватити као *terminus technicus*, а не у дословном етничком смислу. Познато је да су у Карпатској котлини од 568. године до почетка 9. века уз Аваре (у ужем смислу) живели и припадници других изворно номадских група, али и остаци локалног касноантичког и германског становништва, док се у материјалној култури распознају и налази из меровиншког и византијског, тј. балканског и медитеранског круга (*e.g*. Vida 2016a). Из таквог калеидоскопа, у који је током претходних деценија прерасла поједностављена предоцба о Аварима – номадима источног порекла (*cf*. Bálint 2007), писац овом приликом жели да осветли њихове везе са Византијом и Италијом. У ту сврху користи нов методолошки приступ – хоролошку и хронолошку процену налаза, и сам свестан тога да је у књизи поставио више питања него што је понудио одговора, нарочито оних дефинитивних. Сличан исход могао би да поколеба мање искусног археолога, али не и Балинта који је током своје каријере сведочио (и учествовао у) кључним интерпретативним помацима. Стога нема сумње да ће један од главних циљева књиге – „да позове читаоца да размишља, и размисли поново" (p. 12) – бити испуњен у потпуности.

У другом поглављу аутор образлаже истраживачка питања и приступе, наглашавајући да проучавање веза између Италије и Авара има скромну традицију, делимично и због дуготрајне блоковске поделе, као и традиционалне окренутости мађарских истраживача према Истоку. Поједини речити налази били су, иако познати, запостављени у археолошким тумачењима. Од шездесетих година прошлог века, међутим, археологија Авара прераста оквире мађарске науке, а модерније приступе и почетна разматрања ових веза Балинт приписује Атили Кишу (Kiss 1996), присећајући се и сопствених размишљања о тој теми. Ипак, везе Авара са Византијом, па и Италијом, осветлиће се пре свега у делима угледног аустријског археолога Фалка Даима. Док их тај аутор уочава превасходно у материјалу 8. века (*e.g*. Daim 2000a;

2001; 2010), Балинт се обавезао да проучи старије налазе, на које би се потом надовезао Даимов корпус, „што ће будућа истраживања елемената византијског типа током целокупног аварског периода ставити у потпуно нову перспективу" (p. 18). У том смислу спомиње се и чланак Тивадара Виде о локалним или придошлим Ромејима у Панонији 6–7. века (Vida 2009), при чему треба нагласити да се у потоњим радовима и својој последњој дисертацији Вида такође бави везама у материјалној култури између Италије и Карпатске котлине током раноаварског периода (Vida 2018a; в. и крађу синтезу Blay, Samu 2016). „Византијским" налазима у Каганату посветила се, у својој познатој монографији, и Ева Гарам (Garam 2001). Сам Балинт се бавио везама византијске и (касно)аварске културе, пре свега у оквиру свог вишедеценијског изучавања блага из Нађсентмиклоша (Bálint 2010; *cf*. Бугарски 2013). По аутору, корпус налаза сведочи о дубљим везама између Авара и Италије, што је било у вези и с дуготрајним аварско-лангобардским савезништвом, и не може се тумачити у кључу појединачних историјских догађаја или „магловитих *утицаја*, као што се то у сличним случајевима често чини у централно- и источноевропској науци." Нарочит значај придаје се налазима солида из италијанских ковница у Карпатској котлини.

У наредном поглављу, посвећеном регионалним обрасцима дистрибуције, најпре се објашњавају принципи хорологије и циљ коришћења тог метода у студији. Археолошко картирање артефаката и културних феномена у вези је још са давнашњим поимањем „културних провинција" (*Kulturkreislehre*). Међутим, исказна вредност тог уобичајеног археолошког помагала има и своја ограничења, пре свега у погледу (субјективног) избора типолошких параметара који се узимају у обзир приликом картирања налаза, а потом и тумачења добијених група налазишта. Балинт даје одличне примере тих покушаја – успешно одређивање радионичких центара за израду касноаварских појасних гарнитура, при чему су Петер Штадлер и Габор Фанцалски у одвојеним студијама дошли до сличних резултата (pp. 21–22, Fig. 4), али и каснији Штадлеров покушај, свакако (и најблаже речено) преурањен, да на основу дистрибуције одређених налаза рашчита просторни распоред различитих етничких група у Каганату (Stadler 2008). С друге стране, Чанад Балинт покушава да путем проучавања распореда одређених типова налаза, техничких процедура и обичаја сахрањивања поспеши ближе сагледавање медитеранских веза авародопског материјала. Већ у образлагању циљева употребе хоролошког метода он наводи и главна ограничења: прво је разумљиво сваком археологу и односи се на степен истражености и, додао бих, публиковања грађе. О начину бележења података на дистрибутивне карте у књизи могла би да се поведе дискусија. Наиме, налазишта се приказују униформно, без обзира на број документованих налаза одређених карактеристика, „јер њихова учесталост може бити одраз разноликости или јединствености заједнице, док хоролошки приступ покушава да пореди [зоне] у којима има или пак нема [тих налаза или гробова], тј., другим речима, културне одлике [тих зона]" (p. 23, 26). Уз начелну упитаност да ли појединачан налаз неког предмета може да се узме за одлику целе регије (пример из Трансилваније, p. 67), могло би се додати да управо особине одређене локалне заједнице – процењене на основу еклектичности или униформности материјалне културе – најбоље сведоче о њеним културним одликама. У изузетним случајевима, као што су, на пример, гробље из доба ране аварске превласти са зиданим гробовима и махом византијским налазима у Вајској (Bugarski 2012, 246–252) или позниja јеврејска некропола у Челареву (Bunardžić 1980), по свој прилици можемо да рачунамо са инсуларним популацијама особених културних одлика. Такве заједнице, барем за сада, јасно одударају од свог ближег или даљег окружења, што додатно усложњава извођење преко потребних макрорегионалних анализа.

Независно од ове опаске, збирна процена распрострањености многих појединачних компоненти свакако доприноси сагледавању одлика одређених регија, премда треба имати у виду да и сам степен истражености локалитета може да дâ искривљену слику о заступљености појединих врста предмета или погребних обичаја. Та ограда се не односи само на појединачне локалитете, већ и на групе налазишта формиране по било ком критеријуму, па и регионалном. Насупрот оваквом могућем приговору, Балинт наводи да се карте дистрибуције, које одражавају стање истражености у време њиховог публиковања, не могу сматрати коначним, те да је „у неколико случајева" упоредио старе карте са тренутном ситуацијом и „увидео да нова налазишта не мењају у значајној мери раније успостављену ширу слику" (p. 26–27). За потребе једног истраживања недавно сам и сâм исто закључио у вези с распоредом касноаварских појасева са „царским" портретима (*cf*. Dimitrijević 1966, T. XI; Daim *et al*. 2010, Abb. 14, 15). Међутим, у археологији постоје и другачији примери – када нови налази са одређеног простора значајно промене основно тумачење одређене групе артефаката. Такав је, рецимо, случај са шлемовима типа Baldenheim: пре него што је дошло до бројних и веома речитих налаза на рановизантијском Балкану сматрало се да су они германског порекла (*cf*. Vogt 2006; Bavant 2008). Други је проблем када се користе непотпуне карте, о чему ће бити речи.

За разлику од хронолошког, хоролошки приступ је нов у археологији (Perner 2005), а бави се методолошким оквирима студија дистрибуције и увидима који се стичу из ње. Примена у археологији подразумева и испитивање могућих узрока одређених образаца дистрибуције и њихових односа са другим мрежама распрострањености. У археологији Авара недавно је хоролошкој студији приступио Гергељ Чики, у монографији о њиховом офанзивном оружју (Csiky 2015). У Балинтовој књизи, карте распрострањености представљају се према њиховом „претпостављеном" значају – неке осликавају регионалне карактеристике, а друге типолошке или хронолошке особености или пак одређене хипотезе. Скоро све оне могу да се посматрају из више углова, не само као одраз особености региона него и радионичке активности (ако већ и она сама не потпада под прву категорију). Потцртаних недореченості и ограничења свакако је свестан и сам аутор, који наводи да примена хоролошког метода није директно повезана са степеном истражености. Картирајући своје категорије, он је на уму имао општу дистрибуцију авародопског материјала према актуелном каталогу (*ADAM* 2002), на основу којег је процењивао просечну густину налазишта у одређеним регијама, па се картирани артефакти или феномени одређују као *чести* или *ретки* у односу на област у којој се посматрају. Закључци су поузданији ако се поједине категорије покажу као често или ретко заступљене,

или чак незаступљене, у боље истраженим регијама. Треба ипак нагласити да ни сам тај каталог данас није релевантан као пре две деценије, будући да је, између осталог, недавна синтеза сазнања о југу Кагината изнедрила значајне допуне. Уз то, требало би скренути пажњу и на то да су поједине зоне биле слабије насељене због оновремених хидролошких прилика и да се у тим случајевима – средишњи део западног Баната и, по свој прилици, области на северу и истоку аварске државе – мала заступљеност аародопских налаза само делимично може сагледавати кроз степен истражености (Бугарски 2014, 717–719).

Наредно ограничење састоји се у томе да скоро све проучаване категорије, осим вршника, потичу са некропола, које су пак припадале заједницама различитог културног наслеђа. Одавно је примећено да представе о неком друштву које проистичу из сагледавања гробаља, у нашем случају аварског, могу да буду искривљене (Tomka 1986, 155). Поред обима необјављене грађе, аутор је нагласио да се његове анализе дистрибуције превасходно тичу категорија 6–7. века, што је у вези са разноврснијом природом раноаварског материјала и, последично, бројем објављених темељних анализа познијих група налаза. Напослетку, дистрибуције нису хомогене: њихове границе и број примера увек варирају (p. 23–28, n. 57). На 162 карте представљена је распрострањеност одређених типова налаза и, према потреби, њихових варијанти, као и неколико погребних обичаја и документованих златарских техника. Дистрибуција појединих категорија ван Карпатске котлине приказана је на 40 карата, такође на основу података из литературе. Већ у овом уводном поглављу наводи се да је распрострањеност појединих врста налаза, пре свега оружја и коњаничке опреме и одређених типова гробова, равномерна на читавом аварском простору, што се, међутим, односи и на полагање златарских алатки у гробове (Rácz 2014, Karte 1). Према Балинту, предности хоролошког приступа показују се управо у случајевима једнаке дистрибуције једних и различите дистрибуције других категорија. Неке групе различитих налаза, попут оних византијског и германског порекла, не показују једнаку распрострањеност, па самим тим не могу да добију општу интерпретацију: такви предмети очигледно су доспевали у Каганат различитим каналима и ширили се на различите начине. Писац такође наводи да регионалне дистрибуције није посматрао у хронолошкој перспективи, „јер је приписивање појединачних типова [налаза] и погребних обичаја раном, средњем или позном периоду [аварске превласти] било ретко вршено" (p. 29). Наведена реченица није јасна, јер је управо археологија Авара, захваљујући огромном узорку гробова, изнедрила поуздана и врло уска серијацијска датовања налаза (Daim 1987; Zábojník 1991; Garam 1995).

У кратком уводу у регионалну поделу простора аварске државе Балинт наглашава да јој је приступио са археолошког становишта, а не географског, и да се, чак и кад се користе поједине синтагме уобичајене у тој науци, оне просторно не поклапају. У Карпатској котлини се као главне три зоне подразумевају оне маркиране двема великим рекама и трансилванијским планинама, док мање (Балинтове) регије немају јасно дефинисане границе (укупно 14). Тако под међуречјем Дунава и Тисе аутор подразумева средишњи, песковити део те географске области, док се њен јужни део (који би одговарао српском делу Бачке јужно од Телечке лесне заравни) води као „доња трећина међуречја Дунава и Тисе". То, међутим, није означено на приложеној карти, на којој бачко Подунавље аутор назива „приобаљем доњег Дунава". Због малобројности аародопских налаза (Бугарски 2014, 716–720), Срем није означен као географска регија која се обрађује у књизи (p. 45). Међу 14 издвојених регија нема ни Баната, већ је издвојено невелико међуречје Тисе, Мориша и Златице. Иако је наглашена слаба насељеност доброг дела те области, Банат свакако даје аародопске налазе који су добро познати аутору (*e.g.* Ivanišević, Bugarski 2008, 49–59, Fig. 9; Gáll, Romát 2016), што је један од разлога због којих Балинтова подела – која се не поклапа са приложеном картом – није до краја јасна (pp. 29–30, Fig. 7). Уз то, неки простори који нису дефинисани у кратком уводу и унети у карту обрађени су у даљем тексту, док аутор дозвољава да би могла да се издвоји још нека мања регија. Донекле збуњује то што се у рукопису на енглеском језику користе мађарски топоними за места која већ дуже од 100 година носе друга имена, одомаћена у археолошкој литератури (*cf.* Curta 2001a, 96); истина, садашњи назив и државна припадност стоје у заградама приликом првог помињања.

На наредним страницама укратко се описује аародопско наслеђе осам области Мађарске равнице, како је аутор назива, од којих је последња сада именована као „регија доњег Дунава између Вуковара и Београда". Овај део књиге није лако пратити јер Балинт наводи одређене типове налаза – заступљене или незаступљене у појединим регијама – без илустрације, а неретко и без цитата. Проблем је у томе што енглески називи предмета аварске материјалне културе нису стандардизовани у довољној мери, а нису ни сви налази препознатљиви попут привезака-крстића, тако да понекад постане јасно на коју врсту предмета аутор мисли тек уз консултовање апендикса при крају књиге. Примера ради, у тексту се расправља о наруквицама проширених крајева (*… with flaring terminals*), док би узоран превод на енглески језик гласио *bracelets with trumpet-shaped terminals* (*cf.* Kiss 1977, 94, Pl. LXXXI). Потешкоће би се избегле да је коришћена стандардна синтагма, или да је у основном тексту (p. 84) дат позив на Fig. 77/27. Без обзира на то, археолошке особености крајњег североистока Карпатске котлине одударају од типичне аварске слике (нпр. присуство појединих ретких типова гробне керамике 7. века и потпуно изостајање тзв. жуте касноаварске грнчарије), што Балинт тумачи другачијим условима живота у шумовитом пределу а не етничким разлозима, тј. недоказаним присуством Кутригура. Хатванску регију, такође на северу Мађарске, карактерише одсуство накита и појасева византијског порекла и иначе ређе заступљених делова костима као што су ланци и кључеви (Garam 2002), али и коњских и коњаничких гробова. Суседна област Тисафиреда такође показује особености у погледу заступљености/незаступљености појединих категорија налаза, при чему се међу налазима који карактеришу „искључиво" ту регију, а нису *типично аварски*, наводе и оловни крстићи: такав налаз, међутим, потиче и са некрополе Чик у атару Бачког Петровог Села (Бугарски 2009, 98–99; Bugarski 2009, 221–224, Fig. 3/5). Особености те регије повезују се са гепидским наслеђем и с популацијом која се одржала и у касноаварско доба (pp. 31–36, Figs 8–9).

Аварско наслеђе међуречја Дунава и Тисе – у природним границама – опширно је обрађено у књизи објављеној након што је Балинт завршио рад на свом рукопису (Balogh 2016). Своја разматрања, наравно у знатно сажетијем облику, наш писац отпочиње спомињући „општи" утисак да јужни део те области обично остаје по страни у дискусијама услед неадекватног третмана у југословенској и, касније, српској науци (p. 36, n. 104). Иако се не може тврдити да је такав утисак сасвим без основа, ваља нагласити да је у корпусу авародопске грађе са нашег простора обрађен материјал који потиче са преко 220 налазишта, и то највећим делом из литературе (Бугарски 2014), што чини готово десетину укупног броја авародопских локалитета у Карпатској котлини (*cf*. Balogh 2016, 401). Поново се дискутује о налазима и погребним обичајима који недостају, као и онима који су карактеристични за дату област. У раноаварско доба углавном изостају предмети страног порекла и различити облици коњских и коњаничких сахрана, а у касноаварском периоду и иначе ређи налази прапорaца и појасних окова с људским фигурама (*cf*. Rácz 2012), али и фалере коњске орме. Насупрот томе, област карактерише натпросечна заступљеност наушница типа Szentes, одређених варијанти појасних окова и мачева, и, што је нарочито занимљиво, увезених и локално произвођених керамичких посуда „касноантичког/византијског" типа. Насупрот општој слици која одаје доста „сиромашан" утисак, управо из те области потичу најзначајније елитне раноаварске сахране, а индикативна је и већа заступљеност гајки за перчин, традиционалну фризуру степских популација (*cf*. Andrási 1996–1997; Bugarski 2016), као и појединих керамичких облика степског типа. Уз то, део популације приписан је монолидном антрополошком типу, што све доприноси утиску о присуству „групе која припада култури степе, која не прихвата уобичајен аварски накит нити показује интересовање за накит западног типа, док је у исто време очигледно наклоњена извесним елементима византијске материјалне културе" (pp. 36–40, Figs 10–11).

Међуречје Тисе, Мориша и Кереша представља најбоље истражену регију Каганата и дели доста сличности са суседном облашћу између Тисе, Мориша и Златице. Недостају налази одређених наушница (тип Deszk), појасева и оружја византијског порекла, коштаних окова и копчи, док се, с друге стране, бележи већа концентрација перфорираних кашика (*cf*. Tobias 2001; код нас Бугарски 2009, 108–109) и посуда са изливником, као и посебних видова покопа коња. Такве особине приписиване су присуству „независне етничке групе", тј. „правим" Аварима, Вархунима, Бајановом племену или Кутригурима, „иако је ваљано заснована етничка идентификација практично немогућа" (pp. 40–41). Исто је примећено и у оцени кутригурске интерпретације једне јужније банатске некрополе (Ранисављев 2007; Бугарски 2007). У својој скорашњој монографији, објављеној пошто је Балинт заокружио свој рукопис, Ервин Гал се посветио управо тој регији *на периферији аварске централне области*, уз закључак да тамошњи гробови ни у 7. веку, а посебно не у касноаварско доба, немају особине оних из централних делова Каганата у којима је обитавала елита (Gáll 2017, 155–159). Међу особеностима међуречја Тисе, Мориша и Златице, Балинт наводи и значајну заступљеност сиве керамике типова IB1 и IB2 по класификацији Тивадара Виде (pp. 42–43, Fig. 14/1); нису картирани примерци из Хоргоша, Врбаса и Богојева које је Вида обрадио у својој монографији (Vida 1999). Средње Потисје не одудара од околних области. Поједини елементи који се нешто чешће јављају можда представљају „оптичку варку" изазвану степеном истражености, премда, с друге стране, ту регију издваја положај уз кључно важан водоток (pp. 43–44).

Кад је реч о простору Подунавља између Вуковара и Београда, опет се наводи да је „било мало истраживања у јужном пограничном региону Каганата (који у великој мери представља празнину и кад је реч о другим периодима), одакле је чак познато мање налазишта него из Трансилваније" (p. 44). Као што је већ наглашено, прави број авародопских налаза и налазишта у том појасу није занемарљив и било их је могуће картирати – проблем је пре свега у обиму и начину публиковања грађе (Бугарски 2014). Што се пак тиче појединих других периода у чијим се прегледима исти простор сматра „белом мрљом" (*cf*. Kiss 2014, n. 19), такође је скренута пажња да би се при вршењу анализа требало у већој мери позивати на објављену грађу, и поред очигледних мањкавости у истраживањима и публиковању (Bugarski, Ivanišević 2016, 151, 162). Без обзира на претходну оцену, Балинт сматра да се изостајање појединих типова, који су забележени у северном делу међуречја Дунава и Тисе, не може образложити ниским степеном истражености, јер су неке друге врсте налаза регистроване у обе области. Међу њима су наушнице са кугластим привеском, различито прстење, појасни окови са вишеструком врежом, раноаварска копља и коштане оплате тоболаца, разни окови орме, коштани окови торбица типа 3a по класификацији Бендегуза Тобијаса, тзв. жута керамика и поједини погребни обичаји, међу којима је и полагање српова у гробове. Као и у приказу претходне Балинтове књиге (Бугарски 2013), и у овом ћу усмерити пажњу на споменуте и неспоменуте налазе са нашег простора. Поред већ датих примера, није јасно зашто се истиче појава окова торбица типа 3a, чијих је неколико најјужнијих примерака забележено само у Хоргошу, у Мадарашу који се налази нешто југозападније, у Мађарској, и у Бачкој Тополи (Tobias 2011, kat. 178–179, 183, 156–166).

Као карактеристичне налазе Балинт наводи жуте посуде из Челарева, с правом претпостављајући постојање радионице. Златна наушница са привеском од аметиста из Новог Сада по аутору „поуздано одражава иностране контакте, иако њена локална производња тешко може да се оповргне". Перле од аметиста пре свега упућују на везе са Медитераном (*cf*. Drauschke 2010, 58), а сличан пар потиче из једног средњоаварског гроба из Мађарске, који је датован солидом царева Констанса II и Константина IV (Müller 1989, 147, Abb. 5/3–4; 13). Такви налази би можда могли да се посматрају у светлу обновљених контаката између Авара и Византије, узрокованих доласком Бугара 668/669. и арапском претњом из 674. године. На сличан начин, уз опрез је протумачен гробни налаз из Стејановаца у Срему (Bugarski 2012, n. 34). Балинт потом спомиње луксузну византијску наушницу из 7. века – како стоји на више места у литератури, из Челарева. Међутим, Десанка Милошевић је објаснила и исправила ту грешку: наушница није из Челарева већ је била откупљена од једног златара из Београда (Милошевић 1990, 148, кат. бр. 236).

Из Срема аутор најпре спомиње гроб из Манђелоса са налазима карактеристичног мача, алатке од рога која носи

„једну од најреалистичнијих представа *Авара*" и оковом типа Martynovka, при чему наглашава да „представа одагнава било какву несигурност у погледу културне атрибуције ансамбла, имајући у виду географски положај налазишта" (pp. 44–46, Fig. 24, 1, 3–5). У детаљном скорашњем осврту, гроб из Манђелоса је датован у средину 7. века, можда око 650. године и, уз сродан налаз из Носе, повезан са имиграцијом из Азије. Порекло представа је несумњиво алтајско, док рашчитавање етничког идентитета власника алатки захтева знатно већи опрез. Претпостављено је да је реч о западнотурским придошлицама које су оснажиле Аварски каганат средином и у другој половини 7. века (Bugarski 2016, 90–94). Даље се истиче да чувени златни појас из Дивоша (?), непознатих услова налаза, представља изузетан византијски налаз 7. века чак и по највишим царским стандардима. Реченицом да би „Сличан налаз из међуречја Дунава и Тисе […] сасвим сигурно од стране многих научника био интерпретиран као индикатор близине седишта кагана!", Балинт се на неки начин ограђује од прилично оштре критике интерпретације Иване Поповић (1997) из пера Атиле Киша (Kiss 1998). Уз осврт на налаз позлаћеног касноаварског језичка, наводно из Сирмијума, што је Фалко Даим определио у тип Hohenberg–Bozen и за који није сасвим јасно да ли представља византијску израђевину или аварску имитацију (Daim 2000a, 158–159, Abb. 84; cf. Szenthe 2016, 358–360), Балинт износи оцену о „двојној културној оријентацији" Срема, позивајући се и на недавно објављен касноаварски гроб из Стублина крај Обреновца, на десној обали Саве (Bugarski *et al*. 2013).

Друга велика област, Трансданубија, подељена је у мање регија, али оне показују значајније међусобне разлике, које су последица разлика у културној потражњи и радионичким активностима. У северозападном делу раноаварског Каганата није било коњаничких сахрана и сахрана коња, али се, уз чешће прилагање бута, у гробовима бележи израженија појава наушница с ланчићима, прапорaца с људским представама, кључева и була. У позноаварско доба истиче се велика разноликост квалитетних ливених окова појаса, па и оних украшених људским портретима, односно заступљеност жуте керамике и вршника. Нарочито се запажа пораст броја офанзивног оружја, што „можда индицира историјску или економску промену током 8. века, или пак промене у односу са окружењем" – ипак, тамошњи налази не могу да се повежу са историјски документованим досељавањем аварске врхушке почетком 9. века. У области Комарна појављују се предмети какви се ретко срећу на левој обали Дунава, укључујући, између осталог, језичке италијанског типа са животињским главама и српове (Slivenska 2004), што ипак није довољно да би се поткрепили утисци о значајним разликама у материјалној култури које су износили словачки археолози претходне генерације.

Невелика област око Нежидерског језера, захваљујући интензивним истраживањима аустријских колега, такође показује особености. Регија је била насељена још у раноаварско доба, о чему сведоче, на пример, ливене пирамидалне наушнице, појасни окови типа Martynovka и коштани окови торбица Тобијасовог типа 2b. У технолошком смислу издвајају се бронзани појасни окови са *Zahnschnitt* украсом, док су у Трансданубији они иначе били прављени од сребра. У то време је уз покојнике често био прилаган бут, док се у 8. веку практикује прилагање главе. У касноаварском периоду чести су позлаћени појасни окови, копче са представама грифона и велики пунцирани језичци. Недостају игле за косу, наушнице с пирамидалним привесцима и перлама, ланци, кључеви и оловни крстићи, потом појасни окови типова Tarnaméra и Fenékpuszta, ламеле оклопа и, у позноаварско доба, жута керамика. Такође нису забележени оболи, парцијални покопи коња и других животиња, коњанички гробови и гробови коња. На основу набројаних налаза Балинт дефинише троструку културну афилијацију ове регије: степску (гајке за перчин и одређени типови посуда, међу њима и оне са четвороугаоним ободом: Vida 1992), источноевропску (тип Martynovka) и провинцијалну византијску (pp. 48–52, 62, Figs 17–19). Може се додати да су језичци типа Martynovka произвођени и на византијском Балкану, о чему најбоље сведочи налаз матрице из Царичиног града (Ivanišević 2011, 771, Fig. 19/8). У области Нежидерског језера – као и Балатона – посведочена је и локална производња ливених пирамидалних наушница, највероватније од стране римских златара (*cf*. Vinski 1956). Западни контакти су најочигледнији у обиљу наоружања, које се свакако датује пре 805. године, када је Карло Велики законом забранио извоз оружја Аварима и Словенима, док се велики број врхова стрелица у гробовима око Нежидерског језера тумачи, чини се олако (*cf*. Csiky 2015, 389–390), близином границе Каганата.

Североисточна Трансданубија не показује израженије особености. Између осталог, истиче се чешће присуство појединих облика накита византијског порекла и коњске орме, штитова и позних сечива, тзв. црних посуда (Видин тип IC1), као и тзв. жртвених јама (*cf*. Vida 2018b, 32). Будући да нису заступљени *просечни* аварски типови, већ се, рецимо, поједини византијски типови посуђа појављују само у овој области, уз неколико налаза из Барање, Балинт оправдано сумња у Леринчијеву оцену да је ту област насељавао пук азијског порекла (pp. 52–54, n. 165, Figs 20–21). Суседна област Балатонског језера чувена је у археологији Авара по Кестхељу, епонимном налазишту особене културне групе (*Inselkultur*) за коју се већ деценијама дискутује да ли припада остацима романизованог становништва Панонији, дошљацима са Балкана, Италије или из германских земаља на западу (Daim 2000b; *cf*. Blay 2018). Њену главну карактеристику представља истовремена појава ансамбала материјалне културе различитог порекла, при чему се разликује њихова заступљеност на појединим гробљима те невелике регије. Иако се издвајају они, најшире посматрано, византијског порекла, неке класе таквих предмета изостају, укључујући и одређене налазе хришћанске поруке и златарску технику уметања метала. С друге стране, аутор наглашава омиљеност псеудокопчи (најновији прегледи: Samu, Daim 2018; Heinrich-Tamáska, Voß 2018). Посебности кестхељске културе нису такве да би она могла да се издвоји из општег аварског миљеа, премда се истичу касноантички супстрат и снажна германска компонента. Хришћанска обележја, нарочито привесци-крстићи, не посматрају се нужно као одраз верске припадности покојника (*cf*. Bugarski 2009; Bollók 2017). Веома близу Кестхеља смештено је сасвим другачије гробље, Покасепетк (Sós, Salamon 1995), с великим бројем кремираних покојника, и још низ сличних некропола. На њима готово да нема типичних аварских налаза, док се истиче присуство карактеристичних германских и византијских предмета. Сасвим

сигурно, реч је о још једној инсуларној култури. Иако је писац нагласио да се треба суздржати од поједностављене етничке интерпретације, у науци се често наглашава словенска компонента те популације (pp. 55–57, Fig. 22).

Југоисточна Трансданубија, тј. област Печуја и Барања, показује сличности са балатонском регијом, како у материјалу који је заступљен тако и у изостајању појединих типично аварских класа налаза, пре свега наушница. Појављују се, иако малобројни, неки налази византијског порекла који се иначе приписују кестхељској култури, али их нема у области Балатона. То се односи и на византијске мачеве, а занимљиво је да се као оболи користе римски новчићи, а не актуелна византијска ковања. Обе области одликују карактеристичне панонске копче – локално израђиване на основу византијских прототипова, могуће од стране преосталих римских златара – као и дискоидне фибуле и специфичне огрлице од лима које је Ева Гарам одредила као налазе ромејског порекла (Garam 2001, 45–46, Taf. 21–24). Осим налаза из Трансданубије, Балинт спомиње, без цитата, још само мени непознат привезак огрлице из Апатина. У области Печуја истичу се и чести налази фибула Вернеровог типа IF, а у касноаварско доба појединих појасни окови и жута керамика. У дискусији о могућим узроцима разлика између материјала из Печуја и Кестхеља, Балинт спомиње и различите контакте које су могле да одржавају две популације, иначе повезане – у то време запуштеним – римским путем. Сматра да су се потомци романизоване популације Сопијане снажније интегрисали у аварску културу, одржавајући контакте са „елитом византијске пограничне културе" (Чађавица), Италијом (раскошне сахране из Келкеда) и обичном средњо- и источноевропском популацијом.

Познати налаз из Чађавице, јужно од Драве и главне зоне аварског насељавања, завредео је осврт и у овој књизи (pp. 57–64, Figs 23, 24/4). Налаз чине врло квалитетни сребрни предмети византијске израде. Осим традиционалног приписивања једној или двема гробним целинама припадника антске (словенске) или кутригурске врхушке (*cf.* Vinski 1958, 17, 22–23), недавно је понуђена и византијска атрибуција налаза (Bugarski 2012, 250), док се Балинт, на основу посредних описа мача који је наводно потицао из исте целине, приближава аварском одређењу. Ваља напоменути да је налаз у литератури описиван и као остава, за шта постоје индиције и у документацији Археолошког музеја у Загребу (Demo 2014, 58–59, nap. 1–5). Томе би у прилог ишао и сам број налаза, те чињеница да би три главна језичка типа Martynovka морала потицати из више од два гроба, нарочито ако је у једном од њих била сахрањена особа женског пола (Jarak 2016, 13). Коначно, слично компоноване оставе познате су са севера Каганата, из данашње Словачке. С друге стране, професионални археолог и тадашњи директор тог музеја Виктор Хофилер – „jedan od očevidaca nalaza" – тврдио је да је реч о гробним налазима (Vinski 1958, nap. 124).

Трансилванија је слабо истражена област аварске државе. Ипак, нарочито у новије време, објављено је неколико синтеза које се превасходно баве односима Гепида и Авара у доба ране превласти потоњих (Horedt 1975; Dobos 2013; Gáll 2014). Балинт није склон изношењу „збрзаних етноисторијских закључака о *опсталим Гепидима*" (Словени се не спомињу: *contra* Stanciu 2013) у области коју карактеришу бројнији налази солида – укључујући и веома ретке из 8. века – као и поједине класе налаза и примери златарских техника које се, осим у Трансилванији, срећу и у Трансданубији. Особеност Трансилваније представља појава позлаћених и посребрених гвоздених предмета, док су предмети аварског, германског и касноантичко/византијског порекла једнако заступљени. По Балинту, посебност регије наглашена је и присуством вршника у насељима, који су у аварско доба (и 9. веку) заступљени још у северозападном углу Каганата и источно од Тисе (Vida 2016b, 382–385, Karte 6), али и неких предмета који су тек појединачно забележени на важној некрополи Братеи 3 (Bârzu 2010). Ако стоји да мали број налаза оружја у гробовима у Трансилванији (*cf.* Cosma 2018) отежава дискусију о присуству аварске елите на простору који је неспорно припадао Каганату, онда се исказана вредност још малобројнијих византијских копчи мора узети с пуно опреза (pp. 64–69, Fig. 25).

На почетку опширног поглавља 3.4, о могућим узроцима разлика у обрасцима дистрибуције, наглашено је да оне не осликавају нужно различитости између регија, будући да дистрибуција сваке појединачне категорије има сопствене условљености. Уз опште историјске токове, оне могу имати и приватну позадину: многе личне историје, данас неухватљиве, „представљају главни разлог зашто се одређени артефакти и културни феномени не могу сматрати *par excellence* етно-специфичним". Поред тога, примена хоролошког метода у нашем случају више наглашава „одсуства" него „присуства", која могу имати везе са културном, политичком или трговинском изолованошћу одређене микрорегије. С друге стране, Балинт наводи да заступљеност одређених налаза у археолошком запису не мора да одражава културну особеност регије, већ само радионичку активност: не ткају ли и потражња и занатска израда одређених артефаката културни миље неке регије (pp. 69–70)? Гробови, као археолошки (непотпуни) трагови сахрана, не одражавају само избор појединаца, већ и заједнице, па је њихово обликовање и покопавање одређених прилога имало друштвену димензију. Тврди се да су гробни прилози „сами по себи" мање погодни за демонстрацију друштвеног положаја или етничких разлика него пола или узраста особе, што је у основи тачно, али не значи да се вршењем дубљих анализа гробног записа не може доћи до заснованих претпоставки о тим питањима. Погребни обичаји су подложни мањим или већим променама, што се односи и на доба аварске превласти, током којег се на многобројним гробљима бележи отклон у девијацији рака, гашење обичаја парцијалне сахране коња, увећање броја двоструких и вишеструких сахрана и ређе прилагање златарских и ковачких оруђа, док су прилози у храни заступљени углавном у другој половини 7. и првој половини 8. века. Те промене немају нужно етничку позадину, већ иза њих могу да стоје различити економски разлози и динамика културних контаката са окружењем. Истиче се и то што просторно блиске некрополе могу да демонстрирају сасвим другачије погребне праксе, рецимо у вези с полагањем хране: остаје нам питање да ли се и то може узети за једно од ограничења хоролошког приступа. Уз то, неретко су на истим гробљима заступљени различити облици рака, при чему Балинт с правом не нуди етничко разрешење појаве гробова с нишама источно од Тисе (pp. 70–76).

Полагање солида у аварске гробове мора се гледати у светлу историје данка који им је плаћала Византија: о томе

сведочи изостанак тог обичаја у бившим, степским аварским поседима, као и датовање златника које се у великој мери поклапа с трајањем данка – од 574. до 626. године (Somogyi 1997). Док се солиди групишу око ушћа Мориша и на југу Панонске низије, полагање њихових имитација представља локалну особеност западно од Дунава. Оболи римских новчића бележе се у области некадашње Сопијане, а у мањој мери и око Кестхеља – претпостављам због лаке доступности у кругу римских насеља. На приложеној карти, израђеној на основу старог рада Иштвана Боне (pp. 76–78, Fig. 27/4), картиран је само један обол са нашег простора. Златници ковани пре 626. године, највероватније одреда гробни налази, потичу са осам некропола из Бачке, Баната и Срема. С друге стране, из Бачке Паланке потичу три солида кована врло брзо после битке 626. године, док су они из Стапара и Сакула били исковани за цара Константина IV: ти налази би вероватно могли да се припишу средствима која су се сливала од евентуалних пљачки или откупа после пораза код Цариграда, као и дипломатским поклонима у време нарастајуће опасности од Бугара (Бугарски 2014, 346–347). Налази медитеранског порекла у аварским гробовима не одражавају нарочито богатство и статус сахрањених већ, можда, личне везе са Италијом. Посебну пажњу Балинт је посветио ретким налазима столица на расклапање (*sellae plicatiles*) из Келкеда и Замардија, које у аварском контексту, као врло егзотична својина, не представљају полно већ статусно обележје – иако не највишег ранга. Наводећи различите могућности, аутор је најближи томе да их опише као прослеђене поклоне аварске врхушке (pp. 79–80).

Израђевине појединих занатлија или радионица обично се препознају путем формалних, технолошких и декоративних варијанти већих група предмета. Међутим, појединачно картирање тих параметара често даје различите слике. Питање је и колико су те разлике биле приметне (нпр. предмети од злата и позлаћени) и значајне другима, ако не и самим власницима. Уз то, разобличавање појединих мотива – нпр. античких царских портрета на касноаварским појасним оковима – сведочи да је иконографија предложака Аварима била страна и не нарочито битна. Од веће важности за ова разматрања јесу технолошке разлике, које одражавају радионичке традиције и културне контакте: тако је техника отискивања матрицом била заступљенија у Карпатској котлини (мада не у најранијем периоду аварске превласти?), а ливења на истоку Европе. Типологија је од значаја у археологији, али такве поделе нису постојале у време када су се конкретни предмети користили. Ипак, дистрибуција типолошких варијанти може да укаже на постојање радионичког центра, али и на контакте које су житељи одређене регије одржавали са другима. Често нам нису познате хронолошке разлике између појединих варијанти. Могуће је да одређени подтипови нису били коришћени у исто време, али и то да динамика њихове употребе није била иста у свим регијама (pp. 80–84, Figs 29–30). Требало би, ипак, нагласити да је најчешће реч о ужим распонима који не ремете успостављање поуздане опште хронолошке скале, о чему је већ било речи. Од десетак понуђених примера, најинструктивније су разлике у распореду лимених наушница са великим кугластим привеском: примерци типа Tószeg нису заступљени у Трансданубији, за разлику од комада типа Szentes, који су заступљени и у регијама Кереша и Хортобађа (*cf.* Ormándy 1995). Наушнице пирамидалног привеска типова Szentendre и Szegvár заједно се јављају у оближњим регијама Сегедина и Сентеша, док у другим крајевима имају различиту дистрибуцију (*cf.* Balogh 2014).

Писац наводи и интересантне примере технолошких разлика. Ливене наушнице с пирамидалним привеском заступљене су у Трансданубији и око Нежидерског језера – али и Балатона, што не чуди с обзиром на њихово касноантичко порекло (Garam 2001, 28–29, Taf. 10; *cf.* Vinski 1956) – а лимене источније, у Мађарској равници (Figs 19/1, 31/1). Слично томе, лимене наруквице са трубастим завршетком биле су прављене (присутне) у Трансданубији, а ливене на југу Каганата. Те наруквице су свакако ромејског порекла (Garam 2001, 67–74, Abb. 6), с тим што је Балинт одавно увидео да се примерци из аварског контекста разликују по томе што нису ливени. Тако се управо ова врста наруквица узима као пример процеса „аваризовања" византијске робе (Bálint 1993, 222–223). Могло би да се помисли да су ливени налази са југа Каганата били увезени из Византије, док су лимени примерци по узору на њих били прављени у Трансданубији, можда од стране преосталих римских златара. Ипак, на југу аварске државе било је и шупљих, лимених комада. Реч је о налазима из Зрењанина и Стејановаца које је Ева Гарам обрадила у цитираној књизи али их није картирала – можда их зато нема ни код Балинта (Fig. 31/3; Garam 2001, Abb. 6). Распоред псеудокопчи пак указује на различит феномен. Док су отиснути комади углавном такође из Трансданубије, варијанте с каменим умецима већином потичу из међуречја Дунава и Тисе. У овом случају могла би бити реч о разликама у социјалном статусу власника, јер област између двеју великих река није представљала само географско средиште Каганата. Активност мање радионице најбоље се показује кроз појаву релативно ретког типа артефакта у јасно дефинисаној области: наводе се примери појасних окова са схематизованим приказима риба, налажени само између Тисе, Мориша и Кереша, и окова канија мача у облику слова *R* који потичу из још мањег међуречја прве две реке и Златице. Уколико се пак установи континуитет примене одређене технологије, појава нових форми не може без резерве да се тумачи као обележје неке нове популације.

Преиспитују се и поједине златарске технике, па се закључује да гранулација није представљала нарочито захтеван процес, већ упућује на културни миље из којег је златар потекао – „степски", „касноантички" или „византијски". Према Балинту, гранулација није била ретка због софистицираности или високе цене већ због тога што је нису примењивали бројни златари – није ли управо то гранулиране предмете чинило престижнијим, пожељнијим и скупљим? Без обзира на сличне упитаности, неспорно је да се појава нове технике у неком културном миљеу може тумачити само мобилношћу занатлија (које су могле да је усвоје у срединама у којима се стандардно користила) или присуством мајстора са стране, па етничка интерпретација промене није обавезујућа ни у овом случају. Кад је реч о орнаментици, минуциозна анализа Габора Фанцалског указала је на ограничену дистрибуцију појединих карактеристично изведених украса касноаварских појасева са сценама животињске борбе (Fancsalszky 2007). Уколико се пак исти украс затиче у двема удаљеним и културно различитим аварским регијама,

поставља се питање да ли су биле активне две радионице, да ли су људи из тих области одржавали контакте, или је пак занатлија у неком тренутку, археолошки неодређеном, прешао из једне регије у другу (pp. 84–87).

У даљем тексту Чанад Балинт поставља веома интересантна питања, актуелна и у студијама керамике (*cf*. Бикић 2020). Да ли је честа заступљеност неког типа на одређеном гробљу условљена специфичним укусом припадника заједнице, или је до ње дошло захваљујући делатности занатлије који је креирао локалну моду и, можда, каснију ширу популарност датог типа? На узајамни однос радионица и културне потражње могла је да утиче и унутрашња трговина у Каганату, при чему треба имати на уму различите видове „мобилности" артефаката – од личних контаката и трговине, тј. модних струјања, до миграција становништва. Примера ради, број печаћених црних посуда на гробљу Келкед А премашује укупан број таквих посуда из источне Трансданубије, где оне представљају типичан регионални производ: можда је то била последица интензивних контаката локалне популације са грнчарском радионицом из оближње регије? Аутор спомиње и карактеристичне позне комаде орме који су били прављени у области Комарна (Csuthy 2012, 186), али можда и на нашем простору, у Челареву и околини, где је забележен исти број налаза. Ти предмети су могли бити увожени на југ Каганата или пак одатле извожени: у оба случаја били би предмет унутрашње трговине, уколико већ нису у исто време прављени на оба краја аварске државе. Против такве могућности сведочило би изостајање одговарајућих комада орме на широком простору између Словачке и југа Бачке (Бугарски 2014, 727–728).

Потом се нуде поуздани примери ширења појединих врста налаза, пре свега појасних. У тешко сагледивом мору униформне касноаварске продукције, Балинт наглашава да је, тек недавно, Гергељ Сенте успео да из технолошког угла направи разлику између „идентичних" и „веома сличних" комада (Szenthe 2012). Појава предмета једнаке израде излаже се у веома добро осмишљеном прегледу, при чему је већина разматраних локалитета из Трансданубије: одговарајући појасни окови налажени су у оквиру једне некрополе, на локалној раздаљини (до 10 km), те микрорегионалној (50–100 km), макрорегионалној (100–200 km) и великој удаљености, од преко 200 km. У четири случаја „парњаци" су потврђени технолошким анализама, а у једном металографским. Врло је интересантно да ти предмети потичу са налазишта макрорегионалне и велике удаљености (комади из истог калупа потврђени су на гробљима удаљеним 230 km), док се, супротно очекиваном, мање учесталости запажају на микрорегионалном нивоу, што не говори у прилог ранијој процени да је једна радионица појасева покривала круг од око 30 km. Пошто је експерименталним путем показао да је израда касноаварског појаса трајала четири или пет дана, Сенте је закључио да локалне заједнице, чак и оне сахрањиване на великим гробљима, нису могле да представљају довољно тржиште за локалну радионицу. Стога се заговара концепт путујућих златара, о чему је писао и Јозеф Забојник (Zábojník 2000): у овом случају појам „радионице" треба схватити као „специјалистичко знање и техничке вештине […] мајстора, које су могле да се преносе кроз неколико генерација". По Балинту, континуитет потражње и производње показује се једино у случају блага из Нађсентмиклоша, док уз мобилност занатлија треба рачунати и на селидбе власника појединих предмета (pp. 89–92, 94–95, Figs 33–34).

Керамика пружа поузданије податке о стандардној радионичкој производњи. Због наглашене функционалности и ломљивости ове групе налаза, оправдана је претпоставка о локалној продукцији, о чему сведоче и откривене грнчарске пећи. Међутим, поједине врсте налаза имале су већу вредност, па су тако особене сиве посуде забележене на удаљености од 120 km од потврђеног радионичког центра у Дунајварошу. Дакле, проблеми транспорта били су превазилажени ако је постојала потражња, о чему најбоље сведоче налази „балканско-византијских и касноантичких типова посуда", с тим што Балинт оставља могућност да је у међуречју Дунава и Тисе постојала радионица „са провинцијским византијским традицијама" (pp. 93–94, Fig. 35/3). Налази амфора у аварском свету обрађени су засебно, са утемељеним закључком да оне нису представљале посуђе свакодневне употребе нити предмет трговине, већ амбалажу за поклоне – пре свега за вино које је Дунавом допремано до Каганата и тамо дељено међу елитом (Csiky, Magyar-Hárshegyi 2015). Касноаварска жута керамика је страног порекла, док зоне дистрибуције појединих облика нису подударне (новији прегледи: Petrova 2006; Vida 2015; Bognár 2016). Пошто специјализација радионица за израду различитих форми жуте керамике не делује вероватно, чини се да њихова неједнака заступљеност у гробовима одражава фунерарне праксе мањих група Авара.

У расправи о транспортним рутама Балинт потцртава могућност да су Авари користили старе римске комуникације. Уз то, инспирисан успешном реконструкцијом раносредњовековне путне мреже коју је на основу нумизматичких налаза извео Мајкл Мекормик (McCormick 2001), аутор запажа и концентрацију солида у некадашњем Барбарикуму, у Бачкој, уз руб Телечке лесне заравни и западно ка Дунаву. Реч је о природној комуникацији на коју ће налећи и средњовековни пут, док су погодности насељавања уз путни правац могле да користе и аварске заједнице (p. 95, 97, Fig. 35/1). Међутим, са тог шава потичу тек малобројни налази из оба периода аварске превласти (Бугарски 2014, карта 1–2), док се уочена концентрација солида не доводи у везу са средствима из данка – по аутору, нема очигледног разлога због којег би област на самом југу Каганата примила непропорционално велику количину злата, свакако тезаурираног у самом центру аварске моћи. Стога се налази солида на том простору тумаче пре свега као одраз локалне (микрорегионалне?) фунерарне праксе. С друге стране, можда због недовољно поузданих података, Балинт није размотрио изгубљене оставе из Бачког Моноштора и Купусине, суседних места уз сам ток Дунава – угрубо у линији осталих налаза. У литератури се наводи да је остава из Бачког Моноштора била састављена од већег броја златника цара Маврикија, док су бројни солиди из Купусине опредељени у доба цара Зенона (476–491), односно Фоке (Somogyi 1997, 26, 62; Morrisson *et al*. 2006: cat. 348, 357). Оставе би могле да се повежу са историјом ромејског данка Аварима, који је јако нарастао управо за владе цара Фоке (Ковачевић 1965, 126). Појава старијих златника наговештава да је Царство у време највећих обавеза слало и новце из резерви, док би полагање остава можда требало тумачити у светлу немира који су у Каганату завладали после пропасти код Цариграда

626. године (Бугарски 2014, 59, 347). Док није извесно у којој су мери банатски путеви уз доњи ток Тисе (Gáll, Romát 2016, Map 1; *cf*. Ivanišević, Bugarski 2008, Fig. 9) служили за ширење разних типова артефаката, према Балинтовим разматрањима и картама дистрибуције наслућује се да су горњи ток Тисе и Дунав могли да имају такву улогу. Примера ради, два типолошки веома слична језичка налаза су на удаљености од скоро 900 km уз стару обалу Тисе, док су две посуде декорисане истим печатом нађене на удаљености од 174 km ваздушном линијом, односно 350 km низ Дунав. Једнако је условна и трговина између кореспондентних насеља преко залеђених река (pp. 98–99, Figs 36–37), при чему би у разматрање требало узети и распоред ада.

Поглавље о просторним и хронолошким показатељима културних различитости опет сабира уочене разлике у репертоару налаза у двема главним областима, Трансдунабији и Мађарској равници, али и у мањим регијама унутар њих (3.4.3). Разлике се, дакле, не тумаче у етничком кључу. Чак и кад је реч о налазима оружја које се обично приписује Германима, Балинт се уздржава од такве интерпретације јер регије у којима се ти налази чешће појављују „не показују особине које одударају од просечне *аварске* културе" (p. 101, n. 380). Додао бих да такви ансамбли налаза заиста не могу говорити о регионалним етничким разликама, али могу да сведоче, попут рецимо гроба 108 из Арадца, о присуству особа германског порекла на одређеној некрополи (Bugarski, Ivanišević 2016, 156–157, Fig. 11). Последично, уколико у некој заједници – па и регији – има особа страног порекла које се сахрањују на начин својствен сопственој традицији, а у некој другој их нема, то ипак говори и о одређеним културним разликама. Шире посматрано, разлике у гробним инвентарима могу се тумачити и кроз призму личних и породичних судбина, као и различитих прилика и неприлика које су задесиле поједине делове Каганата или целу аварску државу. Балинт разматра и дијахроне промене у регионалној заступљености одређених типова појасних украса, накита, коштаних предмета, посуђа и оружја (pp. 101, 106–107; Figs 38–41). Пре других коментара, нагласићу да карте које показују распоред бојних секира кроз три главна периода аварске превласти, а које се ослањају на рад мађарског специјалисте за ту врсту налаза (p. 106, Fig. 40: Szücsi 2012), не узимају у обзир десетак примерака са наше територије (Bugarski 2015). То је само један детаљ који показује колико је тешко саставити поуздане карте дистрибуције и који у овом конкретном случају доводи у питање постигнути закључак, а начелно ставља у питање домете примене хоролошког метода до појаве опште базе података о аварским налазима.

Поглавље о ношњи (3.4.4) отпочиње упућивањем на термин *Trachtprovinz*, којим би се, по Балинту, у аварској држави могла описати само област Кестхеља. Присутни касноантички, византијски, италијански, германски и аварски елементи женске ношње су „измешани до те мере да се тешко може говорити о хомогеним популацијама *кестхељске културе*, већ – у најбољем случају – тек о регионалним културним посебностима". Анализа гробног налаза мора узети у обзир и процес акултурације и могуће личне разлоге полагања предмета, што свакако јача резерве према олаком етничком приписивању гробова. Јасно је и да костим покојника одражава његов друштвени статус и однос (породице и) заједнице према њему, али треба имати у виду да, макар у одређеним случајевима, социјални статус појединаца и групе може бити наглашен управо демонстрирањем етничких разлика. Такав пример дају сахране германских најамника у српском Подунављу (Bugarski, Ivanišević 2018). Уз то, Балинт наводи праксе сахрањивања девојчица са и без накита у Медлингу у Аустрији и на једној некрополи кестхељске групе. Уопште, богати се сахрањују са скупим предметима, док обичном народу остају слични предмети изведени у скромнијим материјалима и техникама. Зна се, и из писаних извора и на основу археолошких налаза, да су неки припадници елите били склони усвајању стране моде: поред Турака под кинеским утицајем, Балинт наводи и пример Грка у хунској ношњи с којим је разговарао царски изасланик Приск (pp. 108–109); сличан је и пример цариградске омладине која је прихватила источњачку моду (код нас о овој теми в. Милинковић 2004; Бугарски 2009, 87). Веома је занимљив и пример мушкарца и жене, претпостављено је супружника, из гробова 107 и 108 са гробља Келкед А. Обе особе имају монголидне антрополошке црте, при чему је мушкарац сахрањен у аварској ратничкој ношњи, док је жена, вероватно услед модних диктата, носила типичан германски костим и византијски накит. И иначе се у женским гробовима на тлу Каганата срећу германске фибуле и појасни окови, али је накит углавном византијских типова, док „степски типови у потпуности изостају".

Могу ли се уочене регионалне разлике приписивати посебним идентитетима? Кад је реч о групним идентитетима, Балинт не мисли тако: аварска материјална култура („униформна према споља а хомогенизујућа изнутра"), са изузетком кестхељске групе, преплавила је Каганат, и тек понеке некрополе показују значајније разлике у репертоару налаза (Керње, Секзард, Келкед, Замарди – из већ наведених разлога, могла се навести и Вајска). Не препознају се чак ни археолошки трагови тако јаких група у оквиру Каганата као што су Бугари, док се регионалне неуједначености још увек не могу сматрати одразом регионалних идентитета. Донекле упрошћено, оцењује се и да гробни прилози не одражавају личне идентитете. Ово је начелно тачно јер су покојнике сахрањивали други, који су путем сахране настојали да овековече одређену представу не само о преминулима већ и о себи. Ипак, свачији лични идентитет се састоји од много компоненти, од којих се неке ипак одражавају у гробном инвентару: полни идентитет, често и узрасни, каткад професионални, потом социјални статус, те шири групни идентитет – културни, ако не и етнички или верски. Управо се на основу Балинтовог тумачења споменутог гроба из Келкеда дају рашчитати неке црте личног идентитета: реч је о жени вишег ранга, азијског порекла, подложној европским модним струјањима. Кад је реч о етничком идентитету, писац спада у групу познатих археолога који се супротстављају директној етничкој интерпретацији артефаката и „осталих феномена". Будући да је раније писао о томе, аутор нуди крађу расправу о утицајном моделу Атиле Киша о трансдунабијским Гепидима, успут приметивши да се у мађарској науци задржала пракса етничке интерпретације налазишта, док се у другим земљама такве разлике углавном тумаче у кључу импорта или производа страних занатлија (pp. 110–112).

Балинтов осврт је превише кратак да би се објаснила доста строга оцена мађарске археологије. Свакако није реч

о тамошњем изуму, већ о конзервативном истрајавању на етничком одређивању археолошких налаза, што је плод деценијама доминантне културно-историјске парадигме. Ни овај приказ није место за детаљнију расправу о тој врло битној теми. Сасвим укратко, након промене теоријског ракурса, када се археолошкој грађи одрицала било каква исказна вредност по питању етничке интерпретације (Brather 2004; *cf*. Geary 2007), у новије време клатно као да се смирило. И даље се инсистира на културно-временском одређењу пре него на стриктној етничкој подели, али се не бежи од етничког маркирања ансамбала карактеристичних налаза са територија и из времена у које писани извори поуздано смештају поједине групе, при чему се те одреднице сада не схватају дословно већ као технички термини (*e.g*. Curta 2007; López Quiroga *et al*. 2017). О етничкој (само)свести и механизмима формирања етничких идентитета у раном средњем веку, а посебно код Авара, расправљало се и код нас (Бугарски 2009, 139–142). Стога би се и на Балинтову упитаност *етницитет или култура?* можда могло понудити компромисно решење. Групни културни идентитет вероватно је одражавао и неку врсту етничког идентитета, с тим што су таква осећања у односу на модерно време била знатно флуиднија и несталнија.

Четврто велико поглавље књиге, насловљено *„Византијске" везе авародопског материјала*, отпочиње освртом на методолошке проблеме истраживања. Наиме, будући да је византијска материјална култура распрострањена на огромној територији, па су налази из матичних области Царства предмет парцијалних изучавања различитих археолошких школа, још нису израђене поуздане научне синтезе (за преглед „археологије византијске државе" *cf*. Bollók 2015). Уз то, на великом простору бележе се различити облици, па се под кровним термином „византијске" материјалне културе подразумевају и античке, медитеранске и провинцијске одреднице, које притом не искључују једна другу. Кад је реч о заграничним регионима у којима се срећу такви налази, једину синтезу написала је Ева Гарам, управо за простор Каганата (Garam 2001). Њена монографија обухвата многе налазе „византијског порекла", међутим још није сасвим јасно – изузев за новац, амфоре или предмете врхунске израде попут појаса из Дивоша (?) – да ли су они заиста византијске израде или је у неким случајевима реч о локалним копијама (pp. 113–114). У новије време доста се пише о тим дилемама (*e.g*. Bühler 2011; Heinrich-Tamáska 2016), а налази са нашег простора могу бити врло важни у таквим разматрањима. Поред споменутих матрица за израду језичака типа Martynovka из Царичиног града, на основу балканских налаза предложено је византијско порекло наушница типа Jánoshida (Bugarski 2012), док налаз копче са Врћеновачког градишта (Бугарски 2020) подупире утисак да је једна врста панонских копчи била израђивана по ромејском узору (Blay, Samu 2016, 308–309).

Потом Балинт пореди византијске утицаје у Каганату и Источној Европи. Општој подели византијске материјалне културе коју су формулисали Фалко Даим и Јерг Драшке – итало-византијска, афро-византијска, понтско-византијска и балканско-византијска – аутор додаје још три категорије: блискоисточно-византијске, „подвизантијско-аварске" и источноевропске византијске културне елементе. Нисам сигуран да ли се концентрације налаза византијског порекла (најшире схваћено) изван Царства могу довести у исту раван као и макрорегионалне варијанте византијске материјалне културе, али је сасвим тачно то да се она према својој природи и интензитету појавности може категорисати у три просторна круга: централним провинцијама Царства, удаљеним провинцијама у којима се одржава независна култура (црноморска област или делови Иберијског полуострва) и регијама под византијским културним утицајем, које прихватају само одређене елементе материјалне културе и престижних предмета. Та размишљања могу се сагледати као формализовање концепта аварске културе као *пограничне византијске културе* који су формулисали Фалко Даим и наш писац, а који не мора да делује до краја убедљиво. Чињеница је да Каганат баштини више византијских и италијанских налаза него друге регије ван Царства, али то није довољно да би се аварска материјална култура сагледавала као облик византијске. Уз то, како је и сам Балинт приметио, сем појединих предмета Авари нису прихватили ништа друго из Царства. Упражњавали су сасвим другачији начин живота, који није познавао византијску инфраструктуру, обитавање у градовима или зиданим кућама, новчану привреду, хришћанство итд. Поред тога, у њиховој еклектичној материјалној култури заступљени су и германски и степски утицаји, па ни њу не бих сагледавао претежно кроз призму византијских струјања, која јесу непорецива. Интензитет и ширина византијских уплива код Авара стављају се између оних у Источној Европи и код Подунавских Бугара, који су од 9. века прихватили и утицаје у архитектури и хришћанство (pp. 114–117), а требало би додати да се у претходном периоду византијски културни утицаји у прабугарском контексту показују исто као код Авара – кроз појаву престижних предмета у гробовима (*cf*. Рашев 2007).

Дискусију о византијским културним елементима у Источној Европи Балинт отпочиње важним запажањем да се местимична појава њених израђевина углавном разматрала у контексту степских културних корена и етничких релација, тј. миграција номадских група, а међу њима и Авара. Таква сагледавања несумњиво су у вези с недовољном проученошћу византијских налаза: на исти начин, истина много раније, појава византијских налаза у Коринту тумачена је као одраз аварског запоседања тог града, просто зато што су такви предмети били познати из аварских гробаља (Davidson 1937; *cf*. Petković *et al*. 2016, 253–254, n. 15). Исправно Балинтово тумачење поткрепљено је праћењем распореда појединих карактеристичних облика накита и појасних окова, са широм расправом о комадима типа Martynovka и псеудокопчама (pp. 117–125, Figs 42–45). Аутор сад потцртава ромејско, тачније балканско порекло појасних окова типа Martynovka, уз оцену да се у археологији Авара и Прабугара и даље претпоставља њихов степски корен. Псеудокопче су веома интересантне, будући да су широко распрострањене и да су аутори износили сасвим различита тумачења њиховог порекла (*cf*. Бугарски 2009, 91–92). Док за већину аварских и источноевропских налаза не уочава „директан византијски утицај", Балинт наглашава да луксузнији примерци „деле порекло са сличним византијским копчама изванредног квалитета". Ту свакако мисли и на налазе из Дивоша (?): већ је наглашено да они представљају архетип аварских појасева са псеудокопчама (Kiss 1998, 256), док треба имати на уму и став Фалка Даима да су предмети овог типа за аварско

тржиште били израђивани (и) у радионицама ромејских мајстора (Daim 2003, 482–483; такву тезу о налазима типа Martynovka напослетку је изнео Милинковић 2015, 156–158). Иако се чини да византијско порекло није спорно, недавно објављена матрица за израду пседокопчи, наводно из околине Сокобање (Рашковић 2016, 37–39, T. VII), коментарисана и у мађарској литератури (Gulyás 2018, 110, n. 60, Fig. 4/11–14), због несигурних услова налаза не може да се узме као доказ у тој расправи (Бугарски 2020, 68). Дискусија о источноевропским деловима ношње неће бити детаљније коментарисана јер није у непосредној вези с темом књиге. Можемо само да назначимо да Балинт нешто детаљније коментарише „антске старине" и налазе тзв. словенских фибула, преносећи новија разматрања – пре свега Флорина Курте „који је самоуверено показао да њихово приписивање Словенима може да се одбаци". Испоставља се, међутим, да се таква тумачења ослањају на недовољно прецизна картирања (што јесте у вези с Балинтовом књигом) и недовољно строгу анализу: распоред типолошки најстаријих представника може да укаже и на етнички миље у којем су настајале поједине класе тих предмета (Ivanišević 2020).

Следи излагање о везама између Авара, Византије и Медитерана у светлу појасних налаза (4.2.3), који су изабрани због бројности и велике заступљености у научним радовима. Укупно посматрано, појасеви са аварског простора дају знатно нијансиранију слику него што се то обично чини, при чему се на налазе из Византије (и Италије) гледало на начин описан на почетку претходног пасуса. Најпре се разматрају појасеви са штитастим оковима и споредним језичцима, који су раније такође тумачени као степско обележје, док се у последње две деценије углавном воде расправе о томе из које су византијске области потекли. По Балинту то је Закавказје: док су такви налази у Италији и Византији, како се чини, представљали обележје елите, међу Аварима и у Источној Европи ширили су се јефтиније варијанте. Сам облик се у Каганату не среће пре 7. века. На Балкану за сада нема таквих налаза, па није јасно да ли су се аварске занатлије упознавале са предлошцима оваквих појасева током почетних контаката са Византијом, путем данка или преко веза са Италијом. Сасвим су другачији појасеви са различитим византијским копчама (типови Syracuse, Corinth, Bologna-Balgota и сл: *cf*. Schulze-Dörrlamm 2002; 2009), које се и међу Аварима и на тлу Царства ретко налазе у комбинацији с појасним оковима. Појасеви с копчама били су јефтинији и мање престижни од богато украшених гарнитура и, чини се, нарочито омиљени на Криму. О тим једноставним бронзаним комадима нема трага у писаним и ликовним изворима, али услед масовне производње и појаве дају одличне примере разлика у дистрибуцији занатске робе. Стога им се Балинт нарочито детаљно посветио.

Из опширног и добро опремљеног текста, задржаћемо се само на неким констатацијама о најилустративнијим врстама копчи. Најзаступљеније византијске копче у Каганату – тип E24 (Schulze-Dörrlamm 2009, 77–79), тј. са оковом у облику лире (Garam 2001, 99–108) – налажене су од Албаније до Казахстана и Ирана, док се комади типа Sučidava срећу од Француске до Сирије и Азербејџана – али их нема у Италији, Албанији и Северној Африци. Честе су на истоку а ретке на западу Балкана – треба додати да су веома заступљене на нашем простору, Централном Балкану. Копче типа E23 налажене су од Британије, преко Балкана, Кипра и Блиског Истока, па све до Централне Азије. Карте дистрибуције, макар и непотпуне, дозволиле су закључак да су налази типова Sučidava, Yassi Ada и Pára међу Аваре стигли из југоисточне Европе, а копче класа Corinth, Hippo Regius, Balgota, Syracuse и E30 из југозападне (pp. 129–145, Figs 48–54). Закључак је несумњиво тачан, а пада у очи да је аутор анализирао, на пример, копче типа Pára, а не сродне налазе типова Salona–Histria и Gátér које су бројније у Каганату а срећу се – прве у знатно већем броју – и на Балкану (Uenze 1966; Garam 2001, 109–111; за врло интересантан налаз типа Gátér са нашег простора в. Petković *et al*. 2016). Можда је разлог у томе што је за налазе типа Pára већ постојала израђена карта дистрибуције (Fig. 52/1: Madgearu 2003, Fig. 1). Потом се писац окренуо специфичностима подручја команске културе, чији се налази каткад доводе у везу с кестхељским. Занимљиво је тумачење налаза италијанског порекла, који се приписују поморској трговини којој су у „мрачно доба" били изложени центри у јужном далматинском приморју. Балинт расправља и о могућим културним сличностима Албаније и Трансданубије тог доба (pp. 145–149): кад је реч о команској култури, а у некој мери и кестхељској, склон сам да сличности припишем њиховом инсуларном, касније и рецидивном карактеру и да их сагледавам (и) у односу на јасно утврђен касноантички супстрат. „Култура Комани–Кроја је […] урбана, постантичка, ретардирана римско-византијска и превасходно хришћанска" (Поповић 1988, 231).

Пажња се потом усмерава на порекло ливених касноаварских гарнитура, нарочито оних са омиљеним мотивом грифона. Осим што је древни мотив грчког порекла (*cf*. Hayashi 2000), предоџба о источном пореклу тих појасева (Кавказ и Кама) одавно је напуштена, а изворе таквих аварских гарнитура не би требало тражити ни у бугарском материјалу који садржи неке сличне комаде. Балинт не верује да је порекло тих појасева италијанско, изузимајући поједине типове о којима је писао Фалко Даим, док из Далмације наводи познати налаз из Смрдеља, при томе оправдано одбацујући поставку Јована Ковачевића о Аварима на Јадрану (Kovačević 1966). Иако је раније сматрао да је тај налаз „сигурно производ аварског етничког порекла" (Bálint 2003, 59), сада се задржава на тврдњи да је појас из Смрдеља „настао у контексту балканске групе византијске (пограничне) културе" и да стога тешко може да се узме као доказ јадранског или италијанског порекла касноаварских појасних окова (pp. 149–152, n. 680). Имајући у виду још неке налазе, чини ми се да предложак појаса из Смрдеља, ако не и сам налаз, потиче са севера Медитерана. Потом писац оправдано критикује продужено приписивање Аварима појасева типа Vrap–Velino: у исправном сагледавању оставе из Врапа узима за аналогију млађи бронзани бокал са Понтеса, о чему је, као и о налазима металних посуда из Нађсентмиклоша, Врапа и Аде, било речи у приказу претходне Балинтове књиге (Бугарски 2013, 321–323). Након спроведене анализе, неупитна је веза касноаварске ливене индустрије са византијским прототиповима, уз смелију тврдњу о „директном учешћу Авара 8. века у тадашњој византијској култури […]". Очигледно велика потражња за ливеним појасевима у Каганату могла је да се задовољи услед доступности сировина и умешних мајстора. Упознате са уметничким

струјањима у Византији, занатлије су нудиле широку лепезу квалитетних производа. Далеко бројније него у окружењу, такве израђевине сведоче и о релативном благостању у касноаварској држави. У закључку, Авари су били активни конзументи, а повремено и активни посредници у обликовању моде југа и југоистока Европе, чији се неки елементи подводе под византијску одредницу. Међутим, слично Лангобардима у Италији, они су паралелно одржавали везе и са западно- и средњоевропским културама (pp. 142–155).

У знатно краћем, петом поглављу сагледавају се односи између Авара и Италије. Понављају се разлози због којих су те везе биле запостављене у науци, уз закључак да би их ваљало сагледавати у ширем културном и историјском контексту. Авари су 593. године склопили савез са Лангобардима, који су пред њима отишли у Италију непуних 30 година раније. Савезништво се огледало у учешћу Аварима подређених словенских трупа у борбама у Италији током 7. века, али и у посланствима, у томе што су поједини лангобардски великаши добијали заштиту у Каганату и што су, насупрот томе, побуњени Бугари након пораза од Авара морали да затраже помоћ од Баваруца а не од Лангобарда. Пријатељски односи између Авара и Лангобарда трајали су све до последње трећине 8. века. Такође, ако посматрамо зоне политичке контроле, а не интензивног насељавања, реч је о двема суседним државама, повезаним проходном комуникацијом – римским путем. Од антике па до раног средњег века, вести и људи прелазили су то растојање за 10 дана, или чак брже. Лак приступ северу Медитерана Аварима је омогућавао и контакт са византијским насељима у Далмацији, док је Равена била византијско упориште све до 751. године; у Истри се „прљави Грци" спомињу још у осмој деценији 8. века (pp. 157–162; о византијској администрацији на Јадрану у 8, али и 9. веку *cf*. Prigent 2008; нови налази византијских була 8. и 9. века из Задра и Ливна: Milošević 2018, kat. br. 76/3–7).

По Чанаду Балинту, најбољу потврду односа између Авара и Италије представљају налази италијанских ковања солида у Каганату, чији значај није био довољно наглашен у претходним студијама. Иако их је мало у односу на остала византијска ковања у злату – потичу са 15 локалитета у Карпатској котлини – већина комада припада емисијама (и имитацијама) након времена данка, па стога упућују на трговину. Ако се имају у виду ковничко порекло монета (Равена, Рим, Катанија, Сиракуза, Картагина) и општи услови у 7. веку, та трговина се највероватније није одвијала преко Цариграда и Балкана, тим пре што и на Балкану има мало оновременог италијанског новца (Morrisson *et al*. 2006, 45). Налази се групишу око Нежидерског језера и, у мањој мери, низ Дунав. Ипак, они „нису подесни за извођење даљих историјских закључака јер су трајекторије италијанских веза и интерна дистрибуција прибављеног новца [у Каганату] и даље непознати" (pp. 19, 162–164, n. 750, Fig. 61/2). Међутим, ако се та карта упореди са распоредом неких налаза из 8. века који упућују на надрегионалну трговину и(ли) утицаје из Италије (*e.g*. Daim *et al*. 2010, Abb. 14, 15), стиче се утисак да се ради о важном чворишту на путу којим су текле те везе: управо у том контексту аутор сагледава најпознније примерке са северозапада Каганата.

Кад је реч о покретним археолошким налазима, Балинт из шире групе предмета који указују на „византијске везе" изводи подгрупу италијанског порекла. Реч је о различитим типовима наушница, фибула, прстења и игала, потом звончића, кључева и ланаца, појасних окова и копчи, оружја и коњаничке орме, металног и бронзаног посуђа. Наводе се још и погребни обичаји (крстови са сандука), престижна роба попут споменутих столица на расклапање, те поједини технолошки и декоративни детаљи (pp. 165–170, Figs 62–64). Треба нагласити да међу тим предметима има и германских фибула (Fig. 62/10), које не упућују на византијске везе, док се фибуле у облику птица (p. 165, n. 779, Fig. 62/14) у значајном броју срећу и на далматинској обали, где је потврђена производња у Конавлима, с најисточнијим налазом код Крагујевца (Katić, Kapetanić 2019). Аутор наводи и да су му, осим аварских, италијанских и источноевропских, једини налази окова орме од крстасто распоређених калота са проширеним доњим крајем украшеним ресама познати из Книна, што тумачи културним везама између Италије и Далмације (p. 166, n. 806, Fig. 64/6). Реч је заправо о матрицама из Сисције (Vinski 1958, 17, T. XVII/1, 2; Bugarski 2012, 250, Fig. 10/5, 6; Rácz 2014, 72–76, Karte 11; *cf*. Csuthy 2013). Међу стакленим посудама је и ритон из скромног гробног инвентара из Србобрана (Хађмаш 1957), споменут и илустрован новом фотографијом на самом почетку књиге (p. 17, n. 16, 807, Fig. 3/1). Након прегледа налаза италијанског или, шире, медитеранског порекла, писац се враћа на везе између Авара и Лангобарда, дотиче се њихових различитих генеза и другачијих услова у којима су се развијале њихове материјалне културе, уз, сасвим очекивано, снажнију изложеност акултурацији Лангобарда у Италији. Осим тога, Авари нису прихватали све што се носило у Италији, већ израђевине по сопственом укусу, док се појава скромних предмета не може тумачити у светлу дипломатских поклона, данка, плена и сл. Таквих налаза нема пуно а потичу из различитих аварских области, што упућује на *ad hoc* набавке и „представља непроцењив извор за историју Карпатског басена у 7. и 8. веку". Авари су, преко Италије, одржавали и западне контакте, али се, макар за сада, те везе слабо очитавају у археолошким налазима (pp. 170–173).

У шестом поглављу Балинт испитује начине на које су предмети медитеранског порекла пристизали међу Аваре. Будући да су они различите материјалне и, самим тим, престижне вредности, не могу се по правилу приписивати дипломатским мисијама и плену. Као пример узима се познати месингани крчаг из Будакалаша, са великог гробља на којем се, према аутору, није сахрањивала популација нарочито високог статуса – истини за вољу, некропола је темељно опљачкана, као и сам гроб из кога потиче посуда (Vida 2016c, 19). Примање и слање дипломатских поклона има јако дугу традицију, и Авари су свакако учествовали у тој *do ut des* пракси. Међутим, ако из извора имамо одређене податке о поклонима које су примали – укључујући злато, сребро, оружје, зачине, али и софе и слона – не знамо шта су слали заузврат: можда су то биле робиње и коњи. Као и у другим друштвима за која постоје историјски подаци (Турци, Хазари, Печенези, Византија), ратни плен се највероватније и међу Аварима делио према друштвеној хијерархији. Тако прибављена добра вероватно су завршавала у њиховим гробовима, али немамо начина да их препознамо.

Стога се Балинт окреће анализи треће могућности – трговине. Сматра да је класична трговина у 7. и 8. веку била

ограничена на Византију, док се у већем делу Европе одвијала спорадично, а у Западној Европи сводила на регионалну робну размену. У већем делу Централне и Источне Европе, оновремену трговину ваља схватити врло широко, јер су се скоро сви предмети кретали међу различитим етничким групама и/или културама, у различитим формама комуникације. Кад је реч о облицима трговине, Балинт набраја локалну, посредничку и трговину на велике раздаљине, о којој за Аваре имамо мало података. Осим за Сама, нема историјских података о великим трговцима који су путовали кроз њихове поседе. Ипак, тешко је сложити се с тврдњом да је иностранa роба прибављана само путем локалне трговине. Локална трговина се одвијала у кругу од неколико десетина километара, регионална је повезивала суседне регије, попут Балканског полуострва и Карпатске котлине, међурегионална више таквих јединица (нпр. Сицилију, Сардинију и Северну Африку), док је међународна трговина подразумевала трговину вином или грађевинским материјалом: њу не треба поистовећивати са трговином на велике раздаљине (pp. 175–179).

Врло је мало историјских података о аварској трговини, а они се, при томе, не односе на локалне трговачке размене. Балинт најпре исправља превод Валтера Пола о боравку аварских изасланика на Јустинијановом двору, када су они набавили свилу у замену за робове. Своје заробљенике Авари су убијали, продавали или расељавали по Каганату (преци Сермезијанаца), али нема података о томе да су учествовали у великој трговини робљем која се одвијала широм Европе – нити, рецимо, археолошких налаза букагија. С краја историје Каганата позната је франачка забрана продаје оружја Аварима и Словенима, а тај извоз има археолошке потврде у гробним налазима карактеристичних мачева у западним аварским крајевима. Познат податак из Судиног лексикона – да су све аварске вође „постали трговци и варали једни друге" (Pohl 2018, 250–254) – Балинт доводи у сумњу и подводи под жанровско приказивање Авара: у најбољем случају, податак би сведочио о унутрашњој трговини. Аутор, међутим, оставља по страни налазе арапског новца из друге половине 8. века у Каганату (*e.g*. Bartzak 1998), који уз неке друге предмете оцртавају шире трговачке процесе, о чему ћу писати на другом месту.

Наглашено је да није сва византијска роба која је пристизала Аварима била исте вредности. Поједини предмети прављени су у врхунским радионицама, док су једноставније копче *византијског порекла* лако могле да се израђују у самом Каганату (Blay, Samu 2016, 308–309). Кад је реч о изворима византијских производа, Балинт оправдано расправља о пограничним градовима, попут Виминацијума и Сингидунума, и комуникацијама које су водиле до тих упоришта из центара у унутрашњости Царства. Ипак, таква трговина вероватно није дуго трајала, јер је до пада лимеса дошло већ након владе цара Фоке (Баришић 1956; Haldon 2003, 43–44). Амфоре су, са различитом другом робом, највероватније допремане бродовима до градова на доњем току Дунава, наспрам Каганата, док је претпоставка о превозу на камилама, поткрепљена остеолошким налазима из Царичиног града (*cf*. Марковић *et al*. 2019, 26–27), мање вероватна. У археолошкој евиденцији аутор не види трагове постојане трговине са лангобардском Италијом. Сем појасева италијанског типа, у гробовима широм Каганата заступљено је доста врста тамошњих производа, али у малом броју. Поједине мозаичке тесере могле су бити само сувенири, док се из извора зна да су Авари пленили и разну егзотичну робу коју заправо нису могли да користе, нпр. тепихе (pp. 179–185). Неки тако или слично прибављени предмети могли су да добију нову намену. Примера ради, Атила Лакатош је закључио да су бронзани окови полијелеја секундарно коришћени као окови кожних торбица – један такав налаз потиче и са некрополе у Арадцу (Lakatos 2001, *cf*. Tobias 2011, 284, Abb. 1/1).

Закључујући разматрање о аварској трговини, Балинт се поново запитао шта су они могли да понуде заузврат: другим речима, да ли је постојао аварски извоз (*cf*. Bálint 2002, 71)? Аутор се не слаже у потпуности са оценом да је продаја заробљеника представљала извоз, макар не регуларан – иако и сам Валтер Пол пише о повременој трговини робљем (Pohl 2018, 250–253; *cf*. Nikolajević 1973) – као што не сматра да постоје убедљиви докази о трговини сољу из Трансилваније (*cf*. Horedt 1975, 119–120), док се могућност трговине бакром из словачких рудника (*cf*. Поповић 1986, 118) не спомиње. Спорадични налази узенгија и коњаничких сахрана у Италији заиста не сведоче о присуству Авара или о аварском извозу. Реч је о налазима из јасног лангобардског контекста, при чему испитиване кости коња припадају западним врстама. Може се размишљати о аварском извозу коња, иако није јасно колика је била потражња за њима: уз то, обим узгоја у Карпатској котлини не би могао да се пореди са вредностима номадског узгоја коња који је преплављивао кинеско тржиште (Lindner 1981). Кад је реч о аварској материјалној култури, иако у бити еклектична, она је била ексклузивна, па су њени производи крајње спорадични изван Каганата (Бугарски 2014, 727). Та роба није била извожена на захтевнија тржишта: јасно је да Византинци, поштујући своје стандарде, не би прихватали такве израђевине (*cf*. Милинковић 2004, 194). Оне су само спорадично налазиле пут до области централнобалканских Словена, док делује да су Бугари у то време имали сопствене изведенице сличне материјалне културе (*cf*. Станилов 2006, 90–102). Балинт закључује да су, осим путем данка и плена, иностране израђевине пристизале у Каганат и захваљујући локалним и индивидуалним везама које не потпадају под појам трговине, или путем трговине на микрорегионалном нивоу, сада остављајући по страни наведене историјске податке. Чини се, још једном, да је ситуација у смирај Каганата била нешто другачија. Аутор потом контрастира ову слику са археолошком евиденцијом италијанских израђевина, пре свега новца, у Централној Европи, уз закључак да су Авари, колико год да је мали археолошки узорак, били укључени у средњоевропски феномен оличен у сплету веза између Лангобарда, византијских поседа у Италији и њихових северних и североисточних суседа (pp. 186–194). Сасвим је друго питање унутрашње трговине у Каганату, за шта постоје одређене индиције (Бугарски 2014, 727–729).

Седмо велико поглавље доноси детаљну расправу о дистрибуцији византијских налаза и налаза византијског типа у Каганату, а отпочиње поновљеном расправом о значењу тих одредница у домену материјалне културе. Релативно малобројни налази византијских копчи одају утисак да је њихова дистрибуција у различитим деловима Каганата била условљена близином главних зона распрострањености појединих класа, мада би из те расправе требало изузети копче

типа Corinth у Трансданубији, које се јављају тек на једном локалитету. Уз само један налаз у тој области, шест амфора потиче из Мађарске равнице (*cf*. Csiky, Magyar-Hárshegyi 2015), при чему се преноси погрешан податак Тивадара Виде да је налаз са југа тако зване регије – заправо из Бечеја – представљао локални производ, док није јасан закључак да су медитеранске буклије „најдубље утицале на аварску грнчарију" (pp. 195–196, n. 1051, Fig. 68). Балинт затим картира византијске и аварске типове металног посуђа, сместајући у другу групу и налазе из оставе из Нађсентмиклоша и Аде. Извесне недоумице изазива сродна посуда из оставе из Врапа у Албанији, која се приписује провинцијској балканској продукцији (*cf*. Бугарски 2013, 322). Различите посуде византијског порекла стизале су у Каганат на разне начине, а друкчија просторна заступљеност византијских и аварских производа упућује на другачије културне афинитете у западном и источном делу аварске државе. Стаклене посуде, за које се не може тачно разлучити да ли су византијског или италијанског порекла, такође су заступљеније у Мађарској равници него у Трансданубији (pp. 198–199, Fig. 69).

Надаље се испитује појава различитих врста византијског новца и копија у Каганату. Чак трећина солида је познијег датума од времена аварског данка, окончаног поразом под Цариградом 626. године, док је сребрног новца нађено врло мало – најјужнији налаз је из Стејановаца у Срему (Minić 1982). Могло би се додати неколико коментара уз расправу о, како се наводи, равномерној распрострањености бронзаног новца, изузев у регији Кестхеља и међуречју Дунава и Тисе. Заправо, са некрополе Чик потиче фолис приписан емисији Јустина II и Софије из 576/577. године (Бугарски 2009, 111), односно, према читању специјалисте Петера Шомођија из приватне преписке, раном ковању цара Ираклија, а из Арадца бронзани новац цара Маврикија (Somogyi 1997, 24). Занимљив је и размештај случајних налаза бронзаног новца кованог пре 626. године на самом југу Баната. Фолиси су углавном ковани за Јустина II, а најпознији комади за цареве Фоку и Ираклија. Они свакако не потичу од данка, а њихова диспозиција захтева додатна објашњења. Аварско становништво југа Баната могло је доћи у посед извесне количине кованица путем ограничене трговине или непосредног додира с Ромејима, док су фолиси из Банатске Паланке, који су можда чинили оставу, уз опрез доведени у везу са исплатом ромејске војске или федерата у преломно доба доласка Авара. Уз то, из Сомбора потиче налаз бронзане монете из друге половине 7. века, коване за цара Констанса II (Бугарски 2014, 347). У контексту пограничне трговине сагледавају се и концентрације налаза уз доње токове Тисе и Дунава. Све врсте новца су три пута заступљеније у Мађарској равници него у Трансданубији. Разлози нису сасвим јасни, а од понуђених могућности најизгледније делују регионалне разлике у погребним обичајима. Имитације сведоче да су Авари, у недостатку оригинала, били задовољни прибављањем фалсификата, тј. да им је била привлачна симболичка вредност византијског новца, који за њих није представљао монетарну валуту. То, уосталом, показују и налази перфорираних златника – привезака (pp. 200–203, Fig. 70).

У складу са нејасноћама око прецизног именовања налаза *византијског порекла*, након налаза „византијског типа" и новца, Балинт представља налазе „касноантичко-византијског типа" које је разврставао Тивадар Вида (Vida 2009). За разлику од претходно обрађених категорија, различите игле и фибуле су десетоструко заступљеније у Трансданубији. Слично је и с различитим типовима копчи, мада није јасно зашто се поново наводе налази типова Balgota и Corinth. У сваком случају, копчи „касноантичко-византијског типа" – у које спадају и локалне израђевине по византијском узору, нпр. типова Bóly–Želovce и Keszthely–Pécs, али, према аутору, и класа Balgota и Corinth – углавном је такође далеко више у Трансданубији него у Мађарској равници. Затим се расправља о керамичким посудама „византијског" и „касноантичко-византијског типа". Таквих посуда је мало, укупно 43. Уколико је разликовање типова у овом случају оправдано, налази из Трансданубије указују на склоност тамошње популације према касноантичко-византијским облицима, док се у Мађарској равници показује склоност ка формама које су окарактерисане као византијске (pp. 204–206).

У екскурсу о везама са византијском материјалном културом у 8. веку, након новца Балинт узима у обзир разне појасеве квалитетне израде, али, зачудо, готово ништа од познатих налаза које обрађују Фалко Даим и сарадници, укључујући оне из Хохенберга или Брестовца (*e.g*. Daim *et al*. 2010): да су и они мапирани, карта дистрибуције била би нешто другачија. Писац опет спомиње златну наушницу са привеском од аметиста из Новог Сада – у овом приказу је изложена аргументација у прилог датовању у 7. век – за коју сада, за разлику од оцене на стр. 44, тврди да потиче са византијске територије. У контексту тих веза наводи се и остава из Нађсентмиклоша, коју по аутору чине израђевине аварских мајстора, блиско упознатих са византијском културом (Bálint 2010; *cf*. Бугарски 2013). Балинт је у праву када тврди да налази којима се посветио оповргавају утисак о изолацији Авара у 8. веку: сасвим насупрот, они одражавају везе са Византијом, посебно у Мађарској равници и, додао бих, низ ток Дунава. Закључује се да се својеврсна подељеност археолошког наслеђа два главна дела аварске државе показује и у 8. столећу, при чему Мађарску равницу одликује потражња за златом и престижном робом византијског типа, док се у Трансданубији показује склоност према предметима „касноантичко-византијског типа" (pp. 207–213, Figs 71–76). Будућа истраживања ће свакако олакшати разврставање тих семантички и формално сродних категорија.

Осмо поглавље посвећено је управо разликама између Трансданубије и равнице, које су установили многи аутори. Унајкраће речено, авародопски гробни ансамбли у Трансданубији, на тлу некадашње провинције Панонија, богатији су и типолошки разноврснији од оних у источном делу Каганата. Ту појаву Балинт назива *трансданубијским феноменом*; она је нешто шира од саме области, пошто и поједина налазишта на левој обали Дунава показују такве особености, које су стране у равници на истоку. Трагове прекоречне комуникације једнако представљају и поједине керамичке форме на десној обали Дунава. Да би јасније показао исходе својих анализа и културна обележја двеју области, аутор табеларно приказује различите врсте налаза према броју локалитета са којих потичу у Трансданубији и Мађарској равници. Око 40 категорија показује уједначену распрострањеност. Међу њима су златне наушнице са привеском у виду перле, ливене наруквице са трубастим завршетком,

појасни окови типова Tarnaméra, Fönlak и Pancsova, мачеви са накрсницама византијског типа и они са алком на балчаку, потом коштане оплате тоболца, крајеви дршке бича и сисци мехова, српови, сиве посуде, вршници, али и оболи, тзв. жртвени налази, коњаничке и коњске сахране. Реч је, дакле, о типичним аварским налазима – макар били различитог порекла. На трансдунубијским налазиштима пак знатно су заступљеније ливене наушнице пирамидалног привеска, ланци, тордирани торквеси и они са *S* завршетком, буле, дискоидне фибуле и фибуле у облику животиња, лимене наруквице са трубастим завршетком, игле за косу, прапорци, окови за појас типа Fenékpuszta, саксови и позне спате, бојне секире, секире и умба, окови орме са проширеним доњим крајем, тауширане фалере, кључеви, бронзани окови торбица, различито посуђе, укључујући и оно прашког типа, те оболи у римском новцу, парцијална сахрана коња и сл (укупно око 60 категорија). Насупрот томе, лимене наушнице пирамидалног привеска и наушнице типова Tószeg и Szentes, перфориране кашике, *P* окови канија мачева, палаши са алком на балчаку, ламеле оклопа, разно посуђе, амфоре, те гробови са нишама, с коњем преко покојника, коњске и парцијалне животињске сахране и сл. – укупно двадесетак категорија – срећу се на знатно већем броју локалитета у источном делу Каганата. Већи број локалитета у Трансданубији на којима доминирају наведене категорије археолошких налаза у складу је с већим бројем регистрованих аародопских налазишта у том делу Каганата. Иако је Трансилванија знатно слабије истражена, ипак се показују извесне особености тог простора. Релативно често се среће неколико „меровинших" типова, који су у 7. веку могли бити прибављани из или посредством Мађарске равнице, док налази касноантичког и византијског порекла изостају готово у потпуности – изузетак представљају солиди, чак и они из 8. века. С правом се указује да је недостатак тих налаза речит у расправи о евентуалном претрајавању античког супстрата у Трансилванији, нарочито у поређењу с Панонијом (pp. 215–221).

У наставку текста Чанад Балинт расправља о томе да ли су узроци „трансдунубијског феномена" били у пореклу популације, тј. германском и касноантичком наслеђу, или пак леже у друштвеним и културним разлозима. Аутор ставља под сумњу уврежено мишљење да је тамошње становништво било претежно германског или локалног романизованог порекла, или је то била бар њихова култура – „што се чини контроверзним у методолошком и нејасним у археолошком погледу". Такође, писац издваја став Маргит Нађ да разлике нису биле изазване пресељењем група са Балкана на подручје кестхељске културе и јужне Трансдунубије, те као погрешан цитира свој ранији закључак да је релативно просперитетна Трансдунубија представљала „колевку аварске цивилизације". Балинт сада сматра да разлике између Трансдунубије и истока Каганата нису биле условљене просперитетом, већ различитим културним стремљењима. Сам просперитет који се очитава у материјалној култури последица је неколико фактора: материјалних ресурса, доступности специјализованих занатлија и степена потражње. Финансијска основа свакако лежи у огромном данку који је пристизао Аварима, што их разликује од осталих група у ближем и даљем окружењу, али није објашњено како се та погодност односила више на Трансдунубију него на остатак државе.

Кад је реч о раду занатлија, аутор најпре даје пресек превазиђених, историцистички заснованих ставова и актуелних проучавања. У етничком шаренилу Каганата данас је извесно утврђено опстајање, између осталог, локалног касноантичког супстрата, које се одражава и у изради панонских копчи и појединих керамичких облика. О томе сведоче и раније жестоко оспораване серолошке анализе покојника из Кестхеља, које је спроводио Имре Ленђел и које су у новије време делимично потврђене стронцијумским анализама. На основу обрађеног узорка, истина малог, само четвртину сахрањених чинили су дошљаци (Heinrich-Tamáska, Schweissing 2011); додао бих да је сличним питањима на ширем простору посвећен велики међународни пројекат *HistoGenes*, у којем учествују и истраживачи Археолошког института (https://www.histogenes.org/). Као могући етнички маркер Балинт спомиње и прашке посуде, при чему наглашава да су оне у Трансдунубији налажене углавном у дечјим гробовима у Будакалашу (pp. 221–226, n. 1137, 1162). Због још неких налаза из гепидског контекста аутор одбацује њихово аутоматско приписивање Словенима, цитирајући Флорина Курту који у њима не види „етничку, већ грнчарску категорију" (Curta 2001b), док потврде континуитета становништва, значајне пре свега за расправу о генези кестхељске културе, тражи и у оставштини предаварског периода.

У дискусији о балканским занатлијама, који су према неким ауторима деловали на том подручју, Балинт најпре анализира познати пасаж из *Чуда Димитрија Солунског*, сматрајући да су подаци о томе да су Авари повели преко Дунава огромне масе становништва претерани, док у хагиографском наративу извора препознаје утицаје из Библије. Ипак, етноним – Сермезијанци – сведочи да је део тих заробљеника био насељен у околини некадашње римске престонице. Захваљујући истом извору знамо да су они сачували свој културни идентитет. Као једини локалитет који би могао да сведочи о тој групи писац с правом наводи некрополу у Вајској, коју сам управо тако одредио у једном чланку (Bugarski 2012, 246–252) и дисертацији (Бугарски 2014, 85–94). Иако некропола „упућује на вероватно присуство касноантичке заједнице", наглашава се да нема никаквих историјских или археолошких података о потомцима касноантичке популације Панонија источно од Дунава, нити о ромејским придошлицама са Балкана или из Срема. Сами гробови, међутим, представљају опипљив археолошки траг, док понуђена историјска интерпретација пружа један од два могућа одговора на упитаност Тивадара Виде – *локални или придошли Ромеји?* У контексту теме монографије чини се да је недовољно потцртана чињеница да су гробови зидани на римски начин у Вајској изузетни на тлу Каганата. Балинт напомиње да су римске опеке налажене и у касноаварским гробовима у Челареву (Bunardžić 1980), премда је детаљном анализом објављене грађе утврђено да оне представљају обележја (познијих) јеврејских гробова, а да су поред тога нађене само у четири претходно опљачкана аварска гроба, где су доспеле приликом пљачке или каснијег засипања рака (Бугарски 2014, 361–389). Након подужег екскурса посвећеног историјским подацима о аварским заробљеницима, писац закључује да међу њима није могло бити довољно занатлија за све израђевине провинцијске културе 7. века које су нађене на простору Каганата. Уочава и разлику у врстама и квалитету налаза са централнобалканског простора и оних

из аварских гробова, имајући у виду и различит контекст (насеља/гробови) и чињеницу да је на нашем простору дуго трајала демографска криза, да би углавном запустео почетком 7. века (Бугарски, Радишић 2016, 91–94). Пошто су градови на северу Италије у то време трпели мању штету, није необично што је добар део – најшире схваћено – византијских налаза пристизао у Каганат са југозапада Европе. Напослетку, Чанад Балинт коригује свој ранији став да су развоју кестхељске културе допринеле придошлице са Балкана (pp. 226–232, n. 1204; *cf*. Vida 2009).

Културни контакти Авара и Западне Европе нису проучени у довољној мери, а огледају се у налазима каквих нема на Балкану или у источноевропским степама. Након што је излистао низ историјски потврђених сусрета Авара и Запада, аутор даје кратак преглед археолошких тумачења, при чему констатује да су одреднице „баварска", „франачка" и „меровиншка" широке и обухватне слично као и „византијска". Уз то, наводи се оцена Фалка Даима да поједини луксузни појасеви из аварског контекста не говоре нужно о етничкој припадности покојника колико о могућој производњи у франачким краљевским радионицама: надовезујући се на то размишљање, Балинт се пита да ли је и ту реч о дипломатским поклонима. Сличности које се показују у репертоару налаза познате некрополе у Линцу, изван аварског простора, нису такве да би их требало тумачити кроз призму аварског или бугарског присуства, па чак не нужно ни баварског преузимања аварских утицаја – могуће је и заједничко порекло појединих облика. Уопште, као што су Авари прихватали струјања са Медитерана, тако су и западноевропска друштва правила сопствене изведенице појасне моде или прихватала поједине елементе медитеранске ношње који се појављују и у области Кестхеља. Кад је пак реч о наоружању западног порекла, постојале су директне везе, а посредни каролиншки утицаји уочени су и на једној посуди из Нађсентмиклоша. Закључено је да су везе са Западном Европом биле мањег опсега него оне с медитеранским светом, мада су јачале током 8. века. Везе се истоком Европе нарочито су разматране у време политичких диктата; налази слични аварским не представљају резултат сеоба већ трговине и културних контаката. Примера ради, широко распрострањени налази типа Martynovka упућују на заједничке корене у византијској провинцијској култури. У том контексту аутор наводи да је у науци „потпуно одбачено" приписивање остава „антских старина" пенковској култури и Антима: међутим, Казански сматра да су Прокопијеви наводи о Антима који су насељавали широк појас између доњег тока Дунава и Дона поткрепљени налазима пенковске грнчарије (Kazanski 2013). Сумирајући дискусију о радионичком пореклу аварске материјалне културе, Балинт не спори могућност да су у Каганату радиле и занатлије са Балкана или из Италије, али највећу важност придаје претрајалим касноантичким традицијама у Панонији 6. и 7. столећа, односно везама са Византијом које су одржавале аварске занатлије у 8. веку (pp. 232–237).

Културни афинитети и потражња представљају тешко сагледиве елементе у формирању и потоњем развоју аварске материјалне културе, будући да се такви утицаји по правилу разматрају засебно, при анализи појединих врста предмета. Из историјских извора знамо, а слично је било и у случају Хуна, да су једину зидану зграду у Каганату подигли византијски мајстори, и то за самог Бајана. Та мода се није примила, као уосталом ни градски живот, о чему речито сведочи напуштање Сирмијума после пожара већ 583. године, само годину дана пошто су га након пуно мука освојили (Mirković 2008, 111). Због тога је и аварски ринг, где год да се налазио, представљао скромну палисадну утврду. С друге стране, Авари су своје културне афинитете изражавали избором ношње и коњске орме. За разлику од обликовања насеља или макар владарских седишта, у том погледу били су знатно испред других изворно номадских група: не само да су имали приступ престижним предлошцима из плена, данка или поклона, већ су развили сопствену материјалну културу, много богатију и технички софистицираниј у од оновремених култура источноевропских степа или Бугарске. Према Балинту, за то је заслужно затечено становништво, пре свега у Панонији, и југозападно и западно суседство.

У наредном одељку (8.3) аутор на веома прихватљив начин заокружује аргументацију о „трансданубијском феномену", уз интересантно запажање да су разлике у материјалној култури које су поједине групе Авара и подређеног становништва донеле из степе биле знатно мање од оних које су се педесетак година касније показале у Трансданубији и Мађарској равници. Писац узроке не тражи у географским или етничким разликама, већ у локалном супстрату – с једне стране романизованом становништву и Лангобардима, а са друге Гепидима и, мало вероватно, Сарматима. Из тога проистиче различито културно и занатско наслеђе двеју територија, које су имале и различито суседство – вибрантан медитерански свет и Франачку, односно запустеле византијске поседе јужно од Саве и Дунава (pp. 237–239). Иако се аутор таквих оцена с правом клони, различити супстрати понешто говоре и о етничким разликама у Каганату. Групе које су заслужније за стварање синтетизоване материјалне културе по аварском укусу у исто време се разликују од других популација у Каганату: чини ми се да најбољи пример представља кестхељска култура. Културни прохтеви Авара на истоку државе, где је било и седиште кагана, били су другачији. Та група Авара свакако није била сиромашнија, они су одржавали везе са Византијом, а своје културне потребе задовољавали су престижном византијском робом и златом. Културна зрачења Византије у том делу Каганата јачају од 8. века, док је материјална култура Трансданубије прихватана у мањој мери. Трећа велика област, Трансилванија, проучена је у мери да дâ увид у основне, описане културне афинитете (pp. 240–241).

Девето поглавље монографије даје *Закључак и историјски модел*. У прва три одељка Чанад Балинт на јасан и вешт начин сабира главне резултате своје потраге, док у кратком четвртом одељку уводи читаоца у *Вишеслојан историјски модел* – своју интерпретацију судбине Каганата у светлу извршених анализа. Опште узев, Авари су били конзервативни. Нису учествовали у главним токовима привреде и трговине и стога нису били изложени акултурацији, док су се колосална средства из данка с временом веома стањила – мада франачки извори спомињу огромну заплену у рингу почетком 9. века (*cf*. Ковачевић 1977, 97). Потпуно другачији је пример Лангобарда у Италији, чија је акултурација била врло успешна и темељна. Без обзира на контакте који су засигурно постојали, Авари су могли да добију знатно више

од непосредне близине два дела византијског света, Балкана и Италије. Брану таквом развоју представљало је наличје „трансданубијског феномена" – аварско вођство у централним деловима Кагната, међуречју Дунава и Тисе, које током два и по века није променило структуру власти (*cf*. Daim 2003, 523). Импулсе које је препознао у материјалној култури Трансданубије Балинт преноси у поље политике. Из писаних извора знамо да су аварски прваци из западних крајева покушавали да се приближе нараслој франачкој сили и да су прихватали хришћанство (*cf*. Ковачевић 1977, 97–98), што, међутим, није спречило избијање рата који је имао погубне последице по Аваре и њихову државу. Аутор верује да је такав сценарио могао да се избегне (pp. 243–251). Након закључка следи екскурс (10) у којем се испитује да ли су гробља Келкед А и В била гепидска или не (Kiss 1996; 2001). Пошто то не потпада под главне теме монографије, неће бити дискутовано на овом месту: закључено је да нема довољно разлога за прихватање гепидске интерпретације Атиле Киша (pp. 253–261). У апендиксима (11) се, уз врло кратке коментаре, наводе категорије дискутованих налаза, који су делом представљени линеарним цртежима (pp. 263–287, Figs 77–82), након чега следи библиографија.

* * *

Чанад Балинт се одважно упустио у ново поље археологије Авара и на томе му треба честитати. У књигу и бројне сепаратне анализе очигледно је уложен изузетан труд, уз велико знање и искуство који су неопходни у оваквим подухватима. Иако је, као што је у уводу најавио, у књизи постављено више питања него што је дато одговора, добијена слика ће сасвим сигурно бити од велике користи истраживачима. Мора се истаћи да је ово прва синтеза која сагледава домете аварске материјалне културе и упливе у њу на читавом аварском простору, и да су приказане регионалне разлике врло инструктивне и зналачки интерпретиране. Главне поставке су солидно утемељене а синтеза ће свакако бити допуњавана. Питање је у којој мери ће будући рад на понекад неадекватним картама дистрибуције мењати поједине закључке: до тога ће свакако доћи, а извесне допуне за јужни део Кагната понуђене су и овом приликом. Стиче се утисак да бисмо потпуно заокружену слику могли да добијемо тек по стварању опште базе података, каква још није доступна: том циљу за сада је најближа база *Montelius* коју деценијама саставља аустријски археолог Петер Штадлер. Базе података захтевају израду јасних тезауруса. Пошто је универзални језик информатике у данашњем свету енглески, то би значило да би сви појмови који би се уносили и претраживали морали да буду уједначени до најситнијег детаља. Чини ми се да би се то најлакше постигло ако би се као технички термини користили они који су направљени за серију *Cemeteries of the Avar Period (567–829) in Hungary* (Garam *et al*. 1975; Kiss 1977), на шта је још пре две деценије упућивао Атила Киш (Kiss 1998, 251).

На исти начин, требало би јасније омеђити културне регије аварске државе, одредити их према географском значењу истих одредница и дословно се придржавати дефинисаних синтагми. Такође, ако је то икако могуће, ваљало би да будућа истраживања прецизније профилишу појмове из домена „касноантичке", „византијске", „римске", „италијанске" или „провинцијске" материјалне културе, можда према поставци Оршоје Хајнрих-Тамаске и Данијела Сирбеа (Heinrich-Tamáska, Syrbe 2016). Последње напомене, наравно, нипошто не значе да обавештен читалац не може да проникне у разматрања у монографији Чанада Балинта, већ представљају размишљање о једној могућој употреби његове синтезе – надградњи успешног модела која би могла да дâ одговор на још нека истраживачка питања. У сваком случају, књигу ваља примити с великом пажњом, а на будуће развоје треба гледати са оптимизмом, имајући у виду актуелне радове бројних колега чија су остварења често цитирана у монографији. Представљено дело и, уверен сам, будуће студије Чанада Балинта свакако ће имати важну улогу у даљем брушењу културне слике Аварског кагната и суседних области.

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КРИТИКЕ И ПРИКАЗИ – COMPTES RENDUS

Denitsa Nenova, Late Bronze Age social Landscapes of the Southeast Balkans:
A spatial analysis of local ceramics and site distribution,
BAR International series XXXX/2019,
Монографија представља PhD тезу одбрањену на University College of London
(121 илустративни прилог: 13 мапа, 8 мапа дистрибуције локалитета, 26 табела и 28 табли са налазима)

Просторна анализа насељавања територије југоисточног Балкана (Тракије) током позног бронзаног доба, што је заправо суштина монографије Д. Ненове која је пред нама, представља још један начин у комбиновању културно-историјске методе у археологији и информатичке технологије које нам омогућавају *географски информациони системи*, нарочито АрхГИС. Проблеме везане за област Тракије, данас подељену између Бугарске, Турске и Грчке, земљама за које се не може рећи да су у савременој историји имале пријатељске односе, не представљају само политичке поделе, већ и неравномеран степен археолошке истражености ове регије. Политичке разлике које су постојале између ове три балканске земље и честе измене граница, великим делом током XX века, условиле су и извесна ограничења у археолошким истраживањима. С обзиром на чињеницу да савремене политичке поделе сигурно немају основе у праисторијским друштвеним околностима, циљ овог рада је да се проблему изучавања касног бронзаног доба у Тракији приђе не само из контекстуалне већ и географске перспективе. Такође, увек ће постојати разлика у приступима археолошких школа (као и знатне језичке баријере) трију поменутих земаља, са свим геополитичким тенденцијама које су доминирале археологијом XX века, а због чега су многи археолози ушли у замку националних и државних политика.

На месту где се сусрећу Европа и Азија током бронзаног доба није забележен исти развој култура, као на простору данашње Бугарске где је констатована извесна културна цензура и депопулација, највероватније изазвана климатским променама. То није био случај у свету Егеје и Анадолије, које су у прошлости имале утицај на ову територију. Може се рећи да је у позно бронзано доба на територији Бугарске констатовано више локалитета него у турском и грчком делу Тракије, што је последица неравномерног степена истражености територија двеју држава, а у случају Грчке може се рећи да су телска насеља боље истражена од равничарских. Док су поједини аутори Тракију везивали за медитеранску зону утицаја, а понеки је пак сматрали подручјем које се развијало под јаким утицајем Троје, неки су је, руководећи се лингвистичким и културно-етничким везама, повезивали са Македонијом. У европској археологији Тракија је често сврставана у периферију и Балкана и Егеје.

Монографија Ненове представља користан рад за археологе који се баве просторним анализама и обрасцима насељавања у праисторији, будући да указује на начин на који микрорегионалне карактеристике утичу на те процесе. За презентовани метод је од изузетне важности да се прецизно дефинишу фактори окружења како би се добио алгоритам који показује како дистрибуцију насеља у локалу, тако и релативну густину локалитета у оквиру микрорегије. Ненова се такође ослања на резултате радиокарбон апсолутних датума, којима се прецизно хронолошки детерминише појава керамике украшене урезивањем као и порекло локалних традиција израде керамике, који се могу пратити од последње етапе средњег и две наредне фазе позног бронзаног доба Тракије. Методолошки приступ доприноси доприноси бољем погледу на мобилност популација у одређеном простору као и могућих еквилибријума са мобилне на седентарну економију. Једно поглавље у монографији посвећено је историји

археолошких истраживања праисторијских локалитета на подручју Тракије, што ће бити корисно за археологе који се баве истим периодом и на нашим просторима.

Ненова полази од три основна истраживачка питања: прво које се односи на главне културне карактеристике позног бронзаног доба кроз призму материјалне културе и кроз обрасце насељавања и сахрањивања, друго, проблемско питање представља хронологија, док је треће парадигма регионалних веза и социјално-економске интеграције унутар региона. У поглављу о променама и идентитету ауторка дефинише одређене културне карактеристике заједница позног бронзаног доба, стављајући у средиште пажње просторне варијанте насељавања и присуство керамике, те тако покушава да реконструише природу културних промена. У расправи су обухваћени и теоријски аспекти културних модела, демографије, интеракције земљорадника и сточара, миграције итд. Климатске промене су препознате као окидач за промене у материјалној култури, економији и политичком систему. Познато је да су климатске промене у IV миленијуму пре н. е. довеле до депопулације Балкана, с једне стране, и демографски раст у Алпској зони, с друге. Што се тиче бронзаног доба, постоје претпоставке да је највећи водостај у светским океанима наступио у виду мегапоплава које су уздрмале центре моћи у Медитерану између 1315. и 1050. године пре н. е. Периоду којем је предходио „метални шок", дошло је до повећања производње предмета од бронзе, утицао је на динамику повећања размене сировина, металуршких технологија и заната који су са Блиског истока, преко Анадолије, продирали у Европу. Тај се процес манифестује кроз продукцију калајне бронзе и све већим растом фрагментованих предмета у оставама, који управо и почиње око 1600. године пре н.е., истовремено са формирањем Urnenfelder култура на простору Карпатског басена. Ауторка сматра да миграционе теорије више немају основе у археолошким записима, а ако су миграције и постојале, њих представљају померања мањих група људи, будући да оне у нову средину нису доносиле материјалну културу у оном облику у којем се манифестовала у свом матичном подручју. Као потврду за ово мишљење наводи да у људској историји није позната појава тоталне размене становништва. Такође, постоје докази о томе да је материјална култура у новим срединама хронолошки млађа од исте која се налазила у постојбини.

У поглављу „Културна археологија или археологија културе" ауторка расправља о концепту културно-историјске археологије који укључује материјалну културу, начине насељавања и сахрањивања као и одређене погребне ритуале који се упражњавају унутар праисторијских заједница. Мане „археологије културе" представљају поистовећивања са етницитетима, племенима и друштвима, што није погодно да се користи на примерима друштава без државне организације, а у циљу разумевања степена социјалних разлика. Због тога Ненова керамичку продукцију представља као „изабрани медијум" за проучавање технолошких система, начина опстанка и друштвене интеракције у касном бронзаном добу Тракије. Она сматра да је керамика присутна у друштвеним процесима, те прати њено кретање као технолошки одређен и индивидуални објекат који служи за складиштење хране или једноставно за уживање у њој. Керамика је подложна променама и иновацијама кроз дуг период, а разлике у стилу и декорисању упућују на локалну или страну продукцију, колективни идентитет, традицију, стил и друштвена ограничења. Питања културне екологије објашњава чињеницом да су људи и простор међусобно повезани. Од 90-их година прошлог века археолошки регионализам подстакнут је развојем информационих технологија, нарочито *географских информационих сиситема* који својим апликацијама и археолошким алатима омогућавају другачији приступ питањима као што су културне промене, дистрибуција или дифузије идеја, као и културној еволуцији.

У поглављу о „Подацима и методама" Ненова наглашава да се у својим истраживањима ослањала на две групе података. Прву групу података представља керамика касног бронзаног доба са краја II миленијума пре н. е., а другу групу чине локалитети, насеља, некрополе и светилишта. Док је керамика сређена по стилским и типолошким категоријама (нпр. кухињска и стона керамика), друга група података развија се на основу дистрибуције и просторно осетљивих типова локалитета. Класификација и типологија друге групе података заснивају се на истраживачким питањима која су везана за простор, карактер, функцију и технолошке индикаторе. Укупан број керамичких јединица ауторка је са 20.000 свела на 3094 јединице које припадају касном бронзаном добу. Анализа ових података подразумева идентификацију типова у оквиру географског простора путем формирања кластера који одговарају одређеним облицима. Тиме је добијен како растер просторних варијаната за сваки од типова тако и њихов међусобни однос у оквиру категорија. У сврху систематизације и дистрибуције неодговарајућих типова Ненова користи Рендом Форест методу класификације (стабло које се грана), коју је додатно развио Л. Брејман. С друге стране, она сматра да локалитете дефинише не само присуство него и одсуство археолошког материјала у појединим случајевима. Осим оних стандардних типова насеља, обухваћена су и ритуална места и некрополе. У тоталу књига пред нама обухвата укупно 251 локалитет из Бугарске и 110 локалитета из североисточне Грчке, од којих су 222 насеља, 42 некрополе и 36 „светилишта", тачније, само оних локалитета који су публиковани. Локалитети касног бронзаног доба на територије Турске током последњих деценија су знатно више археолошки истраживани, али су остали непубликовани, те тако нису укључени у овај број. У североисточној Грчкој публиковани су једино вишеслојни локалитети, док се о оним једнослојним мање зна. Захваљујући изради археолошке карте Бугарске, источни Родопи и долина Струме боље су документовани од осталих регија. У методологији анализа Ненова наводи да не постоји идеална скала за квантификацију резултата, а срж њених истраживања представља упоређивање односа између две или три одабране скале. На почетку истраживања било је важно одговорити на питања: како дефинисати погодне скале, како се мењају резултати и како се извршава мерење на правој скали?

Као што смо већ нагласили, у фокусу истраживања ове студије налазе се географске локације, функционалне интерпретације и присуство више културних хоризоната на локалитетима. Локалитети су подељени на насеља, некрополе и светилишта (која у Бугарској претежно представљају стенске структуре у степском пејзажу без континуиране окупације, али са присуством керамике). У мањем броју заступљена су пећинска станишта, рудници и утврђења заштићена

каменим бедемима. База података обухвата карактер локалитета, њихову просторну дистрибуцију и њихове разлике у оквиру региона као и недостатке у археолошкој евиденцији. За добар резултат кључан је одабир одговарајуће скале и осетљивост података које садржи. Највећи утицај на насељавање простора свакако имају комуникације и доступност пијаће воде и ресурса. Место на којем ће настати неко насеље не одређују само економске потребе, а обрадива земља није увек поуздан податак за анализу – будући да је простор већ могао бити окупиран од стране других заједница, док рудни и минерални депозити имају ограничено трајање. У прилог томе је у истраживању овога типа важно укључити и геолошке експертизе наводи се претпоставка да је између XIV и XII века пре н.е., можда, дошло и до знатних промена пејзажа које је могао изазвати неки велики земљотрес, када су се створили бројни меандри и лагуне у Горњој Тракији и у сливу Марице и Струме. Ненова на основу географских параметара издваја четири основне географске зоне: Горњотракијску равницу, Родопске планине, долину Струме и северноегејско залеђе Халкидикија.

Што се тиче насеља, Ненова их класификује на групе телова или природних узвишења (тумбе) – којих има 76 и од којих највећи број припада мултикултурним насељима. Другу групу представљају насеља у равници са највише две или три фазе насељавања, а трећу групу насеља чине она са архитектуром прилагођеном стенској подлози. Студија указује како се отворена насеља чешће јављају у источном делу Горње тракијске равнице, док су телска насеља концентрисана како у Горњој Тракији тако и у горњем и средњем току Струме. Седентарне као и номадске заједнице првенствено зависе од приступа води за пиће и природних узвишења, док заједнице са специфичним економским потребама зависе од извора сировинама и комуникацијама. Ненова закључује да, у складу с локацијама у Горњој тракијској равници, насеља показују тежњу ка дугорочнијој пољопривредној производњи, док у Источним Родопима настају претежно сезонска насеља са пасторалном економијом или пољопривредом мањег обима, али се јављају и специјализована насеља као што је Ада Тепе (рударство). Израда „предиктив модела" насељавања упућује на географске и природне факторе који утичу на густину насеља у микрорегијама.

Некрополе су подељене на основу начина сахрањивања, односно инхумације или кремације, у равним некрополама са укопаним ракама, под тумулима или у групи тумула, од којих су најбројнији они типа кургана. У погребном ритуалу касног бронзаног доба преовладавају кремације, док су инхумације веома ретке. У неким случајевима гроб штите формације долмена, које су највише пљачкане током времена и самим тим дискутабилне за анализу. У Западним Родопима тумули су богатији металним прилозима него у осталим подручјима, и на том простору почетком раног гвозденог доба долази до промене ритуала, односно почиње да се упражњава скелетно сахрањивање покојника. У Горњој Тракији током позног бронзаног доба у погребном ритуалу доминира скелетно сахрањивање, а крајем касног бронзаног доба прелази се на кремације и сахрањивање у урнама које на себи имају декорацију у виду пластично моделованих протома. Такође, наводи се и претпоставка да су трачке мегалитске традиције могле настати под утицајима долмена из касног бронзаног доба.

Класификацијом географских података, поткрепљеним археолошким записима, Ненова у првој фази истраживања издваја девет постојећих региона: 1. Горњотракијска равница, 2. Цела зона Горњотракијске равнице, 3. Родопске планине, 4. Западни Родопи, 5. Источни Родопи, 6. Источни Родопи и Сахар, 7. Западна Тракија и залеђе северне Грчке, 8. Горња и средња долина Струмице, 9. Централна Македонија и Халкидики. Од наведених региона Источни Родопи се издвајају као најбоље истражена територија, са највише констатованих локалитета и рудника (Ада Тепе).

У поглављима „О карактеристикама керамике касног бронзаног доба" и „О регионалним образцима и ревизији хронологије" Ненова нас упућује у типологију керамике, с посебним освртом на њено украшавање. На овом месту она расправља и о технолошким разликама између керамике рађене ручно и оне рађене на витлу. Истраживања се највише ослањају на локалну керамику, коју карактеришу морфолошке и технолошке особености, субјективизиране кроз просторне анализе и мапе дистрибуције у простору. Ауторка сматра да се урезани орнамент на керамици јавља током XVI века пре н. е., односно да долази из централне Македоније и коегзистира са локалном burnish и неукрашеном керамиком. Овакав начин украшавања свој врхунац доживљава у касном XIV веку пре н. е. Ненова се затим осврће на методологију стварања базе података која повезује просторну анализу локалитета са преовладавајућом керамиком. Критички се осврће на различиту терминологију култура или група које су дефинисали археолози у XX веку. Резултате илуструје мапама дистрибуције керамике у простору, са растерима заступљености керамичких типова и декоративних техника. Она ревидира постојеће хронологије користећи нове радиокарбон апсолутне датуме и дефинише утицаје суседних региона на развој култура у Тракији. Овако и на једном месту презентовани, апсолутни датуми указују на континуитет живота на простору којим се студија бави.

У последњем поглављу у монографији ауторка нам, као крајњи резултат анализе, представља пет географских микрозона или кластера, који показују извесно јединство у керамичкој продукцији и њеној дистрибуцији. Њих представљају Источни Родопи и Сахар, Западни Родопи, Горњотракијска равница, Долина Струме и Западна Тракија са северноегејским залеђем. Истражујући керамику и локалитете, Ненова на првом месту редефинише основне до сада познате културне карактеристике касног бронзаног доба, а такође јасно дефинише и типове насеља и сахрањивања. У осврту на настанак и развој традиција касног бронзаног доба у Тракији као и степен трансформације регионалног развоја заједница, Ненова на крају врши евалуацију како природе интеррегионалних прожимања тако и промена у материјалној култури с краја средњег и током касног бронзаног доба у Тракији. Ове промене аутор тумачи мобилношћу заједница и прелазом на пољопривредну производњу у мањем обиму.

Свакако препоручујемо монографију Денице Ненове као корисну литературу за све колеге који у фокусу истраживања имају пејзажну археологију и утицаје географских карактеристика на формирање култура у праисторији.

Александар КАПУРАН

J. Macháček, M. Wihoda (eds.), The Fall of Great Moravia:
Who was Buried in Grave H153 at Pohansko near Břeclav?,
East Central and Eastern Europe in the Middle Ages, 450–1450, vol. 54 (eds. F. Curta, D. Zupka);
Leiden–Boston: Brill 2019, 253 стране са илустрацијама

Књига занимљивог наслова – *Пад Велике Моравске: ко је сахрањен у гробу H153 у Поханском код Брецлава?* – педесет четврта је по реду публикација из плодне Брилове едиције „Источно-централна и источна Европа, 450–1450", где се са становишта различитих дисциплина (археологије, историје, историје уметности, архитектуре, лингвистике) осветљавају сегменти средњовековне прошлости великог дела европског континента. Штампана на енглеском језику, Брилова издања доприносе превазилажењу језичких баријера и упознају ширу публику са резултатима друштвених и хуманистичких наука у Пољској, Чешкој, Мађарској, Румунији, Русији, Хрватској, Словенији, Бугарској (и даље нема публикација са темама из данашње Србије). Посебно место у споменутој едицији припада средњовековним темама из чешких земаља – Моравије и Бохемије. Из увида у број и садржај објављених публикација стиче се веома позитивна оцена о дометима савремене чешке медиевистике.[1]

Пред нама је књига посвећена западнословенској кнежевини Великој Моравској, али не периоду њеног политичког узлета, већ последњој етапи функционисања на концу 9. и почетку 10. века. Описује се улога владарске династије Мојмирида и природа моравског кнежевства пред изненадни нестанак са историјске позорнице, који се, поред других чинилаца, доводи у везу и са напредовањем Мађара ка Западу. Централни мотив књиге чини недавно откривен ктиторски гроб (H153) у цркви на локалитету Поханско код Брецлава у југоисточној Чешкој, око кога су постављена питања везана за успон словенских елита. Уредници издања Јиржи Махачек и Мартин Вихода, са Масариковог универзитета у Брну, окупили су неколико медиевиста из Чешке и Аустрије који у својим прилозима разматрају догађаје и феномене везане за великоморавско друштво и његово непосредно окружење. Публикација се састоји од предговора, осам поглавља, списка библиографије и индекса појмова, а опремљена је мањим бројем историјско-географских карата и археолошких илустрација.

Поглавља су груписана у добро осмишљеном распореду и чине заокружену целину. Тако се читалац најпре упознаје са околностима открића поханске цркве и антрополошким одликама гроба H153 које упућују на претпоставку да се ради о особи високог друштвеног положаја. Потом се описује историјска слика регије, поткрепљена необично бројним латинским изворима, са акцентом на међусобним политичким односима између Велике Моравске, источне Франачке и Мађара (друго, треће и четврто поглавље). У другој половини књиге разматрају се поједини друштвени и културни феномени (пето, шесто и седмо поглавље) који воде ка закључном одељку где се сумирају подаци о значају поханског открића у ширем културном и историјском контексту. Намера уредника је била да ово откриће подстакне ширу расправу, што је и постигнуто. Аутори су понудили различита гледишта на неколико кључних питања везаних за разматрану епоху – степен самосталности Великоморавске кнежевине у односу на Франачку, опстанак великоморавских традиција кроз 10. столеће, интензитет и улога мађарског присуства у централноевропским регијама и др.

Претпоставка је да се у Поханском налазила једна од владарских резиденција моравских кнежева, поред оних најважнијих у Микулчицама и Старом Месту. Током вишедеценијских истраживања на локалитету су откривени утврђени центар са резиденцијалним и другим грађевинама и две цркве са некрополама. Најистакнутије место у резиденцијалном комплексу припада тзв. Великом двору, намењеном члановима владарске породице и администрацији, који према концепту наликује на дворове каролиншко-отонског круга (pfalzes). Велика тробродна црква у оквиру утврђења откривена је 1959. године, а друга, мања кружна црква-ротонда у североисточном предграђу – пола века касније, 2008. године.

У почетном поглављу *The Great Moravian Rotunda at Pohansko and an Osteobiographical Profile of Its Founder* (стр. 1–38) руководилац истраживања Јиржи Махачек и антрополог Владимир Сладек описују околности и методологију открића поханске ротонде. Црква, саграђена у комбинацији дрвета и камена, дужине је тек нешто више од осам метара. Око ње се развијало екстензивно гробље чије је време употребе, на основу гробних налаза и радиокарбонског датовања скелетног материјала, одређено у распону од 880. до 970. године. Стратиграфским запажањима је утврђено да је црква подигнута непосредно пре почетка сахрањивања и да је функционисала истовремено са гробљем.[2]

У ротонди је документовано пет гробова. На главној оси, у самом средишту, откривен је гроб H153, ограђен каменом и без гробних прилога, који је очуван у веома добром стању (фотографија гроба након чишћења налази се на корицама књиге). Детаљном остеолошком и палеопатолошком анализом скелетних остатака прецизно су реконструисане телесне одлике индивидуе. Мушкарац, стар 60 година и изузетно крупне грађе (висина 1,85 m и тежина 93 kg), представљао је, сасвим извесно, необичну појаву у свом окружењу. Није био изложен већим физичким напорима и, упркос одређеним здравственим сметњама, омогућен му је угодан живот, уз квалитетну исхрану базирану на животињским протеинима и употреби рибе. Конзумација рибе доводи се у везу са праксом поста, што доприноси утиску о дубокој побожности мушкарца сахрањеног у цркви. Остала је необјашњена ситуација везана за неприродан положај лобање и недостатак неколико вратних пршљенова, при чему су исказане две претпоставке – да је након смрти глава била одвојена од тела (декапитација?) и потом враћена у приближан анатомски положај, или да је активност глодара у земљи довела до поремећаја. Аутори нису дали коначно тумачење јер недостају одговарајући трагови на костима базе лобање.

Физичке одлике мушкарца у гробу H153 и истакнуто место његове сахране упутили су ауторе на претпоставку да је реч о особи посебног статуса – оснивачу цркве. Предвиђеним ДНК анализама биће проверено да ли су поред њега сахрањени чланови уже породице.

На једном месту у књизи наводи се да је Велика Моравска у очима франачких аналиста сматрана интегралним, али дивљим делом франачке империје, јер су моравски кнежеви упорним побунама настојали да изборе независност. Најистуренија област Франачке према немирном суседу налазила се у данашњем аустријском Подунављу; то је баварска префектура Ostland (источно од реке Траун). Аустријски историчар Роман Цетмајер, у прилогу *The Austrian Danube Region in the Decades Around 900* (стр. 39–61), најпре објашњава комплексну етничку слику региона, сачињену од Словена, мешавине Баваараца и других народа германског говорног подручја, као и преосталих Авара. Удаљеност од средишта Царства омогућила је високу самосталност тамошњег племства и црквених поглавара, о чијем деловању постоје прилично детаљни извештаји у изворној грађи. Једна од најмоћнијих била је породица Вилхелминера која је поседовала сопствено седиште са двором (domus) и личну војску сачињену од зависних вазала. Поред тога што је било у сукобу са Морављанима, источнофраначко племство је и посредовало у трговачким контактима између Велике Моравске и Баварске.

У посебним одељцима поглавља описују се околности под којима је аустријско Подунавље дочекало Мађаре. Они су успели да наметну утицај источно од реке Енс после тријумфа над баварском војском код Братиславе 907. године, али је извесно да се ту нису трајно (и масовно) населили. Мађари су успоставили неколико важнијих пунктова, међу којима су и неке римске тврђаве, одакле су организовали даље експедиције. И поред немирних дешавања, на многим насељима је потврђен континуитет живота, док се од средине 10. столећа формирају тзв. мешовита гробља са домаћом и номадском компонентом (при чему се помишља на то да су локални становници прихватали мађарске тековине, а не обратно). Франачка је повратила територије источно од Енса тријумфом саксонске војске над Мађарима 955. године код Лехфелда, али има индиција да је на том простору током читаве прве половине 10. столећа постојао известан континуитет франачке управе и администрације.

Мађарске провале по средњој Европи довеле су до прекида трговачких веза са Медитераном, што се огледа у наглом осиромашењу великоморавске материјалне културе. Треће поглавље књиге – *The Magyars and Their Contribution to the Collapse and Fall of Great Moravia: Allies, Neighbours, Enemies* (стр. 62–93), аутора Павела Коуржила, пружа најпре преглед догађаја везаних за померање Мађара из црноморских области ка Карпатској котлини где су се трајно населили, а затим описе њихових сукоба са суседним Морављанима. Није поуздано утврђено када и како се догодио коначан крах кнежевства, премда се у новијим истраживањима година 906. истиче као кључна (Моравија се последњи пут у изворима под тим именом спомиње 904/905. године).

Археолошки подаци недвосмислено упућују на прекретницу у региону. Међутим, уочавају се извесне микрорегионалне разлике у погледу гашења утврђених центара. У Моравији и другим чешким областима (Бохемија) нису посведочена јасна раномађарска гробља као у југозападној Словачкој где је насељен део источних придошлица, али се прати одређено присуство номадских елемената.

Значајнија страдања од мађарских упада претрпела су, изгледа, само појединa насеља у јужној Моравској, док се на северу прати континуитет живота. Поуздано је установљен драматичан крај Микулчица, где се по свој прилици налазила главна кнежевска резиденција са ризницом. У снажним слојевима пожара с почетка 10. века евидентирано је више десетина номадских стрела, које се, уз још неке елементе попут накрсница сабљи и делова појасних гарнитура, с великом вероватноћом могу повезати с Мађарима. Изгледа да је тај моравски центар био препуштен судбини, будући да нису евидентирани трагови одбране. С друге стране, у Поханском није установљено драматично страдање насеља, већ је оно поступно замирало. Дугогодишња истраживања значајног комплекса у Старом Месту (Staré Město–Uherské Hradiště) такође нису донела податке о поузданим траговима рушења, а насеље је наставило да живи и с временом је рурализовано. Налазишта у региону Оломоуца у северној Моравској показују континуитет трајања током читавог 10. столећа, уз појаву одређених номадских елемената (за разлику од елемената наоружања и опреме, довођење појединих керамичких облика са Мађарима је упитно). Појава предмета мађарског порекла у утврђеним центрима у Бохемији објашњава се заједничким акцијама Бохемљана и Мађара у суседну Саксонију.

Следи занимљива расправа о судбини последњих историјски познатих чланова великоморавске династије Мојмира II и Сватоплука II. У почетном делу поглавља *The Second Life of the Mojmirid Dukes* (стр. 94–109) Мартин Вихода реконструише успон Мојмирида током друге половине 9. века, описујући комплексне везе са франачким и баварским племством. Мојмириди су према политичким и културним обрасцима донекле подсећали на франачке владарске династије, али ипак нису достигли ниво друштвене структуре европског Запада. Имали су економску моћ, развијене трговачке контакте, богатство у племенитим металима и наоружању, а нису ковали сопствени новац. Посебно место у овом прилогу посвећено је преиспитивању култа владарске породице у Великоморавској кнежевини и њеном односу према друштвеној елити. Напослетку су изнети нови закључци о претрајавању чланова мојмиридске династије током 10. века путем родбинских и других веза са центрима у Баварији, западној Панонији и Карантанији.

У наредна два дела књиге размотрена су питања везана за концепт ширења хришћанства и подизања цркава у контексту успона словенских елита. Историчар Давид Калхоус, у поглављу под називом *Graves, Churches, Culture and Texts: The Processes of Christianisation in the Early Middle Ages and Their Social and Cultural Context* (стр. 110–129), најпре даје шири преглед о односима црквених власти и покрштаваних заједница у раносредњовековној Европи, а затим разматра ширење концепта приватних – задужбинских цркава (proprietary churches) из Франачке. Аутор упозорава на методолошке тешкоће с којима се сусрећу истраживачи приликом одређивања границе између паганских и хришћанских обичаја у гробним контекстима. Црква је изричито забрањивала једино праксу спаљивања покојника, док се према количини гробних налаза не може пратити степен покрштавања

Словена (о томе управо сведоче гробови опремљени наоружањем и другим прилозима уз велокоморавске цркве). Коначан циљ цркве био је да се разједини племенски систем и искорене локални култови који су држали словенске групе окупљене око заједничког идентитета, а преиначавање погребних обичаја одраз је ширих друштвених промена.

Премда нема јасних историјских података о ранијем покрштавању моравских Словена, сматра се да су они имали контакта са франачким мисионарима и пре званичног покрштавања 831. године. Уз подсећање на политичке разлоге који су довели до краткотрајног деловања византијских мисионара Ћирила и Методија у Моравској, потцртана је чињеница о дубоко укорењеном латинском хришћанству, из кога је управо и усвојена пракса подизања задужбинских цркава на приватним поседима. Објашњено је да се порекло тог обичаја може препознати у приватним паганским светилиштима из германског круга. Иако су биле грађене средствима имућних појединаца, цркве нису представљале личну својину, већ су биле у надлежности цркве и имале су вишезначну улогу (пасторалну, меморијалну и статусну).

Великоморавске цркве су везане за веће утврђена средишта (Микулчице, Старо Место, Поханско) и у њима је сахрањивање ретко документовано. Будући да је таква пракса ипак била строго регулисана од стране цркве, резервисана за свештенике и високо моралне људе, поставља се питање каквог је ранга била особа што је сахрањена у поханској ротонди. На основу досадашњих истраживања тешко је проникнути у хијерархију ондашњих друштвених елита. Међутим, извесно је да је у Великоморавској кнежевини био успостављен систем наслеђивања високог друштвеног статуса, што се најбоље очитава у пракси богато опремљених дечјих гробова. Аутор напослетку сматра да се известан легитимитет моравске династије и њених елита у региону одржао и након краха саме кнежевине.

У прилогу Стефана Ајхерта (*"Founder Tombs" in Early Medieval Carantania: A Survey*, стр. 130–150) дат је занимљив осврт на најраније сахране средњовековних елита у аустријском делу Карантаније, данашње Корушке. Ова област, насељена алпским Словенима, по многим аспектима била је слична Моравској, с тим што су њени житељи усвојили франачки политички идентитет и хришћанство нешто раније, већ у 8. столећу. Аутор наводи две групе археолошких феномена који упућују на истицање друштвеног положаја у пракси сахрањивања. Једну чине гробови секундарно укопани на праисторијским тумулима, са појасном опремом и наоружањем с краја 7. и из 8. столећа, који се јасно истичу на некрополама у односу на друге (равне) гробове без налаза. Другу групу представљају трагови задужбинских цркава чији се темељи нису очували до данашњих дана, али на њихово постојање упућују делови пластике, надгробних плоча и црквеног мобилијара, из секундарних контекста. Примера ради, фрагмент архитрава са натписом Otker Radozlav, који се према морфолошким одликама датује око 800. године, доводи се у везу са оснивачем цркве, несумњиво словенског порекла. За сада нема поузданих археолошких потврда о реупотреби ранохришћанских цркава у овом региону.

Намера Ива Штефана, аутора следећег прилога, јесте да се преиспита традиционално гледиште према коме је Бохемија сматрана наследницом моравских тековина у 9. и 10. столећу (*Great Moravia, the Beginnings of Přemyslid Bohemia and the Problem of Cultural Change*, стр. 151–186). Након краћег историјата истраживања теме и географских одлика региона, аналитички се објашњавају сличности и разлике у функционисању „секундарних држава" Моравије и Бохемије као и њихових владарских династија Мојмирида и Пшемиславића. Иако су обе територије биле под непосредним зрачењем франачког културног круга, примећују се различите матрице у друштвеној структури, организацији насеља, економији, погребним обичајима и црквеној архитектури. Највише сличности испољено је у сфери модних утицаја (накит, делови одеће) и избору наоружања. За разлику од Моравије, у Бохемији 9. столећа није било централизације власти. Писани извори, као и бројни утврђени центри указују на постојање бохемијских обласних господара, али није јасно како су они појединачно владали над својим територијама.

Закључак И. Штефана је да се у Бохемији може рачунати на известан моравски утицај само током неколико последњих деценија 9. столећа, док геополитичка слика прве половине 10. века није била промењена услед мађарских освајања. Како у раним легендама о пшемиславићкој династији нема помена о великоморавској епохи, изражава се сумња да је моравска елита нашла уточиште у северном суседству (contra: прилог П. Коуржила, стр. 89–93).

На последњим страницама књиге Ј. Махачек закључује издање на најбољи могући начин (*Conclusion: Who Was the Man Buried in Grave H153 in Pohansko and What Happened to Him and His Family at the end of Great Moravia?*, стр. 187–202). Уз понављање појединих чињеница из уводног дела аутор даје коначно објашњење о значају открића поханске цркве и „открива" ближи идентитет особе сахрањене у њеном средишту. Мушкарац сахрањен у гробу H153 био је хришћанин, имућни магнат који је имао могућности да изгради цркву на свом приватном поседу, а који је, можда, обављао функцију чувара поханског замка или био члан кнежеве пратње. Његова резиденција је откривена у новијим истраживањима локалитета и то у непосредној близини цркве где је сахрањен. Уз монументалну грађевину, која је највероватније била његово седиште, откривени су и пратећи објекти, радионице, ризница гвозденог алата, као и појединi предмети материјалне културе који одају висок положај власника тог комплекса. Економски независна имања попут овог примера у Поханском до сада нису била поуздано утврђена на раносредњовековним налазиштима у Чешкој.

Време тензија између старијег друштвеног поретка и новог, у настанку, уз акумулацију богатства и раст моћи појединаца, довело је и до брзог нестанка великоморавског друштва. Иако економски снажно, оно није било довољно организовано да се одупре изазовима нових околности. Сукоби између Сватоплукових наследника, напредовања Мађара и обустављање прилива стране робе и извора металних сировина, довели су до брзог колапса словенске кнежевине у срцу Европе. Уза све наведено, утицаја су имале и климатске промене. На неким локалитетима евидентирани су моћни наноси поплава који су узроковали напуштања насеља.

Приводећи закључак књиге крају, аутор размишља о судбини чланова породице истакнуте личности сахрањене у ротонди – да ли су избегли у суседство или су у сасвим новим условима наставили скроман живот у домовини, под претпоставком да је у јужној Моравији био успостављен мир плаћањем данка Мађарима? Последњих деценија 10. века у

региону се поново успоставља трговачки промет Дунавом. На око 1,5 km удаљености од напуштеног комплекса у Поханском основано је ново насеље, где су археолошки евидентирани тргови који упућују на трговину са удаљеним регијама и на присуство богатијег друштвеног слоја. J. Махачек помишља на могућност да су наследници великашке породице, која је некада имала своје приватно имање, настојали да поврате моћ у региону успостављањем једног таквог новог средишта. Према историјском следу догађаја, Моравска је краткотрајно интегрисана у састав Пољске крајем 10. и почетком 11. века и напослетку – од двадесетих година 11. века – трајно је прикључена Бохемији.

* * *

Књига *Пад Велике Моравске: ко је сахрањен у гробу H153 у Поханском код Брецлава?* на најбољи начин показује како се интердисциплинарним приступом добијају потпунија сазнања о археолошким открићима. Она представља методолошки добро конципирано и занимљиво дело у коме је, укрштањем археолошких, антрополошких и историјских података, на сликовит начин приказано функционисање једног друштва (и његових појединаца) у кратком сегменту средњовековне прошлости. Значајан напредак у археологији Западних Словена пружа подстицај за истраживања у другим словенским срединама, као што је централни Балкан, где се располаже ретким поуздано документованим контекстима из раздобља 9. и раног 10. века. Поједине групе случајних или недовољно стратифицираних налаза, међутим, одају доста сличности са великоморавском материјалном културом, те се намеће питање о природи контаката балканских и моравских Словена.[3] Овој теми вреди посветити посебну пажњу у будућим истраживањима.

У ширем контексту допринос књиге лежи у темељнијем сагледавању веза Морављана са франачким светом путем преузимања културних и друштвених образаца, као што је пракса подизања цркава на приватним поседима. Проучавањем раније пренебрегнутих латинских извора данашњи стручњаци настоје да што јасније сагледају место и улогу Велике Моравске у историји средње Европе. Такође, истакли бисмо пажљиво и критичко разматрање мађарског утицаја у контексту краха Великоморавске кнежевине, уз објективно сагледавање и других чинилаца. Изложена тумачења бацају нешто другачије светло на целокупну слику о деловању Мађара у Европи, којима је, чини се, углавном припадало неславно место у историографији словенских земаља из њиховог окружења. Оно што је свакако најбоља препорука овој књизи јесте то да се кроз сва њена поглавља читалац подстиче на дубља промишљања о коментарисаним догађајима и феноменима.

Милица РАДИШИЋ

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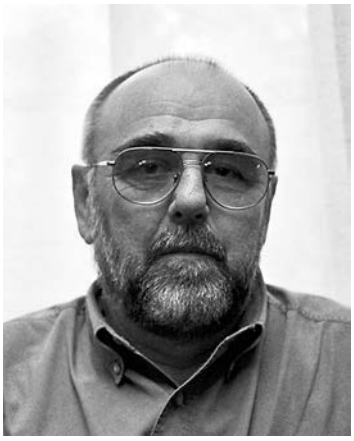
[1] Списак наслова налази се на: https://brill.com/view/serial/ECEE (приступљено 15. 12. 2019.)

[2] Резултати истраживања су интегрално публиковани у посебној публикацији: J. Macháček, P. Dresler, R. Přichystalová, V. Sládek, *Břeclav–Pohansko VII. Kostelní pohřebiště na Severovýchodním předhradí*, Brno 2016.

[3] М. Радишић, Археолошки показатељи веза између словенских култура српског Подунавља и Велике Моравске, *Свет средњовековних утврђења, градова и манастира. Омаж Марку Поповићу* (ур. В. Иванишевић, В. Бикић, И. Бугарски), Београд 2020, 309–327.



МАРКО ПОПОВИЋ
(1944–2020)

МАРКО ПОПОВИЋ припада плејади српских научника који су поставили темеље археолошких истраживања и систематског проучавања споменичког наслеђа на нашим просторима. Рођен је у Ужицу 1944. године, где је провео рано детињство, а школовао се у Београду, који ће остати његов град до краја живота. Од детињства се сусретао са тајнама Ташмајданског парка и нарочито Калемегдана – Београдске тврђаве, што ће одредити његов животни пут. Студије археологије завршио је 1966. године на Филозофском факултету Универзитета у Београду, где је магистрирао 1971, а докторирао 1980. године.

Врло рано, већ током студија упознао се са археологијом Београда волонтирајући у Музеју града, да би се 1968. године запослио у Заводу за заштиту споменика културе града Београда. Свој рад започиње истраживањем Београдске тврђаве и дефинисањем хронологије фортификација, као и ангажовањем на ископавањима у Босни и Херцеговини – у Панику, Врелу Требишњице и посебно Цркве Св. Петра у Ливару код Требиња. Већ приликом првих ископавања исказао се његов динамичан и аналитичан истраживачки дух, који га је красио током целокупне научне каријере. Ти квалитети дошли су до изражаја и у његовим првим извештајима и научним прилозима.

Приступ археологији Марка Поповића почивао је, за разлику од великог броја истраживача, на вишедеценијској посвећености великим истраживачким темама и пројектима, што му је омогућило да дубље проникне у свет средњовековних градова, утврђења и манастира. То ће посебно доћи до изражаја након његовог доласка 1976. године у новоформирани Научноистраживачки пројект за Београдску тврђаву, јединствену институцију у Србији при Археолошком институту. Његов допринос овом пројекту, којим је руководио, огледао се најпре у формирању тима сарадника и несебичном личном залагању, а потом и у унапређењу истраживања, што је подразумевало примену аналитичких метода у тумачењу писаних извора, ликовне и картографске грађе, авиоснимака, планова, археолошких остатака на терену и материјалне културе. Вредно је истаћи да су једна од првих геофизичких снимања у Србији за потребе археологије спроведена у Доњем граду Београдске тврђаве, осамдесетих година прошлог века.

Утврђења, у првом реду средњовековна, заузимала су централно место његових истраживања. Ту се свакако истиче проучавање Београдске тврђаве, од најранијег логора IV Флавијеве легије, преко византијског кастела из 12. века, доградњи у време цара Душана и нарочито деспота Стефана Лазаревића, до турских и аустријских фортификационих остварења. Значајан део опуса Марка Поповића односи се на урбано језгро старог Београда, чиме је утирао пут ка успостављању нововековне археологије у Србији. Велики број његових радова посвећен је управо развоју Београда. Истиче се монографија „Београдска тврђава”, објављена у два издања, која ће задуго представљати незаобилазно дело у проучавању кључне фортификације на раскршћу између Средње Европе и Балкана. Плод систематских истраживања Београда представља и монографија „Комплекс средњовековне митрополије у Београду: истраживања у Доњем граду Београдске тврђаве”, коју је објавио заједно са Весном Бикић.

Значајан део опуса Марка Поповића посвећен је изучавању урбаних средишта и утврђења у српским земљама средњег века. Он обухвата археолошка истраживања најзначајнијих српских градских центара – Смедеревског града и Новог Брда, као и проучавање историјских извора, објављених прилога и грађе са археолошких и архитектонских истраживања Ужичког града и Маглича. Из тих исцрпних истраживања проистекле су капиталне студије „Ужички град" (објављена у два издања), „Маглички замак" и „Утврђења средњовековног града Новог Брда", у коауторству са Горданом Симић. Вреди поменути и његов значајан уређивачки допринос у објављивању монографије Душице Минић и Обреније Вукадин „Средњовековни Сталаћ". Резиденције српских владара и властелинска боравишта, а нарочито средишта првих Немањића у области Раса и дворови на Косову – заокупљали су његову посебну пажњу.

Област средњовековног Раса представљаће његов други, не мање важан, допринос српској и, можемо слободно рећи, византијској и европској археологији. Марко Поповић се врло рано укључио у истраживања Градине изнад данашњег Пазаришта, средњовековног Трговишта, која је водио Душан Прибаковић у име Војног музеја у Београду. Систематска истраживања те значајне фортификације, која су под руководством Марка Поповића трајала преко две деценије, омогућила су да се она идентификује као Тврђава Рас, византијска погранична утврда и потоње средиште првих Немањића. Резултати тих опсежних истраживања приказани су у обимној и студиозној монографији „Tvrđava Ras".

Ширина његовог приступа изучавању археолошке оставштине области Рас огледала се у спровођењу програма рекогносцирања подручја Новог Пазара, Тутина, Сјенице и Рашке. У оквиру тих радова забележен је и велики број касноантичких утврђења и средњовековних црквина, насеља и некропола. Та истраживања представљала су претечу данашње археологије крајолика и у великој су мери заслужна за развој рановизантијске археологије у Србији. Сондажно је истражено и топографски снимљено 20 касноантичких утврђења, што неприступачну област на размеђу некадашњих провинција Далмације и Дарданије чини једним од најбоље истражених подручја. Круну тих истраживања представљало је ископавање Градине у Врсеницама, на рубу Сјеничког поља. Касноантичко утврђење, поново насељено у 9. столећу, налазило се у средишту раносредњовековних српских области, па је предложена идентификација са Дестиниконом, једним од „насељених градова" који се спомињу у делу цара-писца Константина Порфирогенита. Исходи тих истраживања и историјска тумачења објављени су у узорној монографији „Vrsenice: kasnoantičko i srpsko ranosrednjovekovno utvrđenje", у коауторству са Весном Бикић.

Марко Поповић је дао посебан допринос проучавању црквених здања и сакралних комплекса – манастира. Истом преданошћу приступао је истраживањима како црквишта, немих сведока напуштених средњовековних одредишта, тако и великих црквених средишта. Истакли бисмо ископавања манастира Студенице, којима су заокружени археолошки радови у унутрашњем простору комплекса. На основу тих истраживања као и детаљног увида у ранија ископавања Марко Поповић је приредио монографију „Манастир Студеница: археолошка открића" у којој су дати исцрпни описи истраживања храмова и здања манастирског насеља, што прате описи културне стратиграфије, обрађени планови и бројне архитектонске реконструкције. Како у овом делу тако и у осталим његовим монографијама и радовима, те детаљне реконструкције дају посебну вредност и документарност. Из овог дела опуса проистекли су многобројни прилози, као и монографије „Манастир Куманица на Лиму" – написана у коауторству са Даницом Поповић, „Црква Светог Николе у Станичењу" – са групом писаца, „Црква Светог Николе: катедрала града Новог Брда" – у сарадњи са Игором Бјелићем и „Манастир Шудикова у Будимљи" – још једно коауторско дело са Даницом Поповић.

Тиме се не завршава научни опус овог изузетног истраживача који је објавио 19 монографија и преко 260 чланака и извештаја.[1] На овом месту свакако треба споменути и зборник „Историја приватног живота у Срба: од средњег века до савременог доба", приређен са Мирославом Тимотијевићем и Миланом Ристовићем, као и дело „Daily life in medieval Serbia", у коауторству са Смиљом Марјановић-Душанић и Даницом Поповић. Наведимо на крају да је Марко Поповић са успехом проучавао и античко и касноантичко наслеђе, материјалну културу, сигилографију и хералдику.

Његов нарочит допринос огледао се у покретању и уређивању зборника *Singidunum*, издања Археолошког института, и часописа *Наслеђе*, гласила Завода за заштиту споменика културе града Београда. Био је уредник *Зборника Народног музеја* и члан редакција часописа *Саопштења*, Републичког завода за заштиту споменика културе, *Новопазарског зборника*, *Старинара* и посебних издања Археолошког института. Током своје вишедеценијске каријере обављао је бројне функције: био је председник Српског археолошког друштва, председник Управног одбора Завода за заштиту споменика културе града Београда и председник Комисије за споменике од изузетног значаја и српска културна добра у иностранству при Министарству културе, као и члан Одбора за историју Босне и Херцеговине Српске академије наука и уметности.

За свој научни и друштвени ангажман на проучавању, презентацији и заштити културног наслеђа одликован је у фебруару 2020. године Сретењским орденом III степена за нарочите заслуге у области културе. У фебруару 2018. добио је орден Круне I степена. Скупштина града Београда препознала је његов велики допринос проучавању историје и развоја града доделивши му три пута Октобарску награду града Београда – 1974, 1976. (колективну) и 1983. године, као и Априлску награду града Београда 2005. године (са В. Бикић). За допринос изучавању области Раса добио је Награду града Новог Пазара 1985. године. Ваља истаћи да је Марко Поповић остао дубоко везан за родно Ужице, истражујући његову историју и Ужички град. Град му се одужио доделивши му награду „С. Пенезић – Крцун" 1989. и Велику повељу града Ужица 2019. године.

[1] Библиографија Марка Поповића објављена је у зборнику *Свет средњовековних утврђења, градова и манастира. Омаж Марку Поповићу*, ур. В. Иванишевић, В. Бикић, И. Бугарски, Археолошки институт, Посебна издања 74, Београд 2020, 18–33.

Дело Марка Поповића одликује не само широка ерудиција, систематичност и преданост већ и интердисциплинаран приступ и тимски рад, о чему сведоче монографије и радови писани у коауторству. Он је несебично делио своја знања и активно је учествовао у раду млађих сарадника и истраживача, стално их подстичући у њиховом даљем напредовању. У окриљу научних пројеката које је Марко Поповић водио у Археолошком институту створен је тим истраживача који ће наставити да ступају његовим добро утемељеним путем.

Вујадин ИВАНИШЕВИЋ

МИРОСЛАВА МИРКОВИЋ
(1933–2020)

Одлазак МИРОСЛАВЕ МИРКОВИЋ, редовног професора Филозофског факултета у Београду у пензији, дубоко је растужио њене пријатеље, сараднике и поштоваоце. Истовремено их је и изненадио, будући да је она скоро до последњег дана радила на припреми за штампу својих нових рукописа, показујући несмањени ентузијазам било у погледу финалне дораде својих текстова било планова за будућа научна истраживања.

Мирослава Мирковић је рођена 1933. године у Косовској Митровици. Пореклом из породице просветних радника, школовала се у више места у Србији, а матурирала је у Смедереву 1952. године. Основне студије класичне филологије завршила је 1957. године, а 1964. докторирала је на теми *Римски градови на горњомезијском лимесу*, што је касније публиковано као монографија *Rimski gradovi na Dunavu u Gornjoj Meziji* (Beograd 1968). На Одељењу за историју Филозофског факултета у Београду прошла је кроз сва академска звања, од асистента до редовног професора. Током 1966/67. провела је два семестра у Бону као стипендиста Хумболтове фондације, под менторством проф. Јоханеса Штрауба (Johannes Anton Straub), а академску 1982/83. годину провела је у Принстону, као гост проф. Френка Гилијама (James Frank Gilliam). Била је не само учесник бројних међународних научних конференција, већ и организатор неких од њих. Нарочито ћемо је памтити као организатора веома успешне међународне конференције *Римски градови и утврђења на Дунаву*, одржане у Београду, у октобру 2003. године, под покровитељством Хумболтове фондације. Са тог скупа проистекао је зборник радова – *Römische Städte und Festung an der Donau. Akten der regionalen Konferenz, Beograd, 16–19 Oktober 2003*, hrsg. M. Mirković, Beograd 2005. Током каријере била је шеф Катедре и семинара за историју старог века као и Центра за античку епиграфику и нумизматику на Филозофском факултету Универзитета у Београду.

Научна интересовања Мирославе Мирковић била су разноврсна, мада је тежиште њених истраживања било усмерено на проучавање различитих процеса који су се током римског периода одвијали у дунавским провинцијама Царства. С обзиром на њене резултате и неоспорну стручност, није било изненађење када ју је познати немачки издавач научне литературе *Verlag Philipp von Zabern* позвао да буде аутор у научнопопуларној серији *Orbis Provinciarum*. Плод те сарадње била је изванредно илустрована монографија о римској провинцији Горњој Мезији, која је касније преведена на италијански језик (M. Mirković, *Moesia Superior. Eine Provinz an der mittleren Donau*, Mainz am Rhein 2007 / *Moesia Superior. Una provincia romana sul Danubo*, Milano 2014). Од самог почетка свог научног деловања блиско је сарађивала с руководиоцима археолошких ископавања великих античких локалитета као што су Сирмијум, Виминацијум и Сингидунум. Као један од водећих стручњака за античку епиграфику Мирослава Мирковић је објавила низ натписа из балканских провинција Римског царства, како у оквиру чланака тако и монографских публикација. Натписи из Сингидунума као и они са његове територије, из Виминацијума и Маргума, представљени су у прослављеној едицији *Inscriptions de la Mésie Supérieure* (M. Mirković, S. Dušanić,

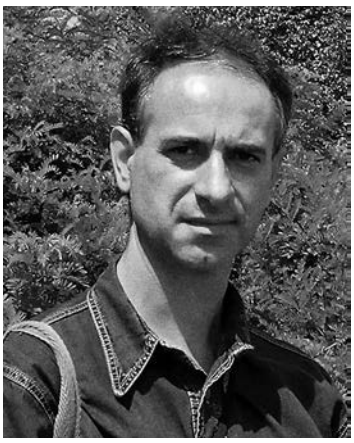
Inscriptions de la Mésie Supérieure I: Singidunum et le Nord-Ouest de la province, Centre d'études épigraphiques et numismatiques de la Faculté de philosophie de l'Université de Beograd, Beograd 1976; M. Mirković, *Inscriptions de la Mésie Supérieure II: Viminacium et Margum*, Centre d'études épigraphiques et numismatiques de la Faculté de philosophie de l'Université de Beograd, Beograd 1986).

Поред ових налазишта, Сирмијум је римски локалитет који је највише и најдуже био предмет њених научних интересовања. Студија о историји овог царског града написана је поглавито на основу епиграфског и археолошког материјала (M. Mirković, *Sirmium, its History from the I Century AD to 582 AD*, Sirmium I, ed. V. Popović, Beograd 1971, 1–94), а последње, знатно проширено, издање ове студије изашло је 2017. године под истим називом као монографија. Публиковала је и 79 натписа који сведоче о конзуларским бенефицијарима, нађених током археолошких ископавања бенефицијарне станице у Сирмијуму, а објављених у угледном немачком часопису *Chiron* (M. Mirković, *Beneficiarii consularis* in Sirmium), *Chiron* 24, 1994, 345–404. Осим епиграфског материјала из римских великих урбаних центара на нашем тлу, Мирослава Мирковић је проучила и епиграфске збирке које потичу са више локалитета у Србији и Црној Гори. Са археолошког налазишта „*Municipium S*", у близини Пљеваља, публиковала је све познате натписе у престижној едицији British Archaeological Reports (M. Mirković, *Municipium S( ). A Roman Town in the Central Balkans, Komini Near Pljevlja, Montenegro*, BAR International Series 2357, Oxford 2012), док је античке натписе из средњег Подунавља објавила у оквиру монографије *Римљани на Ђердапу. Историја и натписи* (Зајечар 2015).

Једна од значајних тема у научном раду Мирославе Мирковић била је организација римске војске у дунавским провинцијама Царства. Њена интересовања протезала су се и на уметничке споменике са наших античких локалитета, а посебно оне који су носили поруку о социјалним променама што су се током времена дешавале. Такав њен прилог, на чијој је редакцији радила скоро до последњег дана, објављен је, нажалост, постхумно, у зборнику радова посвећеном Милоју Васићу, некадашњем директору Археолошког института у Београду (M. Mirković, Hunting wild boar in *Romuliana*, in: *Illyricum Romanum. Studiola in honorem Miloje Vasić*, eds I. Popović, S. Petković, Institute of Archaeology, Monographs 73, Belgrade 2020, 192–198).

Мирослава Мирковић је била чест и радо виђен гост у многим археолошким екипама приликом ископавања античких локалитета, када је често чистила, прала и фотографисала епиграфске споменике. Увиђала је, за разлику од многих историчара, неопходност и значај археолошких података за проучавање историјских, социјалних и демографских процеса у римским провинцијама на Балкану. Сарађивала је у публикацијама Археолошког института у Београду, као што су часопис *Старинар* и едиција *Singidunum*. Одржавала је блиске и пријатељске контакте с нашим еминентним археолозима, али је волела да чује и реч млађих сарадника, често уз кафу, у непосредном разговору. Строга приликом третирања научних проблема, пре свега према себи али и према другима, Мирослава Мирковић је током шест деценија своје научне делатности успоставила стандарде од којих њени сарадници и наследници не би ваљало да одступе.

Ивана ПОПОВИЋ



ЗОРАН БОШКОВИЋ
(1957–2020)

Напустио нас је ЗОРАН БОШКОВИЋ, дипломирани археолог, стручни сарадник у документацији Археолошког института у Београду. Рођен је у Крагујевцу 31. октобра 1957. године. Основну школу и гимназију завршио је у Београду. Студирао је археологију на Филозофском факултету у Београду, где је и дипломирао 1989. године. Дипломски рад из области праисторијске археологије, под насловом „Проблем настанка и развоја накованске културе", одбранио је код проф. др Драгослава Срејовића са одличном оценом. Током студија учествовао је на теренским истраживањима на локалитету Мора Вагеи у Михајловцу, а касније као сарадник Института био је ангажован на археолошким истраживањима на Медијани код Ниша.

Године 1990. Зоран Бошковић се запослио у Археолошком институту на радном месту стручног сарадника у документацији. У Институту је у то време започет пројекат примене нових информационих система у вођењу археолошке документације. Предузети су и конкретни кораци, те је започето са процесом дигитализације који је требало да омогући једноставан начин приступа и коришћења обимне и комплексне документације коју поседује Археолошки институт. Зоран Бошковић је активно био укључен у реализацију овог пројекта, усавршавајући се у области информатике (основе АОР) и програмирања у организацији фирме EI BULL HN. Поред свих објективних потешкоћа у примени новог система у вођењу археолошке документације, који је требало да омогући лаку доступност информација корисницима електронске базе података, препознат је допринос Зорана Бошковића као једног од зачетника тог пројекта. Нажалост, није дочекао завршетак пројекта којем је био искрено посвећен.

За сараднике Археолошког института остаће упамћен као изузетно добар и предусретљив човек, увек спреман да помогне и пружи више од онога што су биле његове професионалне обавезе. Свима који смо га познавали и радили с њим недостајаће његов пријатељски однос, искрен и добронамеран.

Оливера ИЛИЋ

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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.

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- The accused will always be given the chance to respond to any charges made against them.
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– 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.

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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.

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In the list of references: **Popović 2009** – I. Popović, Gilt Fibula with Christogram from the Imperial Palace in Sirmium (Резиме: Позлаћена фибула са христограмом из царске палате у Сирмијуму) *Starinar* LVII (2007), 2009, 101–112.

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Quotation within 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.)

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In a footnote: (Popović 2006, 21)

In the list of references: **Popović 2006** – I. Popović, *Roma aeterna inter Savum et Danubium*, Belgrade 2006.

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)

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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)

In the list of references: **Марковић-Штрбац 1999** – С. Марковић-Штрбац, Пустахије са Јухора, *Политика*, 18. септембар 1999, Одељак Култура, уметност, наука. (S. Marković-Štrbac, Pustahije sa Juhora, *Politika*, 18. septembar 1999, Odeljak Kultura, umetnost, nauka.)

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(1895) ; нови ред, год. 1, бр. 1 (1906) – год. 4, бр. 2 (1909) ;
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