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THE LOST TRIREME'S SAIL. WHY IT'S SO HARD TO FIND SAILS FROM ANCIENT GREEK WARSHIPS?

ABSTRACT

Could an ancient sail survive into sea water environment and what happened to those staying off the coast, in dry conditions, when a naval battle was taking part? Was the factor that old sail-clothes were used for other purposes such as bed covers, bags, clothes, etc, enough to make this lack of today's excavations or something else did also happened? This paper tries to shed some light on the questions above.

KEYWORDS: ANCIENT SAILS, TRIREME SAILS, ANCIEN LINEN SAILS.

Sails, in triremes, were consisted secondary propulsion system. Basic material for sail construction was linen (flax). Its use started in Egypt and spread throughout the Mediterranean as early as the second millennium BC (Black and Samuel, 1991: 220). It's large surface was made by many small pieces of linen stitched together with so much attention from the ancient sail maker "*istiorrafos*" «*ἱστιορράφος*» (Ioannidou, 2014 and 2016: 30-31. It is said that, in order to make them stronger and protected against the thunderbold, the angles were forced with leather from seal or pelt of hyena (Plutarch, *Table talk*: 4, 2,1: 664c.)[1].

Sails, from the Homer epics, had mostly white colour (Homer, Odyssey 2, 46) while flagships used red. It has been noted that black and grey sails existed as well (Simsas, 2006: 128).

PROCESSING AND WAVING OF FLAX

Unfortunately no evidence have come to light about the processing and waving of flax in order to be a sail. Our information focused only for linen textile, in general, specially as cloth, and from two main sources: the ancient Egyptian texts (Blümer, 1912:193) and Plinius (Natural History: 19, 16-18). Taking these into account we can assume that processing and waving of flax could achieved in a similar way for sails in ancient Greece as well. As Plinius mentioned (N. H: 19.3) they plunged the stalks of flax in the water that has been warmed in the sun. Then they submitted them to pressure with a weight. When the outer coat is loosened the stalks were sufficiently steeped. Then they turned with the heads downwards and left to dry in the sun. When thoroughly dried, they were beaten with a tow-mallet on a stone. After that they combed out with iron hatches «*λανάρι*» in order to separate the short of the long hair. Long hair (ίνες), were spun with an instrument called «*γέρων*» (Jullius Pollux, Onomastikon :7. 73) and

1 Pliny also refers that thunder never strucks tents made of skin of seal, since seal is the only marine animal which is never struck. (Pliny, *Natural History*, 2, 56)

Fig. 1 Sails of trireme "Olympias" in Faliro Bay, Athens (Photo by Christy Emilio Ioannidou).

the thread that resulted was soaked in water and then beaten out upon a stone. After that it was woven into a tissue, a standing loom «*ἱστός ὄρθιος*». When the textile was ready was beaten again with heavy maces in order to improve its quality: "indeed, the more roughly it is treated the better it is" (Plinius, Natural History: 19, 3).

According to the spunning method that was used, thread had a specific twist. In Egypt linen threads have a twist similar in letter S while in Europe threads are Z twisted. In Greece Z twist remains stable from the prehistoric times until Roman Empire (Spantidaki, 2011: 76). Any difference can be marked that textiles in prehistoric times was made by double stranded thread -when two threads were twisted together but each one in different direction -while in classical times most of the textiles were made by single thread (Ibid).

Despite the opinion of older and foreign researcher who believed that Greece in ancient times had not sufficient production of flax/linen[2] we can find in ancient texts and archaeological preserved finds[3] a great amount of evidences which support the opposite. Magnificent products, plain, embellished, embroidered[4], with delicate threads, purple dyeing etc. (Spantidaki, 2011: 76). and references about the glorious linen textiles of Amorgos island (f.e. Thucydides: 4, 26, Aristophanis, Lysistrate: 735, Aeschines, Against Timarchos: 1, 97.)

2 Like for example: Rostovtzeff, M.I., The Social and Eaconomy History of the Hellenistic World, 3 vols. Oxford, 1941 and Francotte, H., L' industrie dans la Grèce ancienne, 2 vols., Bruxelles 1900-1901.

3 Like finds of textiles Z twisted from Bronze Age at excavation in Thera. See: Moulhérat, Ch., Spantidaki Y, and I. Tzachili, "Strings, ropes, nets and textiles from Akrotiri, Thera" [in Greek], *Aracne*, Hellenic Centre for Research and Conservation of Archaeological Textiles, 2004, 2, pp. 15-19. Among others, textile fragments of linen Z twisted , have been found: three of 5th BC in Maroussi, one of 4th BC in Hellinikon and one of 5th BC in Marathon. See: Y. Spantidaki and Ch. Moulhérat, "Textiles from Attica" [in Greek], *Arachne*, 2, pp. 5-12.

4 Like the fine textile, from Koropi, which is dated from classical antiquity and it is exhibit in Victoria and Albert Museum of London. See: J. Beckwith, "Textile fragments from classical antiquity: an important find at Koropi, near Athens", *The Illustrated London News,* 1954: 114-115.

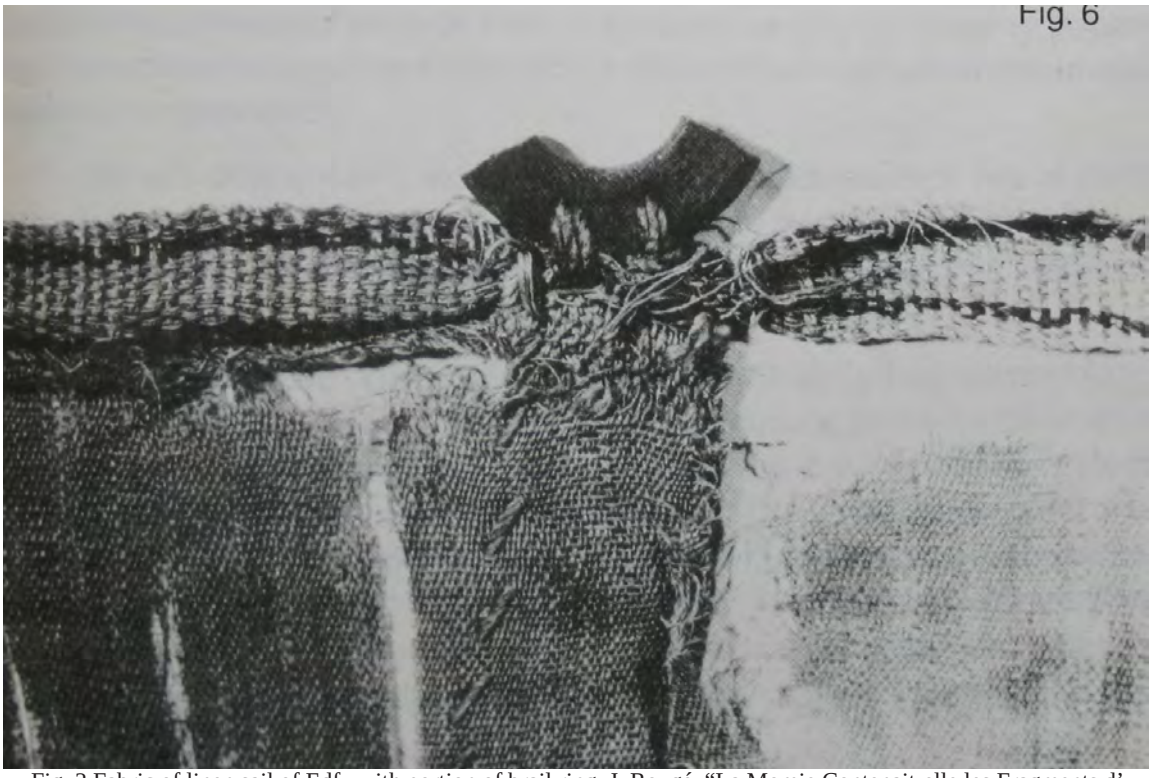

Fig. 2 Fabric of linen sail of Edfu with portion of brail ring. J. Rougé, "La Momie Contenait-elle les Fragments d' une Voile? (Nouvelle Arch. Mus. Nat. Lyon, 25, (1987) ref 10b, fig.2. in Black, E., "Where have all the sails gone?", Tropis IV, HIPNT, 1996: 111.

or those of Colchis (Herodotos, History: 2.105, Strabo:11.17/C498) have left permanently their marks in history.

LINEN TEXTILE AS SAIL

When flax fibres become wet their strength increases (Cook, 1993:10/ Hahn, 2005: 1-42). rendering them suitable for maritime purposes such as ropes, sacks, fishing nets, cords, tents but mostly sail-clothes (Nosch, 2014: 17-42).

The lack of finds of sails in ancient wrecks lead us to the thought that sail clothes that they have been no more serviceable were used for other purposes such as bed covers, bags, clothes, etc (Black, 1996: 105).

This, actually, was a tactic of maritime people who wanted to minimize the cost of every naval equipment that was necessary for their trips. What is surprisingly interesting is the fact that sails were not recycled exclusively for naval purposes. Archaeological finds appear that old sails were used for multiple purposes in the dry environment too.

As an example we can see the wool sail from Viking ship that was discovered at the roof of the northern church of Norway, Trondenes. This sail, is the earlier attested Scandinavian sail fragment (was radiocarbon dated between 1280 to 1420 AD) and was used to feel the gaps between the wooden planks of the church's roof (Bojer, 1994: 271-278). Another fascinating example is the discovery of a linen sail on an Egyptian mummy (Black, 1996: 103-112). This mummy, despite the fact that was found together with others in a temple at Edfu, Egypt, was the only who was wrapped in a linen sail. The sail has several horizontal reinforcing strips, S twisted, 5 cm wide each, to one which is attached a part of a wooden ring, a brail. It is at the Museum of Natural History of Lyon and Carbon-14 dated (±)150 BC (James, 1988: 5/ Rougé, 1987: 91-6).

From the few samples of sails that have been found together with other naval instruments in

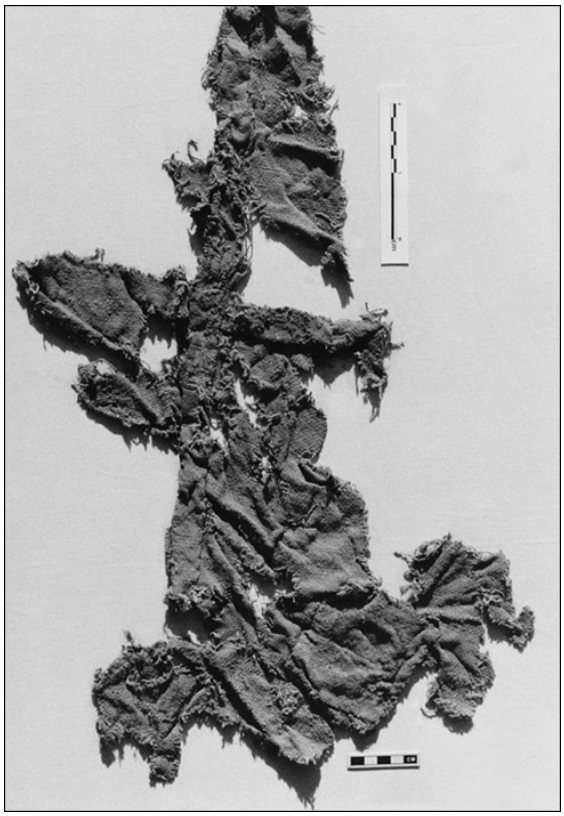

Fig. 3 Sail fragment from Berenike (97.103).
(Photo: J. P. Wild & Berenike Project).

land territories, without been used for other purposes except for ship sails, are some pieces of linen sails that recovered from the excavations at ports of Berenike and Myos Hormos in Egypt during the years 2013-2014 together with bone and wood brailing rings dated at Early Roman period (Sidebothman, 2008: 305-324/ Wild and Wild, 2001: 211-220). These are parts from commercial vessel and most of the textiles are Z twisted. Because of that Z spun direction most believe that they couldn't considerate these textiles as Egyptian sails. Therefore, they adopted their Indian origin and claimed that they were presumably imported. It transpires, however, that the evidence from Berenike are not suggests ships of India but Mediterranean-style ships (Wild and Wild, 2001: 218). Mediterranean ships have one main mast and big square sails with reinforces. Indian ships, as we recognized them from Indian art, have two or three masts and their sails have no reinforcing strips (Schlingloff, 1988: 195-207).

According to my opinion, the origin of Berenike sail it should be put back on the table and second the Greek origin, because a) Greece and Egypt have at all times of history very good commercial bonds b) Greek linen sails manufactured according to Mediterranean way, with reinforcing strips and c) most of Greek textiles are Z twisted.

If actually Berenike and Myos Hormos sails are Greek then we will have some of the first finds of Greek sails of commercial ship. Until now no finds of sail from trireme or generally from Greek warship came up to light.

Returning to our subject, we realized that a great amount, of lost sails could occur due to the tactic of recycling older sails for other use.

During the 5th and 4th centuries, Athens confronted shortages of naval equipments, especially sails and ropes. Thus recycling method should be of great importance. But, could this fact provoke such a lack?

It is widely known that during naval battles triremes uses only the small sails while the big ones were kept up in the shore (Xenophon, *Hellinica*, 1.1.13, 6.2.27, Dion Cassius, *Roman History*, L, 31.2 and 33.2.) if time permitted, usually in specific storage houses "*σκευοθήκη*"

(Among others IG II2 1668). This fact conducts our thought in two main questions. What happened to the big sails which were kept safe into these storages and what to the smaller sinking to the bottom of the sea after a naval conflict?

LACK OF TRIREME SAIL FINDS IN THE LAND

As we mentioned above, big sails were kept in the land inside storage houses and special boxes (IG II2 1668). There are cases were the lack of these storages in a shore obliged people to create quick and rough constructions for keeping naval equipment. In such cases, textiles could be often suffer of attrition due to humidity, mould or

Fig. 4 Reinforcing strip (0758) and brailing rings from Berenike.
(Photo: J. P. Wild & Berenike Project).

would be an easy target of being stole. For the year 424BC we have a reference of mould, rotten sail "*ἱστίον σαπρόν"*.

[I will cause you to be a trierarch expending your own money, with an old vessel, upon which you will never ease spending money or making repairs. And I will contrive that you get a rotten sail][5].

«…ἐγώ σε ποιήσω τριηραρχεῖν <ἀναλίσκοντα τῶν σαυτοῦ,> παλαιὰν ναῦν ἔχοντ᾽,

εἰς ἣν ἀναλῶν οὐκ ἐφέξεις οὐδὲ ναυπηγούμενος· διαμηχανήσομαί θ᾽ ὅπως

ἂν ἱστίον σαπρὸν λάβῃς.» (Aristophanes, *The Knights*, 912-918).

Places near the sea are vulnerable from humidity which favour bacteria and increase fungus.

These lasts provoke important changes in the properties of the fabric fibers. If sails were stored for long time, in places with high percent of humidity they were in great danger of being damaged and not usable any more from the appearance of bacteria and fungus.

As to the stole incidence its quite enough if we read an information of a work of Xenophon (*Hellinica*, 2, 1, 29) in which we learn that after the naval Battle of Aigos Potamoi, Athenian general Konon, escaped and reached Avarnis, where he found and took with him the big sails of Lysander's ships.

Stole of sails could make someone well off either the stealer was of the enemy's crew member or somebody who just wanted to sale them. For example, in Aristophanes work, a smuggler named Thorycion, was exporting various forbidden goods, among them sails, from Aegina to Epidauros (boarders of City States Athens and Peloponnesos):

[…who fort or fleet to the foe betrays; or, a vile Thorycion, ships away

Forbidden stores from Aegina's shores, to Epidaurus across the Bay

5 Translate into English by William James Hickie, 1853.

Transmitting oarpads and sails and tar, that curst collector of five per cents;][6].

«...ἤ τῆς πόλεως χειμαζομένης ἄρχων καταδωροδοκεῖται,

ἤ προδίδουσιν φρούριον ἤ ναῦς ἤ τἀπόρρητ' ἀποπέμπει

ἐξ Αἰγίνης, Θωρυκίων ὤν, εἰκοστολόγος κακοδαίμων,

ἀσκώματα καὶ λίνα καὶ πιτταν διαπέμπων εἰς Ἐπίδαυρον,

ἤ χρήματα ταῖς τ ῶν ἀντιπάλων ναυσὶν παρέχει τινά πείθει» (Aristophanes, *The Frogs*, 361-365).

Looking into the Ancient Inscriptions we will be astonished at the fact of who else could steal naval equipment/sails. As Vincent Gabrielsen observes, throughout the fourth century the naval officials, captains and *triērarchoi* "constantly and seriously draining the dockyards of public equipment" (Gabrielsen, 1994: 149/ Gabrielsen, 1995: 234-240). The reason can be easily interpreted. Some of them, sure enough have been lost during accidents/naval battles. But the rest have been removed for personal profit. Inscriptions testify an important lack of equipment which had been noted when *triērarchoi* delivered their triremes to shipyards and the census was followed (Among others IG II2 1613, 1614 etc.).

By way of example in 353-352BC, 29 ships from Munychia lacked sails (IG II^2 1607, 1609). Most of the missing equipment was in the hands of officials and trierarchs (Gabrielsen, 1994: 146-149). We can also distinguish names like somebody named Mnisikles Kolly who was obliged to return sails and ropes for 18 triremes (IG II^2 1622, 420-431) and someone called Efthymachos who among plenty equipments was obliged to return small and big sails for 35 triremes (IG II2 1622, 443-477).

LACK OF SMALL SAILS WHICH RESULT INTO THE SEA

Considering that all the above mentioned issues consist of a mayor account of sails disappearance the only thing which left for being under microscope is the possibility a sail to be found under the water where the technical recycle or stole could not be existed.

Here, as an important tool functioning the work of Eve Black (1996: 103-112), who analyze the hostile environment by which the sail is surrounded at the bottom of the sea.

Fibers of cotton, linen, silk and wood as well, are composed of celluloses (long chains of sugar vulnerable to oxidation and microorganisms) and lignin. Lignin is the most important, after cellulose, ingredient of plant biomass, it limits the availability of cellulose, strengths and waterproofs the cell. Wood contains 20-30% lignin and has, therefore, survived at the sea's bottom, almost intact when protected by, or buried in sand or mud (Black, 1996: 106). For making ropes jute and sisal were used, which also have high lignin content. It is remarkable that parts or ropes have been found under the sea bottom, attached to anchors.

Unlikely, with linen happens something else. Row flax, contains up to 5% lignin. But on retting, this amount is reduced and when comes at its final form, as textile, it has been left with high average of cellulose, completely vulnerable and at the mercy of the underwater elements (Black, 1996: 106).

According to modern calculations in a today's sea environment it is well known that a cotton rope will survive into the sea approximately 1-5 months, a cotton t-shirt 2-5 months and a pair of woolen socks 1-5 years[7]. In a study of Elene E. Peacock[8] who puts textiles of linen, cotton, wool and silk in sand and water conditions showed that

6 Translation into English by The Project Guttenberg E book of The Frog.

7 U.S. National Park Service; Mote Marine Lab, Sarasota, FL and "Carbage In, Carbage Out", Audubon magazine, Sept/Oct. 1998.

8 The study was carry out at the Norwegian University of Science and Technology, Trondheim, Norway in 1994.

linen was affected most severely (in 3-32 weeks), and the principal agent of deterioration was microbiological, although chemical attack cannot be rule out (Black 1996: 49-59).

Judging by all these its close enough to realize that in such a hostile environment, as sea water, if somebody, after a naval battle in classical times, wouldn't picked up the linen sail of the bottom of the sea no one could ever find it just after a period of one year as this would had completely disappeared.

CONCLUSIONS

Trireme sails, like any other ship type, couldn't survive in land mostly because of recycling or robbery. Sail's robbery usually acted by crew members of enemy's ships, merchants, captains, naval officers and trierarchs as well. On the other hand, sea environment was too hostile for linen textiles to preserve them for long time.

It will be most desirable a discovery of an ancient, not sacked, tomb, in which it will be found in storage an ancient trireme sail with its ropes and other nautical instruments.

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REZIME
IZGUBLJENO JEDRO SA GRČKE TRIJERE.
ZAŠTO JE TEŠKO PRONAĆI JEDRA SA GRČKIH RATNIH BRODOVA

KLJUČNE REČI: ANTIČKA JEDRA, JEDRA TRIJERE, ANTIČKA JEDRA OD LANENOG PLATNA.

Mogu li antička jedra da se sačuvaju u vodenoj sredini i šta se kasnije događa sa njima ukoliko se nađu na obali u suvoj sredini nakon završene bitke? Da li je platno korišćeno za jedra za grčke vojne brodove nalazilo kasnije drugu namenu, poput prekrivača za krevete, torbe, odeću itd. Da li se na taj način može pravdati nedovoljna istraženost i nedostatak nalaza jedara. U ovom radu je učinjen pokušaj da se bliže rasvetli ovaj problem i dobije mogući odgovor na pitanje ostataka jedara sa grčkih ratnih brodova.

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GAUGAMELA 331 BC: THE TRIUMPH OF TACTICS

ABSTRACT

The Battle of Gaugamela (331 BC) is one of the most famous in History due to its impact, but also due to the imbalance of the antagonists and the tactical dispositions, choices and command style which determined the victor. In this study a number of less obvious main issues are tackled: Alexander used a modular method of tactical disposition, based on task forces structured by certain units with good chemistry between their commanders and men; these units were used consistently in terms of position, mission and operating procedures, rules of engagement and sequence. Whatever little variation is observed, had been imposed by the enemy and the environment/terrain. Moreover, the raid to the camp of Alexander as described by Arrian and Diodorus refers to its main base camp, out of direct sight and not to the expeditionary one from where he emerged the day of the battle. The raid itself was not executed as indicated by Arrian, whose sources rather described a breakthrough and turn around action from Persian cavalry units, mistaken by himself for the raiding action and units. Additionally, Alexander's army seems to have been organized, since before the battle of Issus and till after Gaugamela, to a tertiary rather than a binary basis, the latter being standard for Greek-type armies. This tertiary structure permitted increased flexibility in tactical dispositions. Lastly, and most importantly, the tertiary structure applied in a very specific manner allowed the formation of the double-phalanx of Alexander in Gaugamela which pricks on the mind and thought of historians ever since. This double phalanx was formed within and by the standard Macedonian phalanx brigades (Taxeis), which were deployed in two echelons each, the second echelons collectively constituting the hind part of the double phalanx; this model is contrary to the usual concept that the hind phalanx was constituted by allied Greek and perhaps mercenary hoplite units.

KEYWORDS: ALEXANDER THE GREAT; DARIUS III; BATTLE OF GAUGAMELA; STANDARD DISPOSITION; DOUBLE-EDGED PHALANX; TERTIARY ORGANIZATION; PHALANX; COMPANION CAVALRY; HYPASPIST CORPS.

The Battle of Gaugamela in 331 BC was the death knell of the Achaemenid Empire, its third and last battle under the imperial standard against the invading army of Alexander the Great. Despite the detailed accounts, which are far less contradictory than, for example, the ones on the Battle of Granicus in 334 BC, there are many unexplained issues and contested views. By using the ancient sources in the light of their biases or these of their primary sources and by comparing them with organizational, drill and technical limitations and capabilities we try to unravel some of the facts of the most incredible ancient battle.

1. STRATEGIC CONTEXT

In 333 BC Alexander decided to completely destroy the Persian seapower from and at the land, as he was already accomplishing (Arr. Anab. I.XXIV.3) instead of pursuing King Darius so as to finish off the war at one strike after the victory at Issus (Arr. Anab. II.XVII), resulted in a well-organized occupation of all Mediterranean shores of the Persian empire. However, at the same time it allowed the raising of another grand army by Darius due to the time afforded to the defeated state and monarch. This army, assembled at Babylon (Green P. 1992) comprised mainly of elements uncommitted in Issus, as were the units from the eastern satrapies (Arr. Anab. III.VIII.6) defined as of the position of Persia proper. Moreover, remnants of the army of Issus were also included (Arr. Anab. II.XIII.1-III.XI.7), and, the most important thing, extensive, first –hand experience on the Macedonian new fighting tactics and weaponry had been factored in the new army, starting with but not limited to the issue of longer spears and swords (Diod XVII.LIII.1).

Alexander had secured the volatile Phoenicia and the potentially untrustworthy Egypt (Anson E.M. 2013) and took his army leisurely from Memphis against the new Persian royal army (Arr. Anab. III.VI.1 & VII.1). From Tyre he ascended from the main road in Phoenicia to Thapsacus (Arr. Anab. III.VII.1), striving both to pacify the interior and to use a road suitable for his artillery and siege parks (Engels D.W. 1980, pp 54-70) which now could not be ferried by the sea (Arr. Anab. II.XXVII.2) and had developed considerably after the sieges of Tyre and Gaza.

Possibly Alexander was quite happy to find Persian loyalists from the whole empire concentrated and assembled within reach, to crush in one battle (Diod XVII.LVI.4), but this was only one plan of action: although he meticulously projected an image of bold, even reckless, impatient and dashing general, he was not entirely such. The storming of the Cilician gates (Arr. Anab. II.IV-3) and the prompt engagement at Granicus (Arr. Anab. I.XIII.6) were testaments of his dashing. The final action in Pelium (Arr. Anab. I.VI.9-10) and the attempt at Mindus (Arr. Anab. I.XX.5) were bold, night actions to catch enemies off guard; but the action in Halicarnassus proper (Arr. Anab. I.XX.2 and I.XXII.7) and the one in Thebes (Arr. Anab. I.VII.10) were patient, leisurely siege actions, not very vividly nor astutely pursued. When unnecessary risks, in the form on naval engagements, emerged, he had been really cautious and did not respond to repeated challenge (Arr. Anab. I.XVIII.6). The surprise winter campaign of 334 BC (Arr. Anab. I.XXIV.3) was followed by weeks of inaction in Cilicia (Arr. Anab. II.VI.4), prolonged sieges in Tyre and Gaza and a really comfortable schedule in Egypt, which resulted in almost two years between the second and the third major clashes.

This behavioral inconsistency was showing a leader enabled with all needed qualities and using them in discretion, thus increasing the uncertainty of the enemy. Thus, when Alexander crossed the Euphrates, neither he nor Darius were looking forward for a head-to-head clash in equal terms, a set-piece battle. They intended to capitalize on any possible advantage they had or they could create, and negate the opposite part any such opportunities. Darius now believed what the late Amyntas, son of Antioch, an expatriate nobleman of Alexander, had told him before the Battle of Issus (Arr. Anab. II.VI.3&6), that Alexander would come to meet him in arms, and intended to build up all possible advantages. From a new model army (Diod XVII.LV.1) to better selection of the battlefield (Diod XVII.LIII.3), improved tactics, full use of technology and technical resources (Diod XVII.LV.2 & LIII.1) and a smartly executed opening campaign of exhaustion laid at the path of his opponent (Diod XVII.LV.1). Alexander had no intention to play by these rules, and instead of dashing towards Darius in the general direction of Babylon, after crossing Euphrates, continued east (Stein A. 1942) and forded Tigris (Arr. Anab. III.VII.5).

This was a strategic masterstroke. It nullified all the preparations of Darius at the expected convergence path. At the same time his army had a cooler walk south of Kurdistan instead of the scorched Mesopotamia, which most probably would have been stripped from fodder and other supplies (Arr. Anab. III.VII.3). Thus the exhaustion strategy failed. But also the dashing and unpredictable character of Alexander allowed him a chance to repeat the storming of the Cilician Gates in a gigantic scale: moving down along Tigris he was in a position to burst through Behistun to Media (the escape road selected by Darius after the battle- Arr. Anab. III.XVI.1) and from there to Persia, while only militias would be there-and these in low alert, as the gigantic imperial army was practically in front of them, outside of the pass.

Darius was trying for years to transfer the operations in Greece (Arr. Anab. II.I.1; Diod XVII. XXX.1), a strategy which worked superbly against the Spartans in 395 BC (Xen Hellen IV.II.1-3). Instead of this, Ekbatana in Media and then Persepolis, the royal city and birthplace of Achaemenid rule, where to be stormed by the agile and flying macedonian army while the host of the King of Kings was between Babylon and Susa, gleaning the supplies of the fertile crescent.

This made Darius move his gigantic host north-east to Gaugamela (Arr. Anab. III.VIII.7), in order to prevent this move. Alexander would not attempt a breach at Behistun and Zagros mountains with the royal army close by. Still, the morale of the achaemenid host, which were found to run to intercept instead of waiting at their comfortably established base at Babylon (Diod XVII. LIII.1) would have suffered a blow. Similarly, all preparations of the battlefield and the logistics set into place were abandoned and eliminated overnight. The scales were coming towards leveling, but there was still a long way to go.

2. PREPARATIONS AND INTENTIONS

The Persian side

Darius was proving a smart and intelligent man with good reflexes. His gigantic host (Arr. Anab. III.VIII.6) moved relatively fast to avert the threat to the Motherland and impose an all-out battle instead of a contest by maneuverability and generalship. Alexander would have to fight it out with a huge disadvantage in numbers at an advantageous and prepared field of battle (Arr. Anab. III.VIII.7), although not as advantageous and well-groomed as the previous near Babylon.

Although Alexander found the battle order of Darius after the end of the fighting in Gaugamela (Arr. Anab. III.XI.3), it is usually maintained that the Persian army was mainly cavalry, due to the eastern contributions and the slaughter of dependable infantry in Issus (Arr. Anab. II.XI.8). Still, the massive Mesopotamian levies were infantry, as were big parts of Median and Persian national armies and the gigantic host of the Achaemenid kingdom was infantry-heavy by almost 20:1 in Gaugamela (Arr. Anab. III.VIII.3-6). The new long weapons Diodorus mentions (Diod XVII. LIII.1) were most probably issued to the infantry, which had performed very poorly at Issus, in contrast with the cavalry and the Greek mercenaries-which were now down to one tenth of their peak number (Arr. Anab. II.VIII.5 & II.XIII.1).

In Gaugamela the Persian intention is double and doubly obvious: the deployment indicates an intention for envelopment; the disposition, and in this both new arms and new weapon systems must be included, clearly indicates provision to counter frontal charges by qualitatively superior forces. Nothing might be found missing; but, then, practically the same had been the concept in Issus, as well. The means changed in between, the ends did not.

Darius had enough with the Greek tactics which he tried at Issus. The defensive positioning of a hoplite/ pseudohoplite phalanx behind a river (Arr.

Anab. II.VIII.5-6), the palisades to protect accessible positions (Arr. Anab. II.X.1) and the cavalry posted at the flanks (Arr. Anab. II.VIII.10) were all Greek, not Persian traits-and the same may be said for the deep battle formation (Arr. Anab. II.VIII.8). Palisades in the battlefield were the specialty of the Thebans against the Spartans for 20 years (389-371 BC), as were very deep infantry formations (Thuc IV.93; Xen Hellen VI.IV.12 & IV.II.18). And from the mid-5th century, when cavalry operations came into vogue of Greek military practice, the posting was usually at the flanks, with very few exceptions, contrary to the Persians who preferred positioning it in front of the infantry, as in Kunaxa 401 BC (Xen Anab I.VII.11 & I.VIII.24), Pactolus 395 BC (Xen Hell III.IV.23-24) and Granicus, 334 BC (Arr. Anab. I.XIV.4).

Moreover, there is no mention in Gaugamela for Hellenized Persian Infantry, as mentioned in Issus. In Issus, two 30,000-strong bodies of Kardaka professional home troops were given hoplite gear and positioned at the flanks of 30,000 Greek mercenary hoplites (Arr. Anab. II.VIII.5-6). The 30,000 is a very special figure, denoting an army corps according to Herodotus (Sekunda N. 1989, 84) made up of 3 baivarabam of 10,000 each. it was most probably the standing, professional Persian army, hastily re-equipped to increase the successful hoplite paradigm, but at Issus they were cut to pieces by both the Macedonian cavalry and phalanx, due to the latters' longer reach in terms of shaft weapons (Markle M.M. 1977;1978), a fact which prompted Darius to issue longer ones (Diod XII.LIII.1); and to the much better training in this kind of warfare (Gaebel R.E. 2002), which prompted Darius to execute a vast drill and discipline-heavy training program (Diod XVII.LV.1).

The army of Alexander

The spacey plain of Gaugamela allowed the deployment of the Persian host to an astonishing width. This fact denied any thought that the Macedonian army might match the enemy width by elaborate deployment of units, as done in Issus and, to be accurate, in Marathon 490 BC (Herod VI.111) for the first time. In Issus the resulting reduction in depth/density was a constant source of consternation for Alexander (Arr. Anab. II.IX.3 & 4) and possibly the reason for the spontaneous gap which led to the bitter fighting between Greek mercenaries of the Persians and the phalanx (Arr. Anab. II.IX.4-6). Thus, in Gaugamela Alexander could form his army deeper and more compact, as the difference in width would be irrelevant: it would be the maneuver, not the deployment, which was intended to cover the front. By making the formation compact, Alexander succeeded in (1) making harder a Persian breakthrough; (2) invited to the point of complete confidence flanking attempts by the Persians in both flanks; (3) ensured accuracy and perfect coordination in the execution of maneuvering of the whole army.

The constitution of the army of Alexander is a mystery. With few installments of reinforcements (totaling at the very least a sum of 8,750 men by the day the march from Memphis towards Tyre and Gaugamela started, of which 7,200 infantry) and losses due to garrisons and casualties, it is by 1/3 larger than the invasion force. This bolsters the view that the invasion force inventoried by Diodorus (Diod XVII.XVII.3-6) does not include the remnants of the advance force positioned in Asia for 3 years, which most probably accounts for the differences among historians on the strength of Alexander's invasion army (Brunt P. 1963). Arrian (Arr. Anab I. XI.3) only mentions a 35,000-plus force moving to cross to Asia, which matches the number of Diodorus. It also implies a grand total, with support units, such as the engineer corps (artillery and siege, bridging, fording and building units, plus logisticians). All these units were most probably left behind when the clash at Gaugamela was imminent and guarded closely (Arr. Anab III. XII.5), as they could not interfere in a pitched battle where the opponent could retake the initiative originally ceded to encourage battle at the field of

his own choosing and preparation.

The core was the Macedonian army, but even there, only a fusion of our sources allow definite conclusions on the organization and structure. Massive reinforcements had not yet arrived but for the class of 333 BC, 3,000 infantry and 300 cavalry, which had joined the army in Asia Minor, in Gordium (Arr. Anab. I.XXIX.4). Since then, only allied and mercenary contingents had arrived- although Brunt argues against this conclusion (Brunt P. 1963) and this provides even ampler numbers to account for casualties' replacements. Thus, the core of the army were the phalanx regiments, enumerated to six by Arrian (Arr. Anab. III.XI.8-10), plus the 3 Hypaspist brigades (also enumerated by Arrian, in III.XI.9), and the companion cavalry, enumerated by Diodorus (Diod XVII.LVII.1) and by Arrian (Arr. Anab. III.XI.8) to seven squadrons and the Royal Squadron on top of them.

The principles applying are that a heavy infantry unit is 10 times the size of a respective cavalry unit; that royal guard units are double the size of regular ones (Rzepka J. 2008) and that the Macedonian army, at the very latest from the Battle of Issus has its heavy line elements organized on a tertiary and not on the binary basis common in all Greek or Greek-type armies. Given that Arrian equates two Companion cavalry squadrons to 300 cavalrymen (Arr. Anab. II.IX.3-4) at Issus, the Companion Squadron/Ila must be 150-strong, the phalanx brigades/Taxeis are 1,500 strong each, the Hypaspist Corp double that, 3000 as is indeed mentioned (Arr. Anab. V.XXIII.7), and the royaI squadron should field 300 Cavalrymen (Tarn W. W. 1948, 162-3). It is most probable that this reorganization took place in Gordium in 333 BC before the Battle of Issus, using the manpower brought from Macedon by the 3 Generals (Arr. Anab. I.XXIV.1-2). The 3,000 freshly recruited Macedonian infantrymen allowed for one more regiment of 500 men for each of the 6 phalanx Taxeis brigades, and the same goes with the 300 cavalrymen, distributed by 50-horse units to 6 Companion squadrons, beefing them from the 100-strong level implied more than once (Arr. Anab. I.VI.1 & I.XVIII.1) into the 150-strong attested in Issus (Arr. Anab. II.IX.3-4).

Moreover, the Bodyguard is perhaps 200-strong (Arr. Anab. IV.XXX.3); a mixed force of Hypaspists and Bodyguards up to 700 (Arr. Anab. IV.XXX.3), can be broken to a standard unit (500-strong) of Hypaspists, and thus the rest, are the bodyguards. Possibly the bodyguard under Hephestion is committed along Companion cavalry in Gaugamela, according to Diodorus (Diod XVII.LXI.3).

Macedonian light cavalry and archers, might be steadily organized in a binary basis, thus the latter are probably divided in two subunits and are explicitly mentioned as a different unit than the Cretan archers in Issus (Arr. Anab. II.IX.2-3).

Thus the heavy Macedonian infantry accounts for 12,000, the archers for perhaps 1,000 more, the heavy cavalry for 1,400 and the light scout cavalry for an unknown number, but perhaps at 400-600; this is hardly 15,000, less than a third of the 47,000 grand total (Arr. Anab. III.XII.5). If esquires are added, which had an active role in combat, at least at this battle (Arr. Anab. III.XIII.6), there were at the very most one for each cavalryman and one every 10 infantrymen (Front. Strat. IV.I.6), this equals maybe 3,000 men (the bodyguards most probably had no esquire), pushing the total to 18,000, of whom 2,000 cavalry. Moreover, the headquarters-high command, scientific cadre, civil administrative, religious, treasury, courier, medical and siegecraft personnel cannot be calculated, but are over this total, despite the use of infantry for many secondary missions as is foraging and engagement in massive engineering feats.

Moreover, the Macedonian troops are THE main battle line in Gaugamela. Two massive flank guards are expressedly described and are comprised mostly by non-Macedonian units, with few light cavalry and light infantry exceptions. These formations were at a field strength of approximately 5,000 for the right flank guard and probably an equal number for the left, pushing the total

to 28,000, without counting esquires, which they might or might not have. And this is all of the Army of Alexander which took part in the battle. Arrian speaks of a second phalanx, behind the first echelon, but he never mentions one of its units by name but one, the royal hypaspists (Arr. Anab. III.XIII.6).

The usual explanation forwarded by historians is that the second echelon (Arr. Anab. III.XII.1) is made of southern Greek hoplites (Devine A. M. 1975; Griffith G. T. 1947) not mentioned due to disaffiliations of the primary sources, especially of Ptolemy. That may be; though Kleitarchus, the chief source of Diodorus (Steele R. B. 1922; Prandi L. 2012) was in Alexandria under Ptolemy I. Still, eliminating the whole body of such troops is a bit too much, especially for Arrian who is a soldier and understands the nature of things.

Actually, a body of allied Greek troops is identifiable at the left, in the flankguard, led by Koiranos (Arr. Anab.III.XII.4); Arrian explicitly calls this unit "Allied Greek Cavalry" (ibid). Though, he also mentions allied Greek cavalry at another position at the left (Arr. Anab. III.XI.10), and led by Erigius. The latter is elsewhere mentioned as the chief of allied cavalry (Arr. Anab. III.VI.6), whereas a somewhat shady text mentions a certain Kalanus as being appointed commander of the allied infantry (Arr. Anab. III.V.6). This unit has the same function with the mercenary unit of Kleandrus in the right flank (Arr. Anab. III.XII.2), which can be identified with 4.000 mercenary Greek infantry committed to himself and delivered during the siege of Tyre (Arr. Anab. II.XX.5). To identify 'Kalanus' with 'Koiranus' is not a long shot, especially in Greek lowercase scripts, where, in poor handwriting, 'oi' can be mistaken for 'a' and *vice versa* -which leads to correcting 'r' to 'l' and *vice versa*. After all, there is a very similar case with the astute Menidas, a protagonist in Gaugamela as commander of a mercenary cavalry troop (Arr. Anab. III.XII.3), who must be identified with 'Menoitas', bringing at Memphis such a unit, 400-strong (Arr. Anab. III.V.1).

The most probable solution lies with the professional way the Army of Alexander was conducing warfare. Alexander never deployed, in any of his 4 major battles, all his forces. Actually he committed almost half of them, being more conservative than the Spartan Authorities which sanctioned expeditions with up to 2/3 of the available forces of each ally (Thuc II.10).

He did not commit much more than half the national Macedonian army in Asia, leaving the rest with Antipater. In Granicus no allied and mercenary infantry are present, and in Issus even a whole taxis of the phalanx is –or, actually, might be considered-absent (Arr. Anab. II.VIII.3-4). For these battles there is a partial argument; he did not wanted to pit southerners against their mercenary cousins in Persian service-a weak argument in view of civil warfare and stasis in the Greek world for the last 150 years, but, truth be told, since its historical dawn.

But the pattern continues in Gaugamela and in Hydaspes. A more integrated approach might reveal that a considerable force was always left to guard a base, a camp or a bridgehead, to secure the rear and to provide a safe heavens if things do not evolve as wished. Thus, in Granicus the bridgehead and the dockings of the invasion fleet must have been heavily guarded for any surprises by independent Persian cavalry or any mobile force coming from the south, along the Ionian Coast; in Issus the pass and the entrance in the valley (Arr. Anab. II.VIII.1-2) and in Gaugamela a well-fortified camp, at less than a day's march from the battlefield (Arr. Anab. III.IX.1 & III.XII.5). Arrian specifies that Alexander took the army with their weapons only to the field in Gaugamela (ibid), aiming for-or fainting- a dawn attack (Arr. Anab. III.IX.2), but at the end enforcing exhaustion by keeping the Persians deployed in battle order and awake (Arr. Anab. III.XI.2), as had happened in Salamis in 480 BC (Herod VIII.76). The anecdote with Alexander sleeping heavily into the day (Diod XVII.LVI.1-2) must be seen into the same light; to unnerve and further wear down the Persian host.

It is more than certain that the elaborate train of siege park, artillery, the prisoners of war, possible hostages, the captured family of Darius and the acting court of Alexander which practically administered the conquered lands and Macedon were not dragged along at this forced march towards Darius, did not bivouac in the open (Arr. Anab. III.IX.4), on a rather steep hillcrest (steep enough to provide some security from the Persian mobile units, that is chariots, elephants and heavy cavalry), and did not march the following day against the Persian host. All these units were left behind to the major base camp (Arr. Anab. III.IX.1), along with a considerable force of 5,000 Thracians for their protection, for the defense and security of the camp, and for guarding the prisoners (Arr. Anab. III.XII.5). The fate of base camps has proven decisive both before and after Alexander, as in Marathon 490 BC (Herod VI.114-5), Kunaxa 401 BC (Xen Anab I.X.18-19), Aegospotami 404 BC (Xen Hellen II.I.28), Himera 479 BC (Herod VII.167; Diod XI.XXII.1-2), Plataea 479 BC (Herod IX.70), Thermopylae 191 BC (App Syr. IV.18-19), Magnesia 190 BC (App Syr VI.36).

It is often overlooked that the army of Alexander in Gaugamela is essentially the one of Issus, minus respective casualties of that battle, and additional casualties in Tyre, Gaza and Egypt. On the other hand, at the very least 5,000 mercenaries had been added: 1,000 mercenary cavalry who joined in Egypt; that is broken to 400 southern Greek under Menidas and 500 Thracian under Asclepiodorus (Arr. Anab. III.V.1), and 4,000 infantry under Kleandrus, which joined in Tyre (Arr. Anab. II.XX.5). The existence of flank guards, the generic structure, the composition of the wings and the exact disposition and order of the phalanx Taxeis are identical, despite the 2 years. There are some qualitative changes, as the 5,000 new mercenaries are posted to the right flank guard so as to allow the sum of the companion squadrons to be used at the focal point and to replenish the stock of mercenary infantry which was used up in garrison duties. For comparison, the army of Granicus although a bit more than a year distant to the one of Issus, sows little resemblance. Of course, differences in battle order are a function of the conditions and of the selected tactics, but the differences are many.

Still there are some standard operating procedures in all three battles: The most obvious is the mix of light infantry to the heavy cavalry (Arr. Anab. I.XVI.1), a practice of Boeotians and perhaps Thessalians, celebrated by Xenophon (Xen Hell VII.V.24).

The second is the ability of Alexander to move laterally on the battlefield without changing the front and disposition of his units. In Gaugamela it is done by the whole army in a diagonal fashion (Arr. Anab. III.XIII.1-2), but the Companion cavalry had done it before at Granicus (Arr. Anab. I.XIV.7).

But the most important and the least analyzed is the structure of mixed strike packages unleashed against far superior cavalry forces. Alexander used them in all 4 major battles and the use was in some cases multiple in spatiotemporal terms; thus it could happen more than once in the same battle. The basic idea is a shock action by heavy cavalry to both disrupt and pin down the opponent. Light elements, infantry or cavalry, support the sock action to protect the engaged troops and increase their lethality in the disrupted enemy lines (Arr. Anab. I.XVI.1), while heavy infantry charges at the double to engage the pinned enemy, dislocate it and route it.

The idea is not of Alexander's. The best use is in Pactolus, 395 BC, by Agesilaus (Xen Agesil I.31; Xen Hellen III.IV.23-24), but seems quite standard in 4th-century Greek battlefields. Still, its origins must be even older, as the 10,000 of Xenophon implement it with an ease implying a standard skill for professional troops (Xen Anab VII.III.46). Alexander uses this sequence to open the battle in Granicus and secure a bridgehead (Arr. Anab. I.XIV.6); to safeguard the rear of his right wing at Issus and perhaps to bolster his left wing which will be charged by an enormous mass of cavalry (Arr. Anab. II.IX.3-4). In Hydaspes (Arr. Anab. V.XIV.1-2) he

does the same, to engage an intercepting enemy force, and at Gaugamela both his flank guards are configured on this basis (Arr. Anab. III.XII.2-3 & 4-5) to withstand masses of enemy cavalry.

Maneuvering and engagements

The advance of the army of Alexander is an issue which taps onto the heart of the battle mechanics of the battle. The formation is perhaps obvious, and the same might be maintained for the drill; the intention is another dimension altogether, oftenly disregarded one.

In here another issue arises: Alexander spent the night at a summit (Arr. Anab.III.IX.4 & X.1), which means that Persians would be able to see his order of battle as he descended to the plain- or he deployed after descending. This is also consistent with the canted back flanks/ flankguards, which require some level space behind the main line.

The drill had been most probably the turn at 45 degrees right; practically, a half-turn "spearwards" (Arr Ars Tact XXI.1) and then advancing. Same sideways move, but by cavalry only, had been executed in Granicus (Arr. Anab. I. XIV.7). The formation, though, is more obscure. The whole battleline might have been moving simultaneously, which would present as little challenge in timing as possible; but still, moving *en echelon*, with different divisions starting the march successively, not simultaneously, would produce the added and highly desirable effect of denying the left , where envelopment was to be expected, for as long as possible. Once the maneuver at a slant was to cover the Persian front towards its left wing, his own right would become exposed.

Alexander had reconnoitered extensively the previous day (Arr Anab III.IX.5); and he spotted the uneven ground at the left flank of the field. Arrian says Darius camp was not well protected and safely entrenched (Arr Anab III.XI.1)- a sign it was occupied for a short time before the arrival of Alexander. And this was the reason for keeping his troops staying put in battle order, to avert the night raid advised by Alexander's staff (Arr. Anab III.XI.1 & IX.3 respectively). It is understood that traps might have been a legitimate concern for the Macedonian staff (Arr. Anab. III.IX.4), but they actually were not implemented as they would have marred the perfect Persian battlefield. The reconnaissance would have made this clear to Alexander (Arr. Anab. III.IX.5), which means that he quite simply was not in favor of a night action in this particular case-an action expected by Darius.

All these beg the question of the character of the uneven ground at the left of the Persian battle line (Arr. Anab. III.XIII.1-2). If it was rough enough to cause mobility problems for cavalry, how Bessus shadowed Alexander (Arr. Anab. III. XIII.1-2)?. It most probably was presenting problems to the deployment of the chariots only-as Arrian's wording clearly suggests. Thus, Alexander's slanted move would simply take him out of the threat of the scythed chariots, on grounds where infantry and cavalry would face no particular problems and would be able to maneuver at will. And it was rather improbable for this maneuver to be executed on time so as to evade the onslaught of the chariots. Flanking moves were not new; Xenophon mentions it for Thebans in Nemea, 394 BC (Xen Hellen IV.II.18) as an intentional maneuver, and not as a spontaneous event, as Thucydides determines narrating the First Battle of Mantinea 418 BC (Thuc V.71).

If we take into consideration that the motion sideways also threatened the Persian flank, which would give ample reason to the Persian commander at the left (Bessus) to extend, the move of Alexander would threaten (i) getting out of the killing field of the chariots, and (ii) launching a flanking attack; but, with a decent opposing commander it would not enable Alexander to actually do either. Most probably his aim was to stimulate these reflexes and cause a commotion in the Persian line so as to create a weak point to charge in, not around, and form internal flanks. In Issus, a straight charge did the trick, with the stout *xyston*

spears of the companions offering the edge against the *hoplon* shield and simple *dory* spears of Hoplites, both Kardaka mercenaries and Greek mercenaries (Arr. Anab. II.VIII.6). But in Gaugamela the new Persian weaponry might have been the reason for having to create a weak point before attempting to charge, a case not very dissimilar to the Battle of Granicus, where an initial charge disrupted the Persian line, caused redeployment and provided a foothold and a weak point (Arr. Anab. I.XV.1 & 3-4 & 7). In Gaugamela it was the same in a massive scale, with the successive charges and countercharges between the Persian left flank and the right flankguard of Alexander (Arr. Anab. III. XIII.3-4 &XIV.1), till the opportunity presented itself for the decisive charge (Arr. Anab. III.XIV.2).

On the contrary, Mazeus, the Persian commander at the right, flanked the Macedonian left much easier as the rightward move of Alexander gave him even more leeway, and send a cavalry detachment to the main Macedonian base. Diodorus account (Diod XVII.LIX.5-8) for the retrieval of the Persian royal family and the successful assault means the main camp. Arrian describes the action of the center which may have gone to the advanced camp, or to no cam at all: they may have wheeled to hit the phalanx from the rear. The 2nd echelon units could not have caught cavalry at the advanced camp, much less at the rear camp. Arrian messes the camp raid with an action at the rear of the phalanx. Persian detachments after flanking at their right, must have enveloped the Macedonian left which deployed defensively to fight at three sides and was pinned down. Either due to solidarity or because he was attacked and pinned as well, the second-left phalanx Taxis also stopped at its tracks and a breach was created (Arr. Anab. III.XIV.4). From this breach, Persian units (definitely NOT the elite units of the Great King's entourage) poured through the Macedonian phalanx (Arr. Anab. III.XIV.5) to attack it at the rear; thus the second phalanx echelon turned to receive this attack at their rear-not to give chase across an open plain (Arr. Anab. III. 6).

These Persian units, attacking from the rear would have front to their own battle order. So, they witnessed firsthand the collapse of the left Persian flank, leaving them behind enemy lines. This condition should have made them to retire fast and in poor order, through the gap they emerged from. These units must have been the ones accidentally intercepted by Alexander and his companions when they dropped the chase and turned left to assist their pressed left wing (Arr. Anab. III.XV.1-2)

Arrian dwells briefly to the turning point of the battle, the action developed by the combined arms attack of Alexander. He never mentions which enemy unit he fell upon, neither himself nor any of the phalanx brigades. His mention of phalanx and companion wedges (Arr. Anab.III. XIV.2) is most unsettling: the proposals of Devine (Devine A. M. 1983) befit rather a show than a tactical reality under pressure. Arrian's description of infantry wedge (Arr Ars Tact XXIX.5) is inapplicable here as the phalanx is deployed laterally: any other deployment, although possible by the tertiary organization of the Taxeis (Fig. 1), would nullify the tactical surprise for the scythed chariots and is not warranted by the sources. A slanted formation with every man lagging a step behind his rightward respective number (*parastates*) might have been possible (Fig. 2) but remains improbable.

On the other hand, cavalry wedges for the Companion Cavalry charge (Arr. Anab.III.XIV.2) are easy to depict. Arrian clearly mentions them as Macedonian practice since Philip (he does NOT imply a Scythian origin in the Macedonian use, despite the usual liberal interpretation of Arr Ars Tact XVI.6-7). The famous event with the Persian commanders in Granicus (Arr. Anab.I.XV.7-8) is explained perfectly if two wedges clashing frontally are taken into account. Each 50-strong subunit of an *Ila* forms a wedge (Fig. 3). Though, how these wedges were deployed in *Ila* and higher echelons is debatable: the tertiary organization of *Ilae* allowed a wedge of 3 wedges, a line, a column (which is possibly the *Ilae Orthae*, see Arr Anab. IV.IV.7) or a slanted line (Fig. 4). The formation

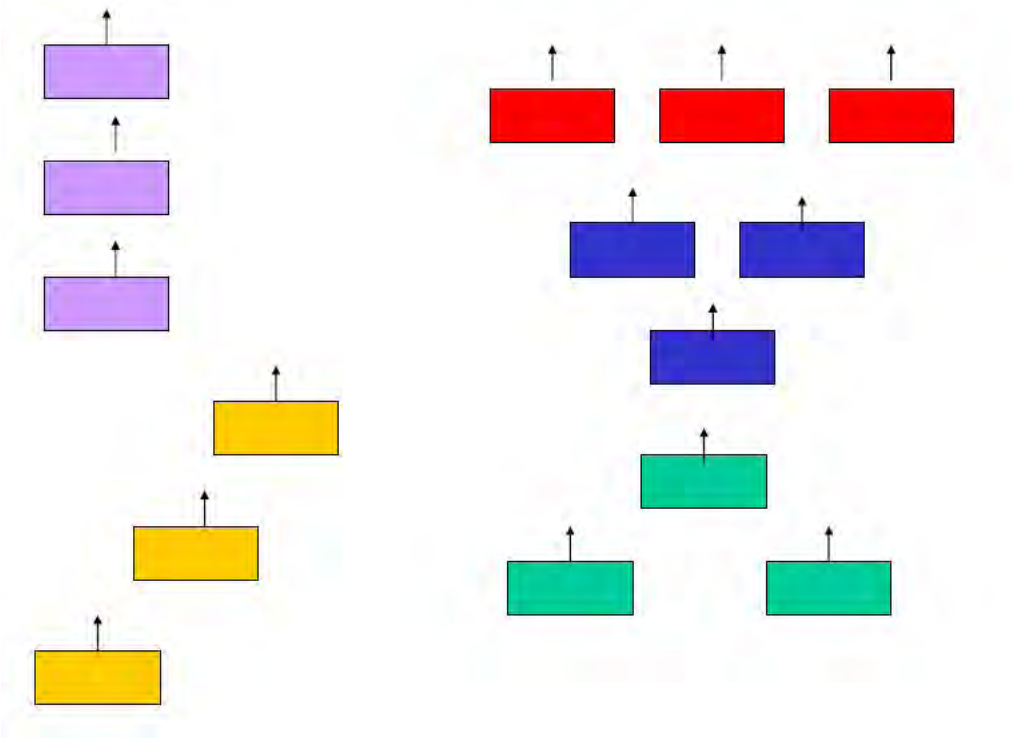

Fig. 1 Possible formations of the 3 Lochoi of a tertiary Taxis

of the seven Ilae adds even more to the uncertainty. The only sure thing is the incorporation of light infantry to support the charging cavalry- the units which initially screened the Companion Cavalry from the chariot attack (Arr. Anab. III.XII.3). The same practice may be assumed for the battle of Issus, though it is not directly attested. But it is expressedly stated for Granicus, and with great effect (Arr. Anab. I.XVI.1). In Granicus, though, two of the three units were assigned to the cavalry commander Philotas directly (Arr. Anab. I.XIV.1).

DOUBLE-EDGED PHALANX

Arrian mentions a double phalanx at Granicus (Arr. Anab. I.XIII.1), without any other comment, as, regarding heavy infantry, he only provides the disposition of the Macedonian phalanx (Arr. Anab. I.XIV.1-3) before the action. No whereabouts are mentioned for allied infantry units, nor for mercenary infantry, which implies either placement as a rear phalanx or back at the bridgehead to provide base security. The former option is bolstered by Arrian, when referring to Parmenio (Arr. Anab. I.XIII.3) stating that Alexander's army outnumbers the opposite force in infantry-the Persian infantry being estimated at less than 20,000 southern Greek mercenaries (Arr. Anab. I.XIV.4). Thus the double phalanx may be explained as a disposition of march, to be deployed in single line battle order once at the river bank.

But in Gaugamela the double phalanx is explicitly elaborated to a double-edged one (Arr. Anab. III.XII.1), a term adequately explained by the same author (Arr Ars Tac XXIX.1). Additionally, the tactical purpose and relevant orders are clearly mentioned (Arr. Anab. III.XII.1), at least part of its operational employment is attested (Arr. Anab. III. XIV.6) and one of its units is mentioned by name: the Royal Hypaspists, which eliminate Persian scythed chariots after the latter pass through the phalanx openings (Arr. Anab. III.XIII.6). Moreover, allied infantry is securing the left flank guard (Arr. Anab. III.XII.4) as the mercenary infantry does in the right flank guard (Arr. Anab. III.XII.2).

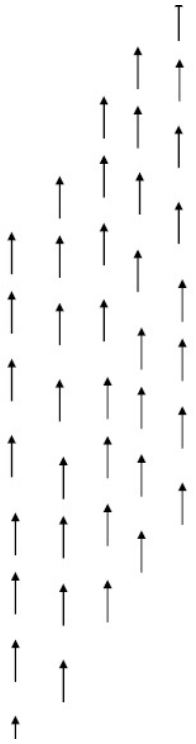

Fig. 2 A possible model for a slanted front in an infantry formation. Each file starts its advance lagging one step from the one at its right

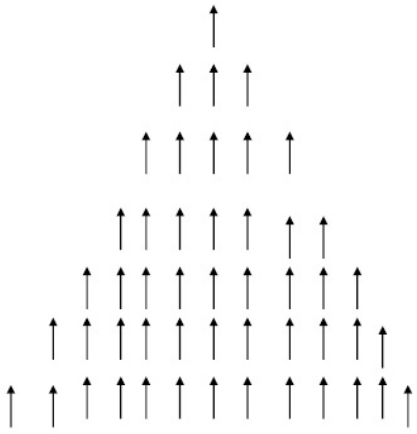

Fig. 3 Macedonian cavalry embolon of 49 cavalrymen in seven rows. Each row covers the rear flanks of the previous, thus explaining the famous incident at Granicus (Arr Anab I.XV.7-8); Cleitus must have been positioned left, second row, to have a shot at the armed hand of the flanking Spithridates

Thus, the hazy second phalanx line cannot have been made up by any other units as usually suggested (Devine A. M. 1975; Griffith G. T. 1947) which would have shaded the first line units, the Macedonian phalanx *Taxeis*. Cohesion, coordination of front and rear units and, most importantly, troop availability issues make it highly improbable. Rather, a true second phalanx line might be a better guess, a concept up to a point felt but not fully explored by Delbruck (Delbruck H. 1990). The Macedonian infantry *Taxeis* might have been deployed, each, in two echelons, the front one with two 500-man *lochoi*, the second with the third *lochos* (Fig. 5, 6). The rear lochoi, deployed to half depth, so as to cover a front equal to the two front ones, would form a real second phalanx, of decreased depth, equal front, shading the move of the first echelon and ready either to plug any breach or to about-face to meet a threat from the rear; thus any breach and encirclement might be managed, contrary to some views which insist on considering such eventuality outright destructive and fatal (Wrightson G.C.L. 2012).This disposition weighs heavily onto *Lochos* Commanders (Lochagoi) which explains Alexander having them in the briefing before the battle, to give orders and explain the plan (Arr. Anab. III.IX.6). The most probable drill to achieve about-facing must have been, at the time, the Macedonian Countermarch (Arr. Ars Tact XXIII.2 & XXIV.1), but the Laconian Countermarch might have been better suited if the front echelon had already been in contact (Arr. Ars Tact XXIII.3 & XXIV.2). The Macedonian army emphasized drill due to its origins dating back to the legacy of Iphicrates in Macedon (Aesch II.26-29) and to the days of Philip II as a hostage in Thebes (Diod XVI.II.2-4).

The same applies to the Hypaspist Corps. Arrian refers to the two units of the corps, the Agema and the Hypaspists as the rightmost units of the first echelon of the phalanx (Arr Anab III.XI.9). The third unit, the Royal Hypaspists, is not men-

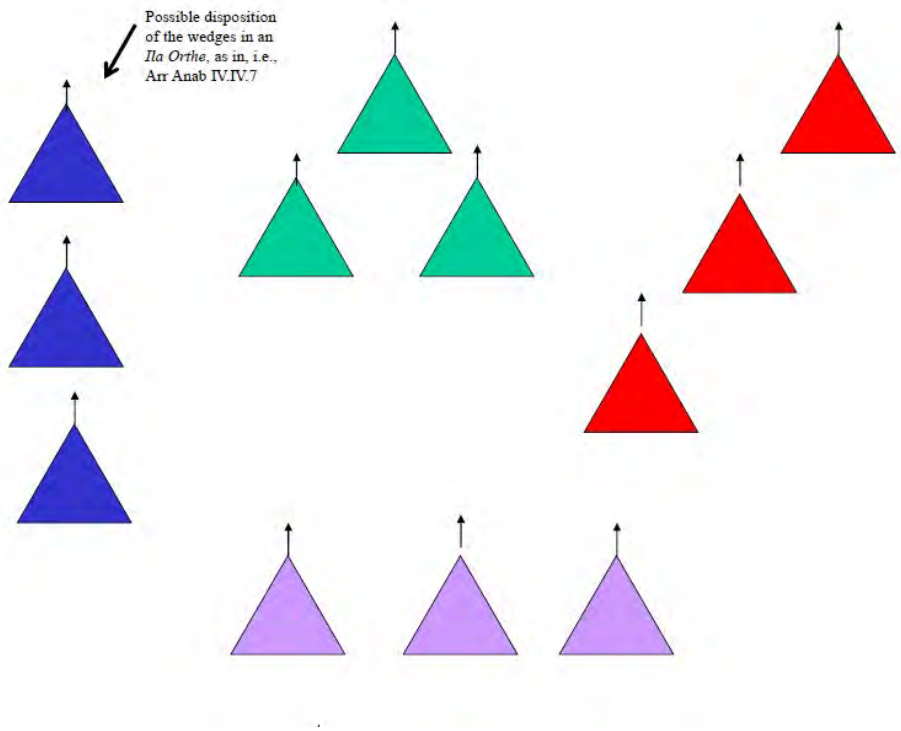

Fig.4 Possible formations of tertiary Ila, with three 50-man wedges

tioned, but only afterwards, when they were tackling scythed chariots having passed through the phalanx (Arr Anab III.XIII.6). Thus once more the most plausible model is a 2-echelon deployment, with two Chiliarchies of the corps in the front and the third at the rear, covering equal front with the two front ones by sacrificing half the normal depth.

The storming of Alexander's base camp

The issue at hand arises from the very different narratives of Arrian and Diodorus on the subject, which seem mutually exclusive, as are other parts of their respective works. Still things are not as they seem.

The latter describes a deep, planned raid to free the Persian prisoners and especially the royal family, sanctioned by Mazeus, the cavalry commander of the whole army and executed by two units (2,000 Kadusians and 1,000 Scythians) by flanking the Macedonian left (Diod XVII.LIX.5-8). The former considers Mazeus the commander of the right Persian flank, not the cavalry commander, and assigns the raid to Persian and Indian cavalry units (Arr Anab III.XIV.4-5) infiltrating through a rupture in phalanx line. Moreover he maintains that the rear echelon about-turns, pursues these two units and defeats them after the camp has been stormed (Arr Anab III.XIV.6). As they flee, they are accidently crashing onto the Companion Cavalry which has turn left to assist the hard-pressed Macedonian left wing (Arr Anab III.XV.1) and a major engagement ensued.

This clearly does not seem plausible, to pursue in open ground cavalry with infantry and somehow being able to intercept it. Arrian probably reports two different actions, not necessarily connected: First, an infiltration and raid by Indian and Persian horse, but while the Indians are indeed counted within the elite units of the Persian center (Arr Anab III.XI.5-6) and are not mentioned or counted anywhere else, the Persians may be also elite units from the center (ibid), but they might be equally

well regular units from the left flank (Arr Anab III. XI.3) or any cavalry unit of the empire, in a *sensu lato* use of the adjective "Persian". After all the elite guard cavalry of the center would have been reluctant to leave the King to execute a raid or even a charge against conventional, rank-and-file target.

Then, he narrates a bitter encounter between the Macedonian cavalry and Indian, Persian and Parthian horse (Arr Anab III.XV.1), without any more explanations. The Parthians are not counted among the cavalry which broke through and stormed the Macedonian camp (Arr Anab III. XIV.4-5). Thus it is most probable that the Companions engaged Persian, Indian and Parthian squadrons fleeing the field, without any connection or participation to the camp raid. Moreover, the Persian squadrons may well have been from the left flank (Arr Anab III.XI.3), the regular cavalry intermingled with infantry, and not the elite units from the center. The Parthians were stationed at the right flank (Arr Anab III.XI.4).

Could Diodorus account be reconciled with the above? Up to a point, it could. The detailed account of Arrian should be preferred to the much more educational, epic, biased and out-of-time, sensational narrative tale of Diodorus as a rule. Still, in this case the comparison is more balanced. Diodorus mentions the positioning of Cretan archers which do not feature at the account of Arrian. Diodorus have them positioned at the left flank (Diod XVII.LVII.4), as was their position in Arrian's account of the battle of Issus (Arr Anab II.IX.3), making it a very dependable and reliable reference. He also details fully the composition of the Greek allied cavalry in Gaugamela (Diod XVII.LVII.3) while he keeps it positioned exactly where Arrian does as well (Arr Anab III. XI.10).

On the contrary, Diodorus and Arrian disagree over the command of a phalanx Taxis. The detailed account of Arrian, over the feudal-hereditary leadership of the unit (Arr Anab III.XI.9) and the central point it had in the battle (Arr Anab III.XIV.4-5) make Arrian's reference more dependable than Diodorus plain reference (Diod XVII.LVII.2). By the same token, Diodorus account for the raid (Diod XVII.LIX.5-8) is more attractive as it gives more definite details and a perfectly plausible reasoning in intention and execution, while Arrian's account is shady and does not even clarifies the target. The fortified, main camp 60 or more stades -12 km- away (Arr Anab III.IX.1-2) or the provisional camp on the hillrange, less than 30 stades- 6 km- from the scene of the main battle (Arr Anab III. IX.3-4). Thus, Arrian's account should be generally preferred, but not always-and in many cases it is wanting, plain and simple (Griffith G. T. 1947).

A very important issue, at the heart of the present discussion, is the identification and positioning of both Skythians and Kadousians which Diodorus assigns to the raid (Diod XVII.LVII.5-8). The Sacae, the only contingent which might be identified with the Scythians mentioned by Diodorus (another Scythian unit-possibly Dahae-was deployed with the Bactrians at the left end but was engaged against the left flankguard of Alexander) are positioned at the right flank (Arr Anab III.XI.4). This is weird, as in III.VIII.3 Arrian clearly states that they are coming along with Bessus command as allies and should thus have been deployed at the left flank-the extreme left to be more specific (Arr Anab III.XI.3). Similarly, the Cadousians are positioned at the left flank (Arr Anab III.XI.3), although Arrian clearly states that they are coming along with the Medes, who are positioned at the right flank (Arr Anab III.XI.4). It is understood that the deployment plan, recovered by the Macedonians and referred to by Arrian, in some cases was not followed, as with the elephants which were included in the written Persian plan as an extra precaution against the Companion Cavalry (Arr. Anab. III.XI.6) but were not deployed in the actual battle, as they are missing from any account of the battle.

Still, the intended positioning of these two units is problematic, especially at the level of the intended use by either Mazaeus or the Persian High Command. It cannot be determined whether this had been an ad hoc task force organized by Mazaeus, a

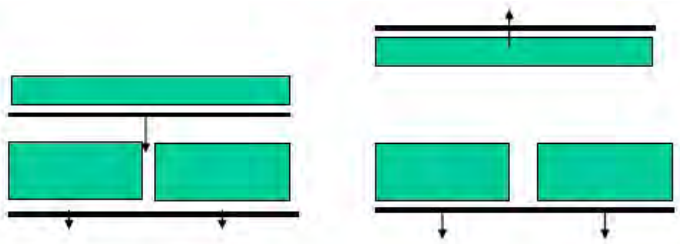

Fig. 5 The tertiary basis of phalanx organization as proposed in this manuscript suggests a double phalanx in Gaugamela which could become double-edged by executing a countermarch. The third Lochos, in half depth, double width, followed as second echelon the other two Lochoi of the Taxis, which were in normal depth side-by-side (thus forming first echelon), covering their rear in full. In this way it is ready to assist in the main effort and if the need be, meet a rear threat rapidly

Fig. 6 The wording of Arrian for the macedonian phalanx in Gaugamela (Arr. Anab. III.XII.1) suggests a book-case double-edged phalanx, as introduced in Ars Tactica XXIX.1 by the same author. This means the second echelon is deployed with the best troops (file leaders) at the very back and file closers directly behind the file closers of the first echelon. The advantage is the prompt reaction to the rear threat; men have simply to about-face individually. The challenge is that this format offers little –if any- support to the main effort

dispatch of available units at an opportune moment of the battle, or a standing order at the army for any unit found itself in suitable position to execute this rescue mission-with a hefty reward.

It is a most reasonable assumption that the raid was launched against the main Macedonian camp, 60 or so stades away (Arr. Anab. III.IX.2). It is there that the Persian royal family and the prisoners would have been kept, along with unfit or unreliable troops (Arr. Anab. III.IX.1). Out of sight of the battle, the guard might have been less alert. If the 5,000 Thracians (Arr. Anab. III.XII.5) were assigned to this, main camp, and not to the provisional one on the ridge, the low alertness would be understood-Thracian national units were not renowned for their discipline.

CONCLUSIONS

The battle of Gaugamela was a masterpiece of planning and execution. The plan correctly anticipated reverses and provided accordingly. It was meticulous, played well the psychological card and the tactical and technical superiority of the troops of Alexander's army. Keeping large numbers of the opponent occupied by small detachments and making Darius to expend early his options and reserves is a token of high competence, not the opposite (Diod XVII.LX.1; Griffith G. T. 1947). The same must be told regarding his personal implication. Criticism for abandoning his position of a general for the one of petty officer or trooper is inaccurate and targeted to exonerate military elites who gave up the glory of participation to the security of managing and commanding. Taking on the Persian empire was an unbelievable feat needing the belief and exceptional participation of his men. The leading by example made it happen, stroke terror within the Persians and legitimized the victory, as would have done for Cyrus the Younger 70 years earlier (Xen Anab I.VIII, 26).

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REZIME
BITKA KOD GAUGAMELE 331. GODINE PRE NOVE ERE: TRIJUMF TAKTIKE

KLJUČNE REČI: ALEKSANDAR VELIKI, DARIJE III, BITKA KOD GAUGAMELE, STANDRARNI POLOŽAJ, DVOSTRUKE FALANGE, TERCIJARNA ORGANIZACIJA, PRATNJA KONJANIKA.

Bitka kod Gaugamele 331. godine pre nove ere, bila je treća i poslednja bitka Ahemenidskog carstva, protiv nadiruće armije Aleksandra Velikog. Nasuprot detaljnim podacima, koji su manje kontradiktorni u odnosu na recimo bitku kod Granika koja se odigrala 334. godine pre nove ere, ima još uvek puno pitanja na koje nema odgovora, ali i suprotnih stavova. Koristeći antičke izvore, i upoređujući ih sa organizacijskim i tehničkim ograničenjima i mogućnostima, pokušali smo da razotkrijemo neke od činjenica o ovoj najneverovatnijoj antičkoj bici.

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NEW EVIDENCE OF THE CULT OF EPONA IN VIMINACIUM

ABSTRACT

During the excavation of the villa rustica from the 2nd century on the site of Nad Klepečkom near Viminacium, a fragment of a so-called snake vessel with an applied medallion was discovered in one of the rooms of the building. The medallion bears a representation of the goddess Epona. This find is the second iconographic representation of Epona discovered in Viminacium so far. In terms of iconography, it bears a resemblance to a marble relief previously discovered in Viminacium, as well as to the representations of the goddess on artefacts from the surrounding provinces in the Balkans. Nevertheless, certain details of the scene have closer analogies among representations from Gaul and Germania. This medallion is the first representation of Epona on a snake vessel, which has, until now, been related to oriental and certain Roman cults (Mithra, Dionysus/Liber), and the vessel itself was produced in a local workshop. Since this pottery vessel was most likely used by the residents of the villa, it represents a testimony of household worship of the cult of Epona in Viminacium.

KEYWORDS: MOESIA SUPERIOR, VIMINACIUM, VILLA RUSTICA, 2ND CENTURY, EPONA, SNAKE VESSEL.

INTRODUCTION

Viminacium, the capital of the Roman province of Moesia Superior, was founded during the 1st century AD on the right bank of the Mlava River, in the vicinity of its confluence with the Danube, near modern-day Kostolac.[1] The territory on which Viminacium emerged used to be inhabited by the tribe of Scordisci Minor prior to the Roman conquest. The Celts inhabited the Danube basin in the 4th century BC for the first time, while in the 3rd century, as noted by the writers from the period of classical Antiquity - Justin, Athenaeus and Strabo, a faction of Gauls returned to and permanently inhabited the territory around the confluence of the Sava and Danube rivers after the attack on Delphi in 279 BC; the Scordisci tribe was also founded in this period (Gavrilović 2011: 250). According to Strabo, Viminacium was situated on the territory inhabited by the Scordisci Minor, who lived together with the Thracians (Papazoglu 1969: 210). The archaeological finds that testify to the presence of the Celts in this territory are numerous. The most important discovery is that of a Celtic necropolis researched on the site

1 The article is the result of the project: *Viminacium, Roman city and military camp – research of material and non- material culture of inhabitants by using the modern technologies of remote detection, geophysics, GIS, digitalization and 3D visualization (no 47018)*, funded by The Ministry of Education, Science and Technological Development of the Republic of Serbia.

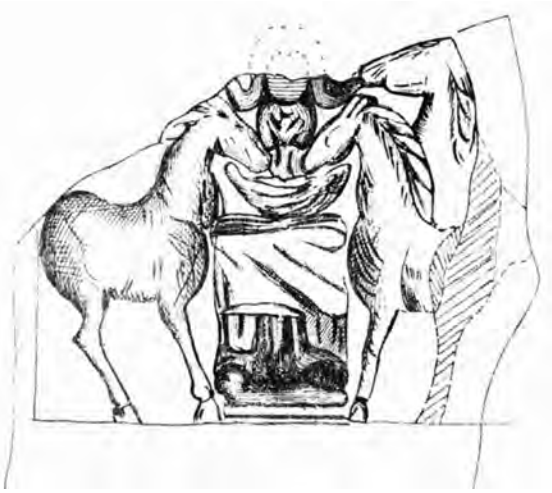

Fig.1: Drawing of the relief of Epona from Viminacium (after Gavrilović 2011: 259, Fig. 2).

of "Pećine", dated to the 4th and early 3rd century BC (Jovanović 1984; Јовановић 1985; Стојић и Јацановић 2008: 408-413). Apart from the above mentioned necropolis, there are also several more Celtic necropolises researched on the territory of Viminacium, as well as the related accidental finds: a part of a necropolis on the site of Rudine (Тапавички-Илић 2007), tomb finds on the site of Repnjak in Kostolac, tombs on the right bank of the Dunavac (Јацановић 1997), late La Tene pit graves on the site of Nad Lugom in the village of Drmno and late La Tene artefacts on the site of Čair (Спасић 1997; Спасић-Ђурић 2015: 18), while the largest portion of the finds comes from Kostolačko Ostrvo and Čibuklije (Стојић и Јацановић 2008: 162-167). The central Celtic settlement, that is, the *oppidum*, has not been archaeologically confirmed with any certainty, but recent excavations on the site of Mali Grad – Todića Crkva, carried out from 2007 to 2013, pointed to this area as the most probable location of the fortification from the 2nd century BC, inhabited until the middle or the second half of the 1st century AD (Спасић-Ђурић 2015: 19). The remains of a Celtic settlement were also discovered during excavations on the site of "Nad Klepečkom", about 2 km east of the legionary camp, during excavations that lasted from 2010 until 2012 (Golubović, Mrđić 2011: 124, Fig. 7, Fig. 8.3).

Apart from the Scordisci, soldiers recruited from the region of Gaul appear in Viminacium after the Roman conquest, around the end of the 1st century AD. Epigraphic finds with Celtic names or epithets which point to the persons of Celtic origin testify to the presence of a Celtic population (Gavrilović 2013: 177-179). Moreover, a large number of artefacts from the location of the Roman city (fibulae, weapons, jewellery and ceramics) is related to the Celts and testifies to a material and spiritual continuity, even during the Roman period (Gavrilović 2011: 253).

CELTIC DEITIES ON THE TERRITORY OF MOESIA SUPERIOR

The artefacts testifying to the Celtic presence in Viminacium are numerous. However, our knowledge of their spiritual and religious sphere is very modest, since the representations of Celtic deities are rare. Numerous pieces of evidence of Roman, oriental and Thracian cults have been discovered in Viminacium so far (Zotović 1996), while the only evidence of Celtic cults or deities is a marble relief portraying Epona (Fig. 1), dated to the 2nd - 3rd century (Gavrilović 2011: 259, Fig. 2). This relief, discovered on the site of "Čair", that is, the location of the Roman city, was kept in the Museum of Požarevac until World War II, after which it disappeared. The cult of Epona in the province of Moesia Superior is also confirmed in the hoard from Branetić on Rudnik, dated to the end of the 2nd century AD, where there is a silver plate with the inscription EPONE, while the goddess herself is represented on the handle of a silver patera, wearing a *corona muralis* on her head and holding a foal in her lap (Popović 1994: cat. 203).[2] Epona's dedicants were most likely miners, blacksmiths or hirers who came

2 Certain authors maintain that the representation is actually a syncretism of Epona, Terra Mater and Orcia (Јовановић 2007: 36-39; Gavrilović 2013: 176).

Fig.2: Roman villa rustica on the site Nad Klepečkom, Viminacium (after Jovičić, Redžić 2014: 54, Sl. 3).

from Gaul and worked in the silver and lead mines on Mt Rudnik (Поповић 1995: 153). The cult of the goddess Epona in the territory of our country is also noticeable indirectly, through the influence that iconographic representations of Epona had on the cult of the Danubian horsemen, i.e. on the representations of the central goddess which appears on the lead icons of that cult (Plemić 2013). This influence originally occurred on the border between Moesia Inferior and Dacia, from where it spread along the Danube to Moesia Superior, Pannonia Inferior and Superior, and was also observed in the workshops which produced lead icons in Viminacium, Singidunum and Sirmium (Plemić 2013: 69). A consecration to the female deity Dea Orcia, discovered on Avala, near Singidunum, should also be mentioned here, since there is a possibility that this was a Celtic goddess (Gavrilović 2013: 176).

Since evidence of the cult of Epona on the territory of Moesia Superior during the period of antiquity is scarce, we consider the find of a fragment of a ceramic vessel, discovered during the excavation of the large complex of a *villa rustica*[3] in 2013 on the site of "Nad Klepečkom", several kilometres east of Viminacium (Jovičić, Redžić 2014), especially significant. The villa had a central courtyard, a western utility and eastern residential part in which the remains of the floor and wall heating system have been discovered (Fig. 2). The entire complex is dated to the period of the middle and second half of the 2nd century. In the north-eastern, residential part of the villa, a fragment of a ceramic vessel with a medallion applied to it, containing an iconographic representation of the goddess Epona, was discovered in one of the rooms.

3 The research of the villa has not been completed. The dimensions of its researched area are 80 x 31.5 m; it consists of at least 24 rooms, and is the largest *villa rustica* researched in Viminacium so far.

Fig.3: Fragment of the snake vessels from the villa rustica with depiction of Epona, site Nad Klepečkom, Viminacium.

CERAMIC VESSEL WITH APPLIED MEDALLION OF EPONA FROM ROMAN VILLA ON THE SITE OF NAD KLEPEČKOM/VIMINACIUM

A fragment of vessel discovered in one of the rooms of the *villa rustica* on the site of Nad Klepečkom was made of medium fine-texture clay, in a red fabric, Munsell: 2, 5YR-5/8, while the outer surface has a red slip (Fig. 3). The diameter of the vessel measures 24 cm and the diameter of the application itself is 5.5cm (Fig. 4). According to the preserved part of the vessel, it is assumed that it belongs to a form whose production was confirmed in the workshop centre on the territory of Viminacium (Raičković 2007: 29, II/48, T. VI, sl. 59). A pot with two, or less frequently three handles, is one of the most numerous forms in the repertoire of the ceramic material of Viminacium. The discovered specimens are often ornamented using the barbotine technique, painting, stamping, but also with the application of ornaments. Since analogies can be found in Moesia Superior (Nikolić-Đorđević 2000: 85, II/52), as well as in the neighbouring provinces (Brukner 1981: 41, T. 105/11-16; Popilian 1976: 91, Pl. XXXIX/399-404), it could be asserted that production was carried out in several local workshops. Within this form, the group of the so-called snake vessels draws special attention; their specific feature being the application of a relief ornament, most frequently together with vegetative or geometrical motifs rendered by stamping. In most cases, the relief ornament is placed on the neck of the vessel, while the snake is always applied on the handles and often on the body and rim of the pot too. Several authors have studied this category of ritual vessels, but the prevailing opinion is that they were used in the cults dedicated to oriental deities, primarily Mithra or Sabazios. Fragments of snake vessels were found, for example, as a part of the inventory in the third Mithraeum in the Carnuntum and dated to the second half of the 2nd and the 3rd century (Gugl, Kremer 2011: 171, Nr. 48). However, recent finds point to their belonging to the cult of Liber, the god of fertility, and his companion Libera (Cvjetićanin 2001: 95-96), which is also testified by the fragment of a snake vessel

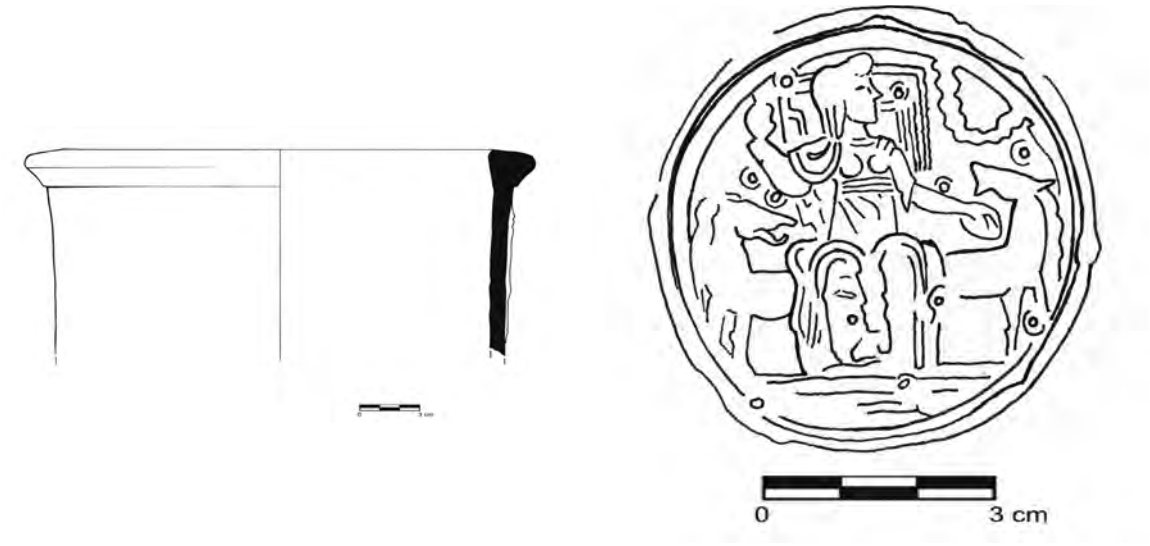

Fig.4: Drawing of the snake vessels fragment (left) and applied medallion with depiction of Epona (right), site Nad Klepečkom, Viminacium.

from Viminacium (Fig. 5), discovered on the site of Pećine, within the workshop centre, on which this deity is represented (Raičković, Redžić, Milovanović 2006: 70, T. II). We assume that pottery fragment from the site of Nad Klepečkom with representation of goddess Epona belongs to this type of ritual vessels.

The central figure, dominating the application, is the goddess. She is sitting on a throne represented by vertical curved lines. Epona is dressed in a long tunic (*chiton*) girdled below the chest. The robe is defined by oblique lines in the region of her stomach. Over the tunic, she is wearing a long himation (*palla*), which covers her arms and reaches her feet and is richly draped around the knees. The goddess's legs stand apart, the knees are separated and the feet are on the pedestal (*suppedaneum*). Her left hand is raised towards an animal and she is holding a patera in it. The part of the arm covered by the robe is clearly discernible from the rest of her arm, which is bare. The right hand is raised, and the goddess is holding a small object in it, but it cannot be identified with certainty, since it was rendered in a simplified manner due to the lack of space. The goddess's head is shown in profile. It is turned to the left, and the only clearly visible details are the nose and the eye. The hair most likely has a middle parting, though it is possible that there is a representation of a crown or a veil on the top of her head, since it is flat. Below it, thick locks falling down to the shoulders are visible. The horses flanking the Epona are considerably smaller than the goddess, so these are most likely the representations of foals. Their bodies are directed away from the goddess, but their heads are turned towards her, while the rear legs are behind the throne on which the goddess is seated. Behind the head of the foal on the right side, there is a representation of mane, which can be noticed behind the foal on the left, too. The horses have no headstall or reins, they are depicted completely without equipment. A motif of an arching garland is depicted in the upper right part.

THE CULT OF EPONA IN THE ROMAN PERIOD

During the Roman period, Epona was the most popular Celtic deity, appearing on the largest number of artefacts (Linduff 1979). The goddess's name stems from the Celtic word for a horse, i.e. mare – *epos* (Monaghan 2004: 249). Epona is the protectress of horses, mares, foals and everything related to horses, a goddess of fertility, an iatric deity and the protectress of the dead (Boucher

Fig.5: Fragment of the snake vessels from Pećine/Viminacium with depiction of Liber/Bachus (Спасић-Ђурић 2015: 98, Sl. 99).

1990: 997). As a horse goddess, Epona is also the protectress of equestrianism, muleteers and horse stables, and of carriages, transport and trade, that is – all occupations related to horses (Turcan 1996: 23). On the iconographic artefacts, Epona is depicted either riding a horse, mare or a foal, which is typical of the region of Gaul and Germania (Fig. 6), or sitting on a throne flanked by two (or more) horses (Fig. 7), which represents the so-called "Imperial" type, predominant in the Danube basin and across the Empire (Boucher 1990: 986-991; Euskirchen 1993: 622-676). Epona is the goddess of fertility and vegetation, so in iconography, a wheat ear, the horn of plenty (*cornucopia*), a basket with fruits and a patera from which she is feeding horses appear as her attributes. The representations from Gaul relate her to the underworld and a chthonic aspect, she protects the decedents and leads them on their journey from this world to the afterlife, so on these representations keys, dog and raven appear as her attributes (Green 1992b: 17-19). As a healing deity, Epona is connected to wells, lakes and thermal water springs (Linduff 1979: 833).

The cult of Epona is evident across the Empire, from Great Britain to the Balkans, and the finds correspond to the distribution of the Roman legions in Europe and are, in most cases, connected to legionary forts. The iconographic artefacts are primarily made of stone, or less frequently of bronze and terracotta and, together with consecrations, date back to the 2nd and 3rd century. The finds dedicated to Epona are most frequent in northern Gaul (Burgundy, Metz-Trier, Meuse), in the Rhine basin and in both Germanias (Linduff 1979: 821; Green 1992b: 16, map 4; Bucher 1990: 985-999). According to the epigraphic inscriptions, in the legionary forts on the Rhine and Danube, Epona was recognised and worshipped primarily as a military goddess, the protectress of the cavalry and horses, who protected the soldiers on the battlefield (Green 1992b: 16). The cult had an official character, and its dedicants were mostly the legionaries, specifically, those from the cavalry regiments predominantly comprised of Celts and, later, Germans. At first, the cult was observed by the population from Celtic regions, that is, individuals and groups from the Celtic ethnic corps. However, over the course of time it spread among the civilian population belonging to other ethnic groups, but related to horses and equestrianism. Epona was worshipped in homes and sanctuaries, for example in Burgundy, in Ebtrains-sur-Nohan (Nievre), where one temple dedicated to Epona

has been discovered (Green 1992b: 16). The goddess's popularity also stems from her universal character as a mother goddess who is a symbol of fertility, life and death, looking after prosperity, abundance, health and regeneration, and as the protectress of people in the afterlife (Green 1992a: 205-207). Epona also became a member of the Roman pantheon, which was made official in Rome, where Epona was the only Celtic deity which had a public holiday every year on December 18 (Duval 1976: 50; Green 1992b: 19). Horses and mules were decorated in honour of Epona, and Celts never ate horse meat out of respect for her, which also spread as a taboo across the European cuisines in later periods (Monaghan 2004: 249).

Fig.7: The so-called Imperial type of Epona's representations, Relief of Epona from Museum of Fine Arts, Budapest (after Boucher 1990: 994, Nr. 207).

DISCUSSION

The most frequent type of representations of Epona on the artefacts from the Roman period is those in which the goddess is riding a horse; this is characteristic of Gaul and Germania (Linduff 1979: 823, Typ A; Euskirchen 1993: 625-662, Typ I-V). However, that type is rare in our region and has only been identified on one silver plate from the hoard in Petrijanec (Šiša-Vivek, Leleković, Kalafatić 2005: 236, slika 7). On the application of the snake vessel from the site of Nad Klepečkom there is a representation of the goddess Epona which belongs to the type in which she is sitting on a throne, flanked by horses, i.e. the "Imperial" type, typical of the Danubian provinces of the Empire, which appears from the 2nd century AD (Linduff 1979: 823, Typ B; Boucher 1990: 986-991; Euskirchen 1993: 662-676, Typ VI-VII, Kat. Nr. 212-245). The only artefact dedicated to Epona which has been discovered in Viminacium so far (Gavrilović 2011: 259, Fig. 2), but also the finds from across the Balkans, in the neighbouring provinces, such as the relief from Koprno in Croatia (Cambi 2002: 207, Fig. 1.), two reliefs from Tibiscum in Dacia (Timoc 1997: 115-117, Fig. 1, 2), a relief from Thessaloniki **(**Boucher 1990: 994, Nr. 206), a relief from the Museum of Fine Arts in Budapest (Boucher 1990: 994, Nr. 207) and the relief from Harletz/*Augustae* in Moesia Inferior (Euskirchen 1993: 675, Kat. Nr. 242) belong to this type. Nevertheless, all of the above mentioned artefacts from the surrounding provinces belong to a sub variant

Fig.6: The so-called equestrian type of Epona's representations, Alt-Trier (after Euskirchen 1993: 647, Abb. 16).

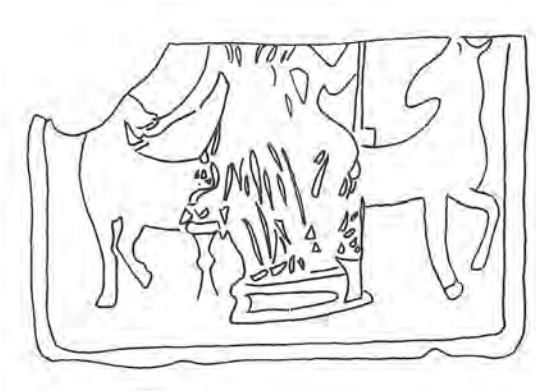

Fig.8: Drawing of the relief of Epona from Ostia (after Euskirchen 1993: 674, Kat. Nr. 238, Abb. 33.2).

of the type in which the horses are represented facing the goddess (Euskirchen 1993: 665-669, Typ VI, Variante 1), while the representation on the relief from Viminacium shows horses turned away from the goddess so, according to Euskirchen, it belongs to sub variant 3 (Euskirchen 1993: 671-674, Typ VI, Variante 3). This sub variant appears on a brick fragment from Ostia (*Italia*) (Fig. 8), a bronze sculpture from Muri in Switzerland (*Raetia*), reliefs from Limbach in Saarland (east Gaul), Köngen (Fig. 9) and Öhrningen (*Germania Superior*) (Euskirchen 1993: Kat. Nr. 233-238) and on a gemstone held in the National Museum of Denmark, in Copenhagen (Fig. 10) (Boucher 1990: 994, Nr. 200a). These finds are dated to the end of the 2nd or the very beginning of the 3rd century AD, which also corresponds to the period to which the fragment of a snake vessel with a representation of Epona from the *villa rustica* in Viminacium was dated. On four of the six above mentioned artefacts, the goddess is either feeding the horses from a basket or stroking their manes. Hence, the specimen from Ostia (Euskirchen 1993: Kat. Nr. 238) and the gemstone from Copenhagen are direct analogies with our specimen, since they represent the goddess with her right arm outstretched towards a foal she is feeding, while in her raised left hand she is holding a stick, or a sceptre on the specimen from Ostia, and a horn of plenty on the gemstone from Copenhagen. The difference with the representation from Viminacium is that in it, the left hand is outstretched towards the foal and in her right hand the goddess is holding an object. Such positioning of the hands is more frequent on the finds which belong to the Equestrian type than on those belonging to the Imperial type. The object that Epona is holding in her raised right hand cannot be identified easily. It cannot be determined with certainty whether it is a cornucopia or a stick/sceptre, since the representation of the object is schematised, i.e. due to the lack of space on the applied medallion, the craftsman could not render a detailed representation of the object. The hand is raised up high, which leads us to believe that it could be a sceptre.

On the application from the snake vessel from the villa in Viminacium, the goddess's body is depicted en face, while the head is shown in profile. In most of the specimens belonging to this sub variant, both the body and the face of the goddess are shown en face, while only the specimen from Copenhagen shows the goddess in profile, so the representation on the snake vessel from Viminacium is a combination of these two types. The goddess's head shown in profile is more common on artefacts belonging to the Equestrian type. The horses, i.e. foals, on the medallion are represented directed away from the goddess, but their heads are turned towards Epona. On the specimens belonging to this type, the horses' heads are turned

Fig.9: Relief of Epona from Köngen (after Euskirchen 1993: 672, Kat. Nr. 236, Abb. 31).

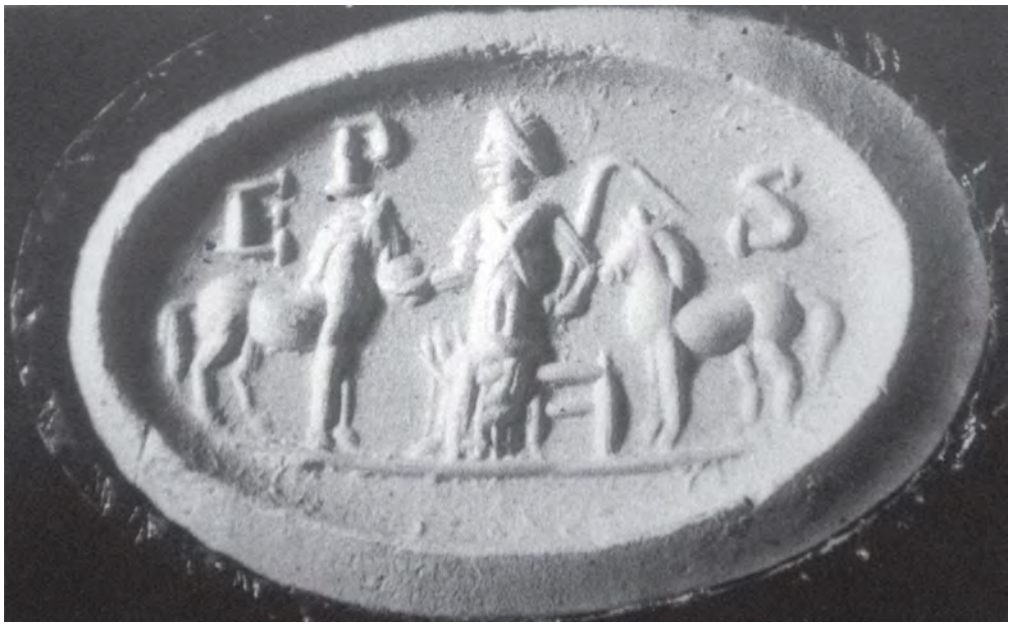

Fig.10: Carnelian gem with the representation of Epona, National Museum, Copenhagen (after Boucher 1990: 994, Nr. 200a).

away from the goddess, or shown en face, so the only analogy with our medallion, when it comes to the representation of the horses, can, once again, be found in the specimen from Ostia.

The garland in the upper right corner of the representation on the medallion remains a mystery. On certain reliefs, curtains appear in the corners of the scene itself, as is the case with the specimens from Budapest (Boucher 1990: 994, Nr. 207) and Rome (Schleiermacher 1932: Taf. 15). The garland on the specimen from Viminacium could be an imitation of these representations, since there was not enough space on the medallion to depict the other, symmetrical curtain in the opposite corner, which is absent for this reason. However, the garland and the curtains in the scenes from Budapest and Rome are not represented in the same manner - the garland has imbostures, which could represent a rose wreath. This is possibly pointed to by Apuleius in his "Metamorphoses", where he notes that in Thessaly, the icons of the goddess Epona held in the stables were decorated with rose garlands (Apuleius, *Metamorphosis,* III, 48). Therefore, the garland on our medallion could be a schematised rose garland, but there are no iconographic analogies for it.

The representations of Epona on ceramic vessels are extremely rare. The only analogies among the discovered materials are found on a fragmented bowl from Triere, rendered in the *terra sigilata* technique (Ebermann 2015: 13, Abb.1) and on a ceramic medallion from Lectoure (Euskirchen 1993: 663, Kat. Nr. 210). However, the reliefs on the fragments from Triere and Lectoure depicting Epona belong to the artefacts of the Equestrian type, while the representation of the goddess on the ceramic vessel from Viminacium belongs to the so-called Imperial type of representation. If we observe the relief representations of Epona, we can conclude that there are no regularities in the iconographic representation of the goddess, i.e. that a certain material the artefacts are made of does not necessarily imply a specific manner in which the relief depicting the goddess was rendered.

All of the finds of ceramic vessels with applied snakes discovered so far are related to certain oriental or Roman cults, which is not the case with the newly discovered specimen of a ceramic vessel from the villa east of Viminacium. Interestingly, all of the specimens from the territory of Viminacium come either from the settlement layers or from the funerary, i.e. utility units (Raičković, Redžić, Milovanović 2006). Since these vessels

do not belong to a specific sanctuary, they can be the confirmation of a private, house cult, taking into account the symbolism of the snake as the protectress of the home (Vámos 2009: 538). It is assumed that the cult of the Celtic deity was close to the residents of the villa so, bearing that in mind, we can interpret a fragment of a ritual vessel with a representation of Epona, which had the role of a family protectress, as possibly being of Gaulish origin. There is also a possibility that the owner of the villa in Viminacium could have been a military veteran who saw his military service in the cavalry, since it is known that the soldiers from these regiments were often Epona's dedicants.

The interpretation of the snake vessels, as well as their dedication to oriental cults, or the deities of the Roman Pantheon, whose primary bearers were the soldiers of the regiments from the East, was exclusive. The recent find of the ceramic medallion can offer an additional interpretation of the ritual vessels, related to the cult of goddess Epona.

CONCLUSION

A fragment of a ceramic vessel with a representation of the Celtic goddess, beside the previously discovered stone relief, additionally confirms the observance of the cult of Epona in Viminacium in the 2nd century. The special importance of this object is reflected in the fact that this time the context of the find is known. It represents a unique specimen among snake vessels, opening a new chapter in their interpretation. Since the representation is found on a ritual vessel used in certain rites, this is most likely confirmation of a house cult, observed by the residents of the villa. Observing only the applied medallion with the representation of the goddess, we could conclude that it was created under the influence of the established iconographic schemes from the stone artefacts of the so-called Imperial type which are, at the same time, the most common type of Epona representation in the Danube basin.

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REZIME
NOVI DOKAZI O KULTU EPONE NA VIMINACIJUMU

Prilikom istraživanja antičke vile rustike iz II veka n.e. koja se nalazi istočno od grada Viminacijuma, pronađen je fragment keramičke posude koji je izazvao posebnu pažnju. Naime, radi se o keramičkom loncu sa apliciranim medaljonom na kome je predstavljena keltska boginja Epona. Kelti su na prostoru Viminacijuma u trenutku rimskog osvajanja predstavljali starosedeoce, a brojni arheološki nalazi potvrđuju njihovo prisustvo i tokom rimskog perioda. Nalazi koji svedoče o rasprostranjenosti kulta Epone na prostoru provincije Gornje Mezije su izuzetno retki, pa je stoga značajno predstaviti ovakav jedan primerak koji potvrđuje zastupljenost kulta posvećenog boginji Eponi, pored već poznatog kamenog reljefa koji je pronađen u Viminacijumu. Epona je kao zaštitnica konja i konjaničkih veština u najvećem broju slučajeva poštovana od strane vojnika, pa je u početku sam kult definisan kao vojni, da bi kasniji nalazi potvdili i civilni, odnosno kućni kult. Ikonografski prikaz Epone na posudi pripada tzv. „imperijalnom tipu", koji je najčešće zastupljen na Balkanu i u Podunavlju, gde je boginja prikazana kako sedi na tronu okružena konjima ili što je verovatnije, ždrebadima. Boginja je obučena u hiton i himation, a u levoj ruci drži pateru koju pruža ka jednom ždrebetu. Predmet koji boginja drži u desnoj, uzdignutoj ruci je teže protumačiti pošto je predstava šematizovana, ali se najverovatnije radi o štapu ili skiptru. Položaj konja, koji su okrenuti u smeru od boginje, izdvaja ovaj primerak od primeraka iz obližnjih provincija. Najbliže analogije našoj predstavi nalazimo na prikazima Epone iz Ostije, istočne Galije i Germanije.

Za primerak iz viminacijumske vile možemo reći da je bio sastavni deo kućnog kulta, s obzirom da je pronađen u rezidencijalnom delu objekta. Sve karakteristike keramičke posude ukazuju da se radi o formi čija je funkcija bila prvenstveno trpeznog karaktera, da bi grnčari u određenom trenutku započeli proizvodnju sakralnih posuda u okviru ovog oblika. Reč je naime o tzv. „zmijskim posudama" čija se upotreba vezuje za kultove koje je rimska vojska donela sa Istoka, posvećenim božanstvima Mitri ili Sabaziju. Takođe, sakralne posude su tumačene i kao sastavni deo kulta boga Libera, što potvrđuje i jedan primerak posude sa apliciranim medaljonom tog božanstva pronađen na Viminacijumu. Viminacijumski primerak sa predstavom Epone, za koji smatramo da pripada upravo ovom tipu posuda, govori nam da je njihova primena imala značajnu ulogu i u kultu jednu keltske boginje.

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ARCHAEOLOGICAL SITES FROM ANTIQUITY REGISTERED IN THE SURROUNDINGS OF HOT SPRINGS ALONG THE DANUBIAN LIMES IN SERBIA

ABSTRACT

Along the Roman limes (the part located in today's Serbia) there were several hot springs. Alongside some of them, archaeological sites were registered, which would suggest the possibility that those hot springs were exploited in Antiquity. This paper gives an overview of the sites and findings discovered in the vicinity of the hot springs at Milutinovac, Boljetin, Višnjička Banja, Leštane, Vrdnik, Slankamen and Erdevik.

KEYWORDS: LIMES, DANUBE, ARCHAEOLOGICAL SITES, HOT SPRINGS, SERBIA, MILUTINOVAC, BOLJETIN, VIŠNJIČKA BANJA, LEŠTANE, VRDNIK, SLANKAMEN AND ERDEVIK.

Bearing in mind some basic theoretical demands, on one hand, as well as, on the other hand, the complexity and diversity of the geological structure of the territory of Serbia, and the existing structure –geological, geomorphological, hydrogeological, physical-geographical and other circumstances, B. Filipović divided the territory of Serbia into the following six hydrogeological regions:

1. Dacian Basin region
2. *Carpatho-Balkan region*
3. Serbian crystalline core region
4. Šumadija-Kopaonik-Kosovo region
5. Dinaric region in Western Serbia
6. Pannonian basin region (Филиповић 2003: 15).

The subject of this paper is the archaeological findings (mobile or otherwise) from Antiquity discovered in the vicinity of hot springs in the area of the part of the Danubian limes which is located in the territory of today's Serbia. The goal of this paper is to establish whether those healing water springs alongside the Danubian limes were known and exploited during Antiquity. In order to determine a possible continuity of exploitation of those springs, prehistoric and medieval layers will also be mentioned, registered on sites for which we have confirmed that they existed in Antiquity.

Sites registered at Milutinovac (Dacian Basin region), Boljetin (*Carpatho-Balkan region*), Višnjica and Višnjička Banja, Leštane (Šumadija-Kopaonik-Kosovo region), Vrdnik, Slankamen and Erdevik (Dinaric region in Western Serbia) will be presented in the paper.

MILUTINOVAC

Early Byzantine period		Fortification	6th century

Milutinovac is a settlement in the municipality of Kladovo, in the Bor District.

The existence of hot springs at Milutinovac was not noted in B. Filipović's overview. However, traces of the existence of a former water source were noted by F. Kanitz. The traveller noted that it ran beneath the hill of Čuka Mare (altitude above sea level, 366 metres), to the northeast from Mi-

lutinovac, where there were, incidentally, the remains of an earth fort from the First Serbian Uprising, according to Kanitz, built on foundations from Antiquity: "At the bottom of this sharply profiled hill there is a source of rather tasty warm salty water; because of that, not far from the village which was inhabited three decades ago by people from Montenegro, test drills were made eighteen years ago in hope of finding salt, but to no avail" (Каниц 1989: 481-482).

Kanitz noted that there was a rectangular fort in the village of Milutinovac, approximately 50 x 60 metres in dimensions, certain parts of which were preserved up to the height of two metres. The traveller thought that the remains of the fort would disappear in a very short span of time (Каниц 1989: 481-482).

The fort, whose local name remains unknown, was provisionally identified by P. Milošević and M. Jeremić as *Timena*, a fort registered by Procopius. It was erected on the spot where the Danube is at its' narrowest, so as to enable the control of a large, nearby sandbank, whose existence additionally facilitated the crossing of the Danube. Since the site was put in danger by the building of the hydro-power plant Đerdap II, archaeological excavations were conducted (Milošević i Jeremić 1986: 245).

Research has shown that it was an early Byzantine fortification from the 6th century, of approximate dimensions 48–49.90 x 54 m on the inside, and 51.80–53.30 x 57.80 m on the outside. The corners of the fortification where strengthened with one circular (southern tower) and three ellipsoid towers. The existence of a quadrangular tower was registered in the middle of the oval rampart, and the entrance into the fort was probably there as well. On the inner side of the rampart, parts of stair constructions were discovered, and also the exit to the footpath. The width of the rampart is 1.90–1.95 m. When it comes to mobile findings, fragments of early Byzantine amphorae and half *folles* of Justin II were found, dated into the seventh decade of the 6th century (Milošević i Jeremić 1986: 246–249).

The location of the fort at Milutinovac was certainly chosen because of strategic reasons, most prominently the fact that it was built at the point where the Danubian Ključ is the narrowest. However, we do believe that the existence of a nearby hot spring significantly influenced the everyday life of the people manning the fort, hence, this site can be put on the list of those connected to healing springs. The noted existence of a former hot spring at Milutinovac influences the opinion that similar springs, which no longer exist, could have been present alongside other sites in the region as well.

BOLJETIN

Antiquity		fort	1st – beginning of the 5th century
Early Byzantine period		fort	6th century
Middle Ages		necropolis	10th–11th century

Boljetin is a village in Serbia in the Municipality of Majdanpek, in the Bor District.

The existence of a hot spring at Boljetin was noted by Felix Kanitz. There are no mentions of the existence of that spring in modern literature. The traveller wrote that the Antique fort, not far from the confluence of the Boljetin river with the Danube, is located "on the opposite side of the hot spring which originates from the very river, not far from the bank" (Каниц 1985: 214).

The existence of a military encampment was registered in the area of Boljetin, used from the 1st until the 6th century. It was built in the first half of the 1st century, as an earth fort with palisades.

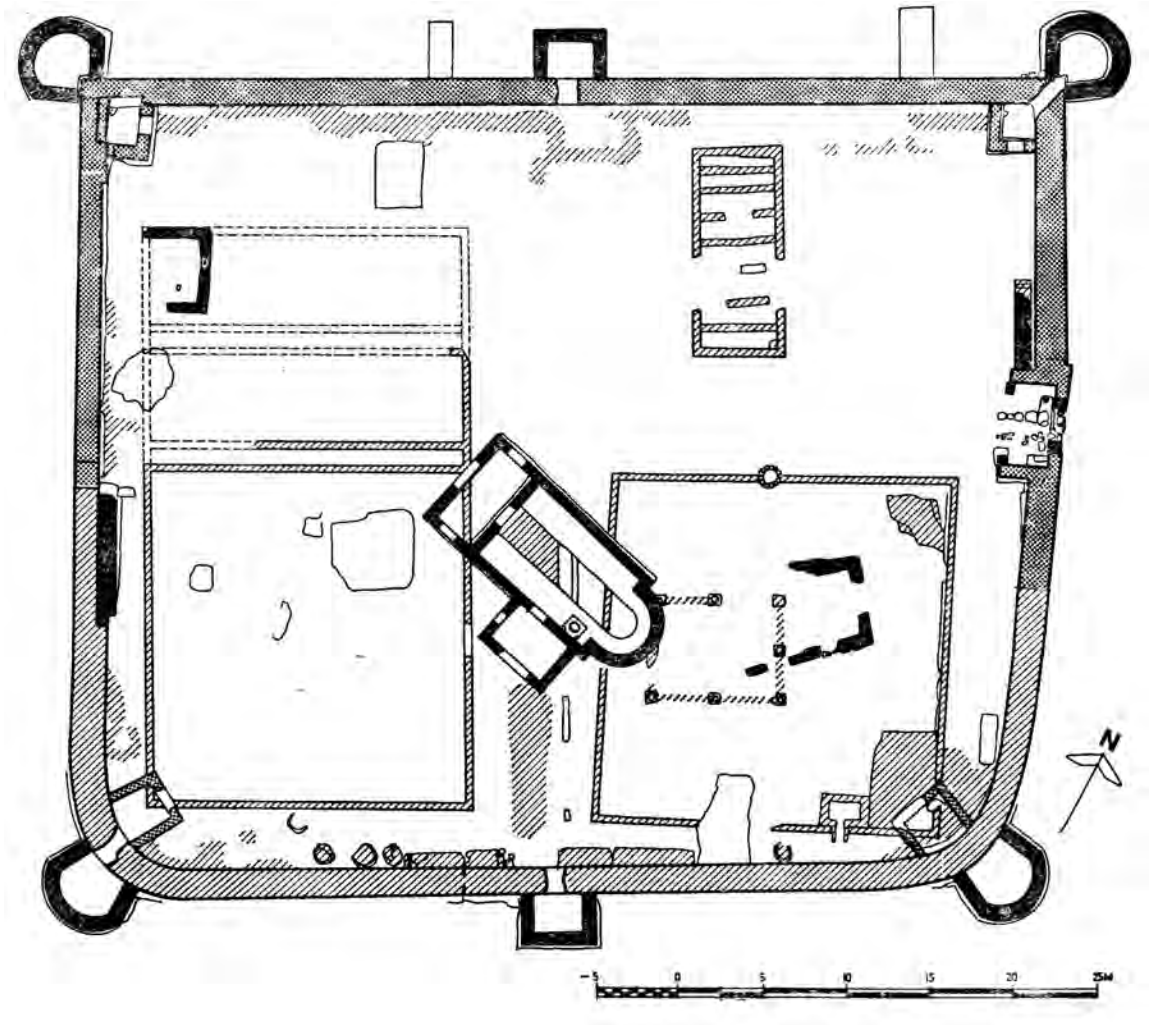

Fig. 1. The ground plan of the fortification at Boljetin, according to: Зотовић 1982/1983: 213, сл. 2.

During the second half of the 1st century, ramparts were built. The fortification was abandoned in the 2nd century, maybe during the reign of Hadrian. It was rebuilt for the first time just before Aurelian left Dacia. It was destroyed in a great fire in the first decades of the 5th century and was rebuilt for the second time during Justinian's great restoration in the 6th century (Зотовић 1982/1983: 211).

The dimensions and internal organisation of the earth fort remain unknown. Conclusions about it can be drawn from its stratigraphy and analysis of architectural remains from the 1st century. Remains of the fortification from the second half of the 1st century were noted only in the south-eastern half of the encampment. The dimensions of the oldest fortification have not been precisely established. We do know that the north-eastern to south-western axis corresponded to the length of the axis of the restored fortification, while the north-western to south-eastern axis was somewhat longer than the axis of the fortification in the following building phase. In this phase, the fortification was manned by soldiers from the IV Flavia Legion. The destruction of the fortification occurred on the north-western side, from the direction of the Boljetin river, in the area of its confluence with the Danube ((Зотовић 1982/1983: 214-215).

There are several objects from this period preserved in the inner part of the fortification. Object 1 is especially interesting to us, built from polygonally cut mortared stone blocks. The entrance into the object was located in the south-western wall,

directly beneath the apse of the later church, and it connected the object and the porch that ran along the street. In the middle section of the south-western half of the object, some 2.50 meters from the south-western wall, there was a porch with a rectangular base. On the corners of the porch, there are four plinths from well-shaped tufa for columns or pillars. Since no parts of columns were found, it is possible that it was a wooden construction. Remains of a mortar floor were discovered in the inner part of this area. Alongside the southern wall, in the eastern part of the object, a small chamber was added, with a hypocaust, with dimensions of 7.20 x 1.10 m. The walls of the room, 40 cm thick, were made of brick and crushed stone. The mortar on the walls and the floor had admixtures of crushed bricks. Three hypocaust pillars were registered. The *prefurnium* was located on the outer side of the south-eastern wall of the building. Since the possibility of the existence of a pool was eliminated, it is probable that the hypocaust room had the function of a *sudatorium*. The object was seriously damaged when a church and another object were built in a later period (Зотовић 1982/1983: 215-216).

These items were certainly the remains of a Roman bath, above which a Christian religious object was raised, because of its shape, but maybe also because of the importance linked to the use of hot water from the nearby hot spring.

The other object discovered from the same building phase represents the remains of a *horreum*, and traces of three furnaces were registered as well. There were paved streets in the encampment, oriented towards the entrances on the ramparts (Зотовић 1982/1983: 217-218).

During the first restoration of the fort, just before Aurelian left Dacia, the three preserved ramparts were rebuilt, while the north-western rampart and the northern half of the north-eastern rampart were built from the foundations. On this occasion, the inner towers of the fortification were built. The inside of the fortification, in this phase, was filled with tents, organised in almost regular lines along the north-eastern to south-western axis. It is assumed that the encampment was manned by a part of the VII Claudia Legion in this period. The encampment is believed to have been abandoned in the first decades of the 5th century. The time when the encampment was abandoned was marked by a layer of debris, while traces of fire can be noted in the eastern part only (Зотовић 1982/1983: 220–222).

In the time of the Early Byzantine restoration of the limes, the fortification at Boljetin was restored as well. It is believed that on that particular occasion only the relatively well preserved ramparts from earlier stages were rebuilt or partially restored and adaptations at the gates made, while the outer towers were built from the foundations. As we have already mentioned, in the central part of the fort, above the Roman bath, a church was built, with the inner dimensions of 15 x 5.50 m, oriented along the axis east–west. The base of the church is a rectangular naos with a semi-circular apse and a rectangular narthex. Along the southern wall of the naos, in its eastern half, following its contour, a rectangular *paraclis* was added. On the inner side of the wall of the apse, following its contour, a stair-shaped part was added, probably a base for seats. On the inner side of the southern wall of the naos, a baptistery was added, with dimensions of 1.20 x 1 m. All parts of the church were built by alternating well-shaped and crushed stone and brick. The church represented, in its restored or even levelled, demolished state, a cult place linked to the medieval necropolis. It is possible that the remains of the church were not visible in this period, but rather that it remained embedded in the conscience of the population as a cult place were burials were performed (Зотовић 198/1983: 223-224).

When it comes to buildings from the final phase of the fortification, the existence of two workshops was registered. The military was, again, living in tents, whose layout was significantly sparser than the one noted in the previous phase, which indicates that the number of soldiers in the fortifica-

tion was significantly diminished. On the basis of numismatic findings, it was concluded that this temporary period in the fortification came to an end in the last years of the 6th century, when the encampment was destroyed in a big fire (Зотовић 1982/1983: 225). V. Kondić identified the fortification at Boljetin as *Smorna*, which was registered by Procopius (Кондић 1971: 54-58).

During research at the medieval necropolis, established within the ramparts of the fortification from the Antiquity period, the presence of 97 skeletal graves was recorded. It was established that one grave, marked with number 72, belongs to the Roman period. It was a child's grave, oriented along the south-eastern to north-western axis, facing northwest. It was discovered under an intact construction made of daub. There were no grave offerings. Other graves belong to the medieval necropolis, dated into the period of the 12th–14th century (Ерцеговић-Павловић 1982/1983: 227–230).

During the research of the necropolis, in the Early Byzantine layer, a hoard was discovered consisting of eleven lunular earrings made of copper and bronze, decorated using the filigree technique, which S. Ercegović-Pavlović attributed to the Slav population and dated into the 10th–11th century (Ерцеговић-Павловић 1969: 83–95).

In our previous papers, we gave evidence of the long lasting and continuous life at Boljetin, i.e. Antique and Early Byzantine *Smorna*. We didn't obtain an answer to the question regarding the importance that the hot spring, registered by Kanitz, had on the functioning of the fortification. It is probable that the strategic position of this location was of primary importance for choosing the place for the *castrum*. However, we believe that the easily available hot spring was very important for the everyday lives of the soldiers and all others who sojourned at the *castrum* or its immediate surroundings. The presence of a Roman bath in what was practically the centre of the fortification, with a relatively small surface area and with hypocaust heating, suggests the possibility that water from the hot spring was used in the bath. It is easy to assume that, if that was the case, a certain cult worshiping developed for the hot springs, inspiring such a feeling towards the place where that water was used as well – i.e. the *balneum*. The importance of the cult place continued through the Early Byzantine basilica and the medieval necropolis.

VIŠNJICA AND VIŠNJIČKA BANJA

Bronze Age	The culture of Žuto Brdo	SETTLEMENT	
La Tène period		Pottery	
Antiquity		- Buildings - Votive inscription (?) - Ring with a carnelian gem - Coins - The site of Bela Stena – four tombs made of bricks	
Early Middle Ages		The site of Bela Stena Byzantine, Sarmatian-Iazygian and Slav pottery	
Middle Ages		There were remains of a round tower on the bank of the Danube and a medieval monastery	

Višnjička Banja is a settlement within the area of Višnjica. It was named after a hot spring, originating from the bank of the Dunavac. The temperature of the water is 14.4°C, and its pH level is 7.5. The water is characterised by the presence of hydrogen sulphide (Филиповић 2003: 76).

The first mentions of archaeological sites at Višnjica, at the beginning of the 20th century, were provided by M. M. Vasić, who mentions the findings from the Žuto Brdo culture. Data can be found related to a broken urn, found somewhere between Višnjica and Veliko Selo, which contained a bronze bracelet, a bronze plummet and two bronze nails. That data was insufficient for dating the urn more precisely. In the Belgrade City Museum, several fragments of La Tène pottery are kept, found in the western part of the settlement (Гарашанин, Д. 1954: 58).

In the area of Višnjica, several objects were found, dated into the Roman period. Thus, Kanitz noted that, in the place where "the monastery of Dušice, in which, it is said, Kraljević Marko was buried" was (as Milićević wrote), he had found "undoubtedly intact walls of a Roman fortification" (Каниц 1985: 152).

The finding of a votive inscription is also interesting, though Vulić believed that there was a possibility that it was, in fact, a forgery (Вулић 1909: 143). Antefixes were also discovered at Višnjica – masks placed on a building (Гарашанин, Д. 1954: 94).

Also originating from this area are the accidental findings of a ring with a carnelian gem, found on the bank of the Danube, and a golden coin of Emperor Theodosius, found at the site of Rimski grad in 1908. Today, the coin is kept at the National Museum in Belgrade. It is also worth mentioning that fragments of Roman pottery were discovered at the site of Bela Stena (Гарашанин, Д. 1954: 94).

To the east of Bela Stena, the site of Gradine is located, where remains of a Byzantine fortification are present on a dominant plateau. The position of the fort enabled control over a significant portion of the Pannonian plain, made even more important by the fact that the confluence of the rivers Tamiš and Danube is several kilometres to the northeast of the site. We should also mention that Procopius, while writing about Justinian's fortifications on the Danube, mentioned, among others, a strong fort, located some eight miles below Singidunum, and called it *Octavus*. Ć. Barišić identified that fort as the remains on the site of Gradine. During research on the site of Bela Stena, a team from the Belgrade City Museum performed a field survey at the fort, in the place where the existence of a necropolis was established. On this occasion, four brick built, Roman tombs were discovered (Тодоровић, Кондић и Бирташевић 1956: 77).

The first and the second tomb contained children's skeletons. The first tomb was built out of bricks with dimensions of 44 x 32 x 4-8 cm. The length of the tomb was 91 cm, width 35 cm, and height 32 cm. The tomb was oriented along an east–west axis. The skeleton was laid on brick paving, placed on the right side. There were no grave offerings (Тодоровић, Кондић и Бирташевић 1956: 77).

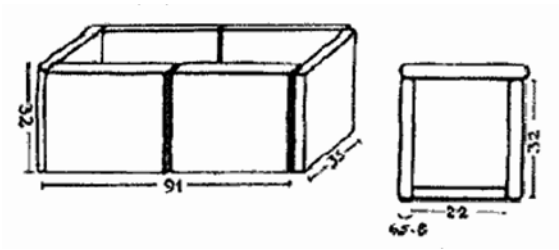

Fig. 2. The construction of a child's tomb at the site of Gradine, near Višnjica, according to: Тодоровић, Кондић и Бирташевић 1956: 77, сл. 5.

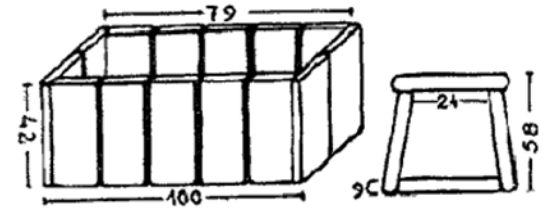

Fig. 3. The construction of a child's tomb at the site of Gradine, near Višnjica, according to: Тодоровић, Кондић и Бирташевић 1956: 77, сл. 6.

The second tomb was built with bricks, with dimensions of 15 x 42 x 9 cm. An almost completely destroyed child's skeleton was found in it, suggesting the possibility that the tomb had been opened and robbed. The tomb was oriented along an east–west axis. There were no grave offerings (Тодоровић, Кондић и Бирташевић 1956: 77).

The third tomb was built of halved *tegulae*, with dimensions of 41 x 51 x 3 cm. The inner width of the tomb was, for the most part, 42 cm, while it reached up to 50 cm around the head of the deceased. The length of the tomb was 190 cm. There was a skeleton in it, laid on its back, oriented along an east–west axis, with hands crossed on the chest. There were no grave offerings (Тодоровић, Кондић и Бирташевић 1956: 77).

The fourth tomb is similar to the previous ones. It was built with bricks, with dimensions of 44 x 32 x 7 cm. On the lateral side, there was a larger *tegula* with dimensions of 55 x 43 x 2.5 cm. The inner dimensions of the tomb are 38 x 179 cm. The skeleton was laid on its back, oriented along an east–west axis. The left hand of the deceased was stretched along his body, and the right one placed on his stomach (Тодоровић, Кондић и Бирташевић 1956: 77).

We should also mention that a local, Nikola Urošević, sold several bronze Roman coins to the Belgrade City Museum, which he had found on this site. One piece came from Augustus' coinage, three from Severus Alexander's, of which one is from the city of Nicaea's mintage, one piece from Licinius' coinage, one from Maximian's, and one bronze coin from the period of Jovian's reign (Црнобрња 1978: 205).

During archaeological excavations at the site of Bela Stena, conducted in 1955 by the Belgrade City Museum, numerous fragments of Byzantine and Sarmatian-Iazygian pottery were found in the floor of a bread oven, mixed with Roman pottery fragments, while on the floor of the oven, and around it, fragments of Slav vessels were found (Тодоровић 1958: 329–334).

The findings of gold objects accidentally discovered on a sandbank of the Danube also come from Bela Stena. The findings consists of a gold necklace with a cross and a gold ring. They were discovered among the remains of a skeleton, and most probably come from the necropolis belonging to the Early Byzantine fortification, and are dated to the end of the 6th and the beginning of the 7th century (Татић-Ђурић 1964: 185–193).

There is also data suggesting that remains of an old monastery, which the locals call the monastery of Despot Stefan, exist near Višnjica. Outside of Višnjica, on the bank of the Danube, remains of a circular medieval tower used to be visible (Тодоровић, Кондић и Бирташевић 1956: 88).

There is no direct evidence on the exploitation of hot springs in the area of Višnjička Banja in Antiquity. On the other hand, there's ample proof on the tumultuous life and the existence of a Roman settlement, fort and necropolis in this place, whose development was probably largely influenced by those hot springs.

LEŠTANE

Bronze Age and Older Iron Age		The site near Bubanj Potok necropolis with skeletal burials and urns	
Antiquity		The site of Zabran Accidental finding of an iron pickaxe	
Antiquity		The site near Bubanj Potok pottery	

Leštane is a settlement in the Municipality of Grocka in the City of Belgrade. There are two hot springs in the area of Leštane, both of which belong to the nitrogenous water group. The temperature of the water at the source of L-1 is 21°C, and the pH value 8, while the temperature at the spring L-2 reaches 25°C, and the pH value is also 8 (Филиповић 2003: 76).

During works at the quarry at Leštane, a small cave was discovered and completely destroyed, where, according to the workers, many petrified bones were found, and several hearths. When the expert teams arrived in the field, all the findings had already been destroyed, so only several mollusc fossils were gathered. A part of a destroyed hearth was also registered. It is possible that this was a domicile from the Palaeolithic (Бошковић 1956: 11).

During the construction of a by-pass road around Belgrade, at Bubanj Potok, not far from Leštane, workers discovered graves belonging to a prehistoric necropolis. It was recorded that the necropolis was found 5,200 metres from the road to Smederevo. On this occasion, a large number of skeletal graves and urns was dug through. The archaeologists did not manage to arrive in the field in time, hence, they were only able to identify some human bones, fragments of La Tène and Roman pottery and an iron spear. On the basis of the description obtained in the field, the urns could be roughly dated to the period of the Bronze and older Iron Age (Тодоровић, Кондић и Бирташевић 1956: 76).

The only finding from the Antiquity period comes from the site of Zabran, where an Antique pickaxe was found, which is kept in the National Museum in Belgrade today (Поповић, И. 1988: 37).

Findings from Antiquity are too few for us to be able to talk about a horizon at Leštane. The existence of a prehistoric necropolis would suggest a cult place, which could be linked to hot springs. An answer to the questions on the further continuity of this cult place and possible exploitation of hot springs can be given only by future research.

VRDNIK

Eneolithic	Vinča culture Kostolac culture Vučedol culture	The site of Pećine settlement fortification	
Bronze Age	Bosut culture	The site of Pećine settlement fortification	
Older Iron Age		The site of Pećine A skeletal grave	
Antiquity		Findings of Roman coins	
Antiquity		The site of Gradište fortification with a necropolis (?)	
Middle Ages		Fortified city	11th–12th century, First mentioned in 1315 (Rednak, Rednuk, Regnitz).
Middle Ages		Site of Staro Groblje (Tursko)	

Late Middle Ages		monastery Vrdnik – Ravanica	End of the 15th– beginning of the 16th century – first mentioned in 1566

There is a deep shaft with a mineral water spring at Vrdnik Banja. The temperature of water is 33˚C, and the pH value 7.4. Within the class of hydro-carbonate waters, it belongs to the magnesium-potassium-calcium subclass, which makes it unique in the region (Филиповић 2003: 111).

The area of Vrdnik abounds with archaeological sites. The oldest traces of settlements come from the multi-layer prehistoric site of Pećine, with cultural layers from the Eneolithic, Bronze Age and older Iron Age. There are several known findings of Antique coins in the area of Vrdnik. The Antiquity site of Gradište suggests the possibility that there was a fortification with a necropolis from the Roman period in this place. When it comes to the Middle Ages, we have the fortified city of Vrdnik, mentioned for the first time in 1315. Connected to the city, perhaps, is the oldest part of the multi-layer medieval necropolis at the site of Staro (Tursko) Groblje, where the burial practice continued during the period of the Turkish reign as well. The period of the medieval Vrdnik is concluded with the monastery of Vrdnik – Ravanica, linked by popular myths to Prince Lazar, even though it was built, at the earliest, at the end of the 15th – beginning of the 16th century. The first known mention of the monastery was in 1566.

The multi-layer prehistoric site of Pećine at Vrdnik was discovered during the systematic research of the territory of Srem, performed in 1967. The dominant position and large amount of mobile archaeological findings indicated that there was a great need to systematically investigate the site. The first archaeological research of the site of Pećine was performed by the Institute for Protection of Cultural Monuments in Sremska Mitrovica in 1969 (Popović, D. i Medović 1969: 35-36).

The site is located on a hill, with three steep-

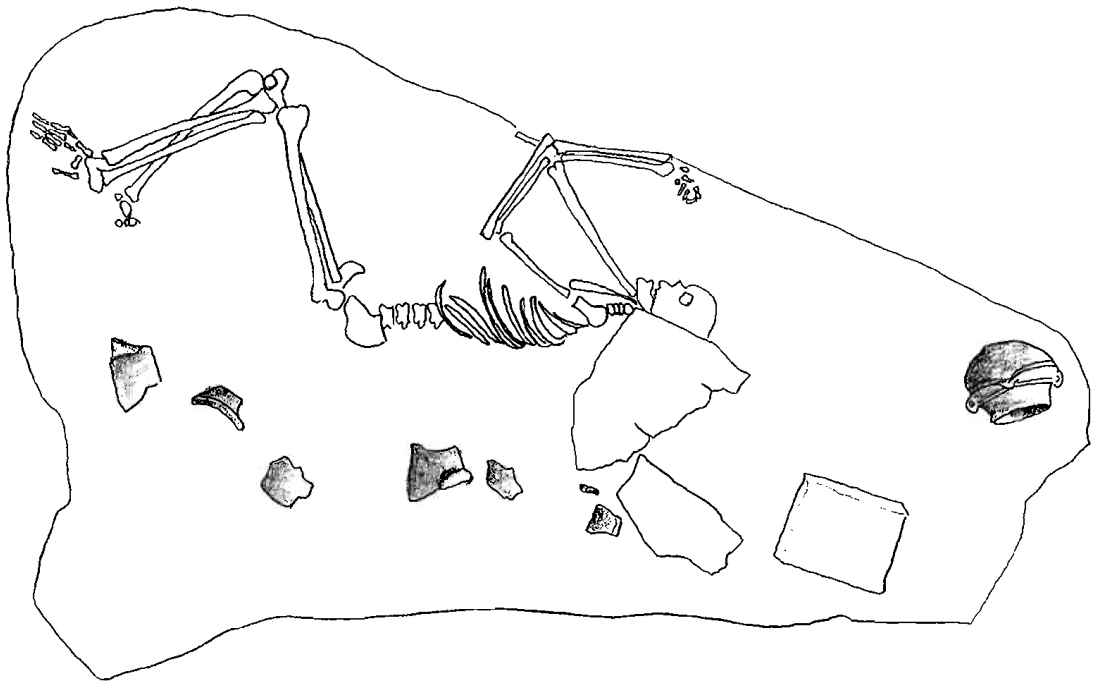

Fig. 4. The sketch of tomb 1 from the site of Pećine at Vrdnik, according to: Медовић 1984/1985: 7, T. I.

ly cut sides. The exception is the southern side, where the site is connected, via a long saddle, to the slopes of Fruška Gora. The entrance into the settlement was most probably located on this side (Popović, D. 1981: 13; Медовић 1984/1985: 5; Tasić 1974: 259; Миладиновић-Радмиловић и Капуран 2010: 91).

There was a flattened plateau at the top of the hill, with dimensions of 350 x 250 metres, with an artificially made ellipsoid summit. According to the note by D. Popović, the fortification from Vrdnik represents "a typical example of a hillside *gradina* [hillfort] from Srem" (Popović, D. 1981: 13).

During archaeological research, cultural layers were registered from the Eneolithic, Bronze Age and older Iron Age, i.e. cultural groups of Kostolac, Vučedol, Vinča and Bosut (Ibid; Ibid. 1997: 7; Медовић 1984/1985: 5; Миладиновић-Радмиловић и Капуран 2010: 91).

We will single out the only finding from the older Iron Age period – a pit with the remains of a skeletal burial. A skeleton was discovered, laid on the right hip, in a slightly cramped position. The skeleton was oriented along an east–west axis (Медовић 1984/1985: 5-8).

The right arm was bent at an angle of 45˚, with the hand at face level, and the left one, also bent at the elbow, with the hand at the height of the right elbow. The knees, set one over another, were found at hip height. The shins were crossed (Поповић, Д. 1997: 9).

The deceased was found below a flat stone of large dimensions. Beside the head of the deceased, as a grave offering, there was an amphora made in the manner of the Bosut cultural tradition. Not far from the skeleton, several other pottery fragments were found, decorated with engraved ornaments, from the older Iron Age. It is also interesting to note the findings of a larger vessel, most probably a *pithos*, decorated with the motive of a fir branch, and a deep bowl, with a garland engraved on the shoulder. P. Medović believes that these fragments could represent the remains of ritually broken vessels (Медовић 1984/1985: 5-8).

Anthropological analysis has shown that the skeletal remains belonged to a male, aged ca 25 at the time of death. Data obtained through the anthropological analysis suggest that this individual most probably died of natural causes (Миладиновић-Радмиловић и Капуран 2010: 91–95).

We believe that this type of burial, in which traces of ritual activities can be noted, can be linked to the soteriological function of hot springs.

The site of Gradište is located in the area of Vrdnik, on the plateau of a hill, whose base is ring-shaped. On three sides, the hill slopes have a steep fall, while the only suitable access is on the eastern side. Traces of Antique building material and human bones were registered over a surface area of 100 x 80 m. Pottery findings are very rare and atypical. The character of the site indicates the existence of a small fortification with a necropolis (Popović, D. 1967: 173).

Findings of Antique coins occurred in the village area (Гарашанин, М. и Гарашанин, Д. 1951: 224; Đorđević 2007: 33).

The site of Staro Groblje or Tursko Groblje is located on the eastern periphery of Vrdnik. Findings of medieval and Turkish pottery were registered, and also one bronze ring, a large amount of human bones and several whole skeletons. It was evidently a medieval necropolis with several burial phases (Popović, D. 1967: 173).

The fortified city of Vrdnik was built at 400 metres above sea level. It was mentioned in historical sources for the first time in 1315 and had been mentioned under different names – Rednak, Rednuk, Regnicz. It had an elongated semi-circular base, with the entrance gate on the eastern part of the rampart. Archaeological excavations demonstrated the existence of walls surrounding the peripheral area as well (Миленковић 1998: 153).

In the village area, there is also the monastery of Vrdnik, dedicated to the Feast of the Ascension of Christ, built at the end of the 15th or the beginning of the 16th century. It was mentioned as "the monastery of Saint John near the village of Vrdnik" in Turkish sources. After the Great Exodus

of Serbs in 1690, it was populated by monks from the monastery of Ravanica, and henceforth it is often referred to as the Ravanica of Srem (Кулић и Срећков 1994: 61).

SLANKAMEN

Eneolithic		Novi Slankamen The site of Obala Potoka finding of a copper axe	
Middle Bronze Age		The site of Gradina	
Late Bronze Age	Urnfield culture	The site of Gradina	
Older Iron Age		Novi Slankamen The site of Čarevac hillfort	
La Tène		Novi Slankamen The site of Grabovac pottery	
La Tène		Novi Slankamen The site of Čarevac hillfort	
La Tène		The site of Gradina Celtic oppidum civitas Scordiscorum	
La Tène		The site of Venac	
La Tène		The site of Tanackov Salaš pottery	
Antiquity		The site of Tanackov Salaš pottery stone monument (lost)	
Antiquity		The site of Gradina early roman settlement	
Antiquity		The site of Gradina fortification Acumincum	
Antiquity		The site of Dugorep (Humka) small fortification	
Antiquity		The site of Oduševac small fortification	
Antiquity		The site of Počenta necropolis	
Antiquity		Novi Slankamen The site of Grabovac pottery	

Antiquity		Novi Slankamen The site of Crkvena findings of roman bricks	
Antiquity		Novi Slankamen The site of Pozadina Jande findings of provincial pottery and bronze coins	
Middle Ages		The site of Gradina fortification	12th–16th century
Middle Ages		The site of Venac pottery	
Middle Ages		Novi Slankamen The site of Crkvena Findings Of Medieval Materials	
Middle Ages		Novi Slankamen The site of Koševac hoard of silver coins	

There is a well with mineral water at Slankamen. The temperature of water is 18.4 ˚C, and the pH value is 7.5 (Филиповић 2003: 112).

Stari Slankamen represents a very significant multi-layer site. Its complex but, at the same time, clearly differentiated stratigraphy shows traces of settling in the middle and late Bronze Age, Hallstatt, La Tène, through Antiquity, when the city of *Acumincum* was probably located here, all the way to the late Middle Ages. Most of the findings came from the site of Gradina, although the existence of cultural layers was established at other locations as well.

Two Antiquity layers can be identified at the site of Gradina. The older layer belongs to a Roman settlement, and the more recent to a fortification, i.e. a fortified city, most probably *Acumincum*. The Antique necropolis, registered at the site of Počenta, is certainly connected to the mentioned settling layers. Findings from Antiquity were also registered at the sites of Dugorep (Humka) and Oduševac, where small fortifications were located, with the function of defending the periphery. In the area of Novi Slankamen, findings from Antiquity were registered at the sites of Grabovac (pottery), Crkvena (bricks), and Pozadina Jande (bronze coins and pottery made in the provincial manner).

N. Tasić provisionally links the horizon from the late Bronze Age at Gradina in Stari Slankamen to the settlement from the Urnfield culture, although the entire profile of pottery material does, in a certain manner, go beyond the frame of the stylistic properties of the said culture (Тасић 1966: 18).

The site of Venac is located on a high plateau above Gradina and leaves the impression of a prehistoric fortification with a ring-shaped earthen rampart and canals. There are four artificial circular plateaus on the site. A partial examination of one of those showed that they were artificially made. The existence of a stone ring was established, which may have marked the periphery of the plateau. The ring, consisting of a single line of stone, was located some 15 metres from the centre of the plateau. La Tène pottery was found in the lower layers, while fragments of heavily crushed medieval pottery were found near the top. It wasn't possible to determine the purpose of the plateau, that is to say, whether it was a tumulus, sacral object or part of a developed fortification system on the plateau (Dimitrijević i Kovačević

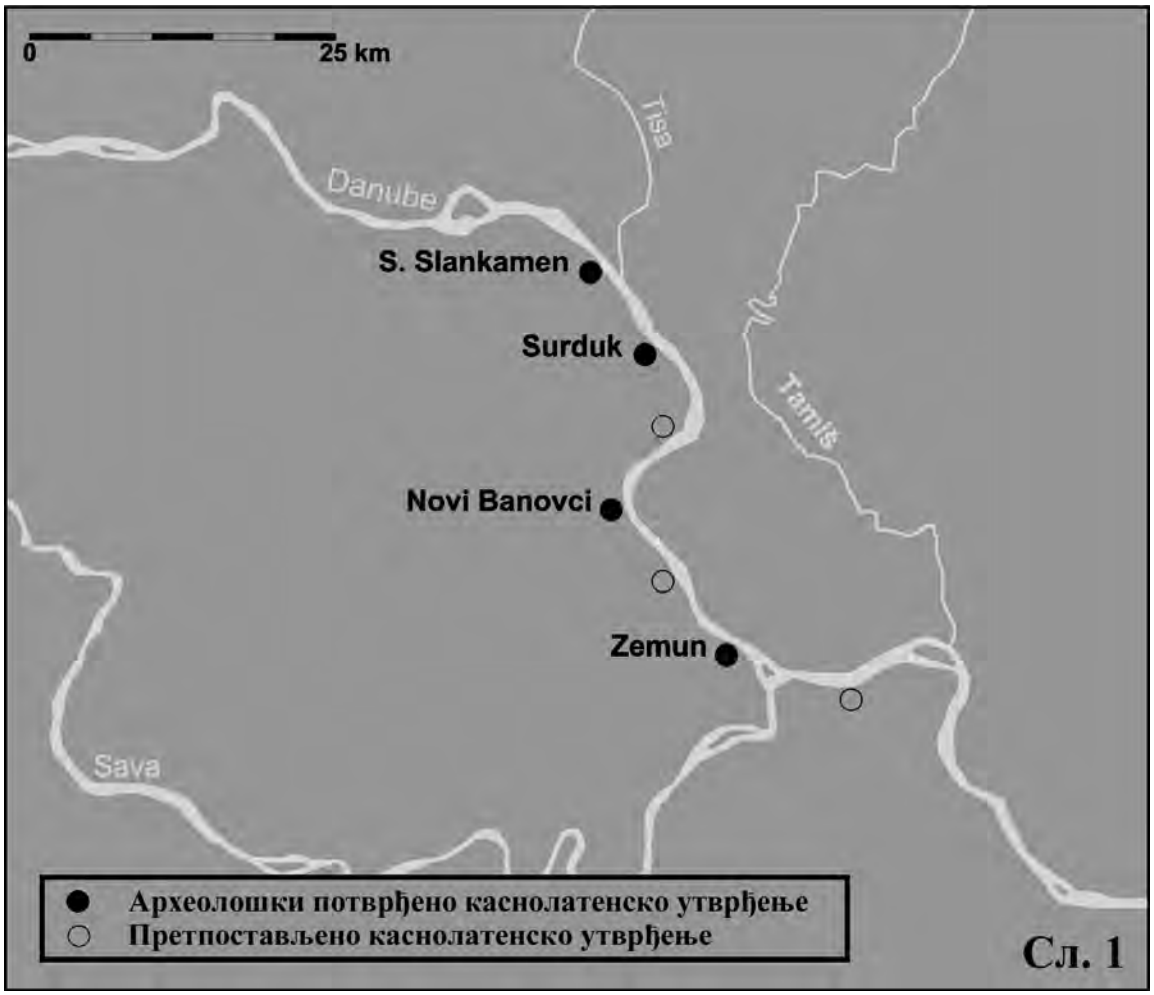

Fig. 5. The position of the oppidum at Stari Slankamen in the presumed system of La Tène fortifications on the right bank of the Danube, according to: Тапавички-Илић 2014: 22, сл. 1.

1965: 116).

In the location of today's Slankamen, there was a Celtic *oppidum* and the Roman fortification of *Acumincum*. Remains from the La Tène culture indicate that one of the centres of the territory of Scordisci (*civitas Scordiscorum*) was located here. The La Tène Slankamen certainly had an important role in the military and economic life of the Scordisci. The *oppidum* at Slankamen was built on a plateau from which the confluence of the Tisa into the Danube, Banat and parts of Bačka were clearly visible (Горенц и Димитријевић 1956: 150-155).

It is certain that the *oppidum* represented a part, maybe even the central part, of the system of Celtic forts built along the right bank of the Danube, at the presumed mutual distance of seven kilometres. The forts were built over a relatively short time span, almost at the same time, at the end of the 2nd and the first half of the 1st century BC (Тапавички-Илић 2014: 21–32).

After the Romans settled in this area, it maintained an autonomy of sorts, even though it nominally belonged to the territory of *Bassianae*. Inscriptions confirming the existence of *Civitas Scordiscorum* were found at Slankamen and at Petrovac. The first mentions the *princeps* and *praefectus* of the Scoridsci, while the other mentions two brothers, *principes*, members of the tribal council. Both inscriptions are dated to the end of the 1st and the beginning of the 2nd century AD (Ibid.). The mentioned finding from Slankamen confirms the theory that the settlement of *Civitas*

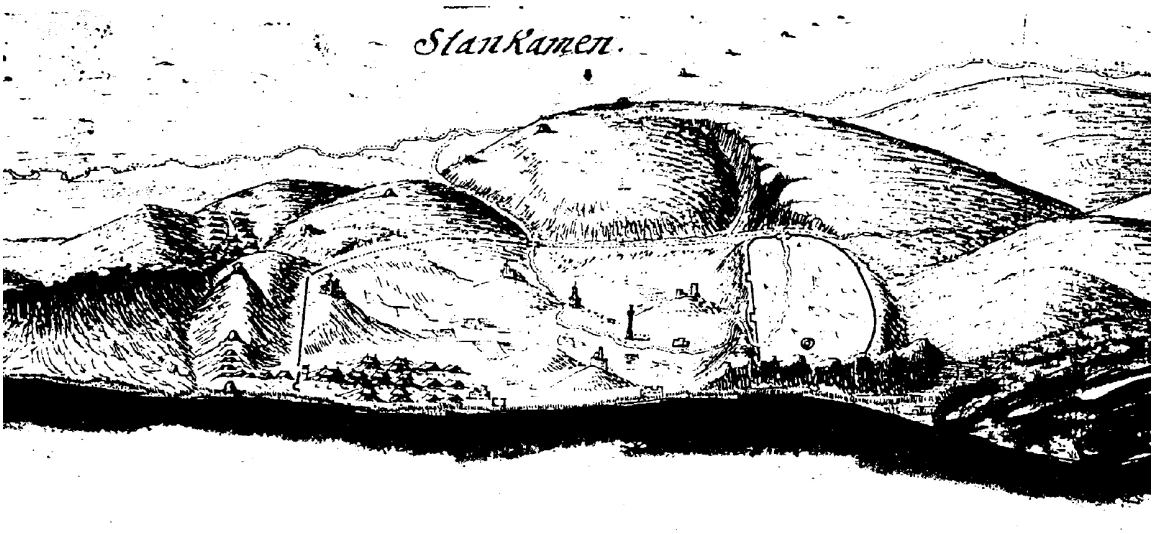

Fig. 6. Marsili's drawing of Slankamen, according to: Popović, M. 1996: 165.

Scordiscorum was precisely in this place.

The Scordisci forts in eastern Srem continued to exist, and even their Latin names are known. Hence, seven km downstream from Slankamen (*Acumincum*) there is Surduk, formally *Rittium*, while 14 km to the south of it is Novi Banovci, i.e. *Burgenae*, while 14 km from Novi Banovci, Zemun (*Taurunum*) is located. We should also mention that ca seven km downstream from Zemun is the plateau of Zvezdara, a place which is presumed to have represented the Scordisci *oppidum* in the area of today's Belgrade, i.e. Roman *Singidunum*. All the listed forts in eastern Srem were turned into Roman *castra*, which means that the already existing defence system of the Scordisci was easily fitted into the Roman limes. Wooden structures, palisades and trenches were rebuilt, this time with stone, and within such walls, solid constructions were made of stone and brick (Петровић, П. 1995: 18–22).

The best example for the mentioned process of turning Celtic forts into Roman *castra* is the *oppidum* at Stari Slankamen, since the Roman *castrum* matches the Scordisci *oppidum* completely in size and shape, with both of them fitting into the configuration of the terrain. We know that this fort was restored during the 2nd–3rd century AD. The walls of the fort were built of stone, and within them, new buildings were erected. At the bottom of the plateau there was a civilian settlement, in which a large amount of debris and small findings was discovered (Ibid. 23).

After the Roman conquests, administrative units were formed in the territory of Srem, with a certain amount of autonomy in local matters. We may say that the central territory of the Celtic Scordisci was eastern Srem, while western Srem was populated by the tribes of the Amantini, Breuci, Cornacates and Tricornenses. It is also obvious that the Romans attempted to limit the influence and strength of the most important population within the Scordisci tribe alliance by giving it a limited territory for the future *civitas* (Jovanović, B. 1987: 850).

Limiting the tribe of Scordisci to the narrow zone of the eastern Danubian valley in Srem was suitable for Roman interests in this part of the Danubian limes. We may assume that there was a fortified settlement in the area designated for the Scordisci *civitas*, where the most important tribal chieftains gathered. Such an organisation ensured at least a partial preservation of old tribal structures (Тапавички-Илић 2014: 30).

A favourable strategic position, on the opposite side from the confluence of the Tisa, caused the early presence of the Roman army in this area.

Fig. 7. The fortification at Slankamen, according to: Popović, M. 1996: 165.

We know that, at the beginning of the 1st century AD, several divisions of the II Adiutrix Legion were stationed in the area of eastern Srem, as well as several auxiliary units. From a later period comes the tombstone of a veteran from the II Adiutrix Legion, discovered near Slankamen. It was, however, only during the reign of Trajan that a large number of forts was built or restored in Pannonia, and troops transferred to the Danube. In this period the Danubian limes got the structure it would retain all the way until the end of the 3rd century AD. During the 2nd century, three auxiliary units were stationed in eastern Srem; among them was the I Campanorum Cohort, stationed at *Acumincum* (Душанић, С. 1968: 96).

On the opposite bank of the Danube, near Titel, several epigraphic monuments were discovered mentioning the 1st Britannica Cohort. During the late Antiquity period, equestrian units were stationed at *Acumincum – cuneus equitum Constantinium Aciminci* and *equites sagittarii Aciminci* (Jovanović, A. 1997: 29-30).

Two bricks with the seal of the 1st Campanorum Cohort also bear witness to the presence of this unit at Slankamen. One of them, discovered at the end of the 19th century, was transferred to the Archaeological Museum in Zagreb, but it is considered lost today. The other brick, dated into the 2nd or the beginning of the 3rd century, is kept in the archaeological collection of the Belgrade City Museum (Душанић, М. 1988: 87–91).

Bearing witness to the people living in *Acumincum*, who returned to their homelands after serving their term, is also a tombstone mentioning the 2nd Adiutrix Legion, found on the bank of the Danube, near Slankamen. On the basis of the name of the consuls, Lucius Annius Maximus and Septimius Aper, the monument was dated precisely to 207 AD (Ферјанчић 2002: 266).

Two dominant plateaus can be determined at Stari Slankamen, where the forts may have been located: Gradina and Humka. At the site of Gradi-

na, archaeological excavations registered an Antiquity horizon beneath the medieval fortification. It was probably precisely at the site of Gradina that the antique *Acumincum* was located.

Research has registered the existence of a luxurious medieval building, dated to the period from the 13th to the 15th century. A large number of stone balls and iron arrows were discovered as well, remnants of the Turkish occupation of the fort. Beneath the foundations of the medieval building, a wall from the Antiquity period was discovered, made from crushed and cut stone, joined by mortar. The wall was erected above a prehistoric pit house. It was established that the antique building stretched below the entire medieval object, but it wasn't possible to determine its function. Field surveys have shown that, at the base of Gradina, in the area of today's village, a large civilian settlement had developed, as well as a series of necropoles on the nearby hills. It is probable that a fortification system was built around the periphery as well, traces of which were registered at the sites of Dugorep and Oduševac (Dimtrijević i Kovačević 1965: 116-117).

The important cult centre of Jupiter Dolichenus was at *Acumincum*, as witnessed by a votive monument discovered in the middle of the 19th century. The altar was transferred to the Kunsthistorisches Museum in Wien in 1851. Lj. Zotović mentions that the Romanisation of the Syrian divinity is clearly visible on the monument, but that some elements of the composition show clear traces of older oriental beliefs and the prototype of the representation of the god Hades, whose Romanised "heir" is Jupiter Dolichenus (Зотовић 1971: 59–64). We believe, however, that there are insufficient elements to link that monument to the cult of Hades.

At the end of the 19th century, J. Brunšmid registered another relief from Slankamen. While staying there, in May 1894, Brunšmid noted a secondarily used marble monument in the ramparts of the city. The author extracted the monument and shipped it to the Archaeological Museum in Zagreb. The monument is decorated with reliefs on two adjacent sides. There is a representation of a palm tree on the wider side, along whose trunk a snake is crawling, while two birds are kissing at the top of the crown. The narrower side of the monument is decorated with a relief representation of a satire. Since the monument was decorated only on those two sides, Brunšmid believes that it was probably a part of a doorpost and suggests that it could have been in a temple of Bacchus (Brunšmid 1895: 182).

In 1954, The Military Museum began its archaeological research of the Danubian limes in Srem, in the area from Stari Slankamen to Novi Banovci. In the period from 1955 to 1959, the Military Museum performed archaeological excavations on the site (Peković 2013: 13-14). In 1955, the National Museum from Zemun took part in research on the site of Gradina.

In the area of Roman *Acumincum*, the existence of prehistoric, antique and medieval cultural layers was registered. The north-eastern slope of Gradina was especially intensely populated in the Roman period, when it had a defence function on the line of the Danubian limes.

A plateau of a predominantly loess composition, at the site of Gradina, is dominated by the remains of a medieval city. Archaeological research has shown that the medieval ramparts continue onto the Roman walls and follow their trajectory. Two phases of Roman settlements were registered: an early Roman settlement, formed during the reign of the Flavian dynasty, and a fortified Roman settlement, with massive mortared walls, with abundant monetary findings from the 4th century (Đorđević 2007: 72-73).

The site of Humka or Dugorep is located at the confluence of the Tisa and the Danube, some 30-40 metres above the steep right bank of the Danube. Archaeological research conducted in 1958 showed the existence of a fortified object – *speculum*, with dimensions of 7.75 x 7.75 m. On the basis of the manner in which it was built and the mobile findings, the object was dated into the 4th century. At the site of Tanackov Salaš, during a

field survey, the existence of La Tène pottery was registered, as well as early Roman pottery of provincial crafting. The existence of a Roman monument, with an inscription, was also established. Unfortunately, we were unable to find more precise data on this inscription (Ibid. 73).

The medieval Slankamen is listed as "urbs" (*ad urbem Slankemun*) as early as 1189, when mentioned by Arnold of *Lübeck*. An even more important piece of information comes from 1442, when a letter from the Chapter of Budim mentions Slankamen as "*castrum ac oppidum*". The existence of the city – the fortification and the periphery – and its suburb is mentioned in 1553 by Antun Vrančić in his travel log, which states that Slankamen had "*arx et oppidum*". In the 16th century, Slankamen is mentioned by two other travellers, Stevan Gerlah in 1573 and Vratislav in 1591. Both these authors noted that there was a city in Slankamen and its suburb, surrounded by walls, but they were all in ruins in their time already. The Turks took and destroyed the city in 1521 for the first time, finally conquering it in 1526. In a letter from the nuncio of Budim, Baro de Borgia, from the same year, there is a mention of the Sultan staying at Slankamen and raising fortifications. When it comes to the objects from the city, written sources mention only four of them – the cathedral of the Holy Spirit with a hospital for the poor and invalids, raised by Jovan Man between 1316 and 1334, the church of Saint Mary, mentioned for the first time in 1400, the orthodox church of Saint Nicholas, traditionally linked to Zmaj Ognjeni Vuk, and the city gate (Dimitrijević i Kovačević 1965: 118).

In the area of Stari Slankamen, at the site of Počenta, the existence of a Roman necropolis was registered, certainly connected to the antique *Acumincum* (Popović, D. 1967: 178).

The accidental finding of a bronze axe from the Eneolithic period comes from the area of Novi Slankamen. The axe is kept in the Heritage Museum of Ruma today (Велимировић 2009: 9).

The site of Čarevac is located some 1.5 km from the periphery of Novi Slankamen. It is located on an oval hill, with a very favourable strategic position. It is a hill fort from the Hallstatt and La Tène period, whose three sides are free, and is separated from the adjoining hill by a small trench on the southern side (Popović, D. 1969: 251).

One kilometre from the northwest of Novi Slankamen is the site of Grabovac, where fragments of La Tène and Roman pottery were registered. The site of Crkvena is located on the northern periphery of the settlement, near today's cemetery. It is on a hill in the shape of a rounded square, with dimensions of 70 x 70 m. There are very rare traces of Roman brick on the surface, as well as more numerous findings of slag, bones and roughly-made medieval pottery. The configuration of the terrain indicates that this could have been a fortification, while local tradition has it that there was a mosque in this place. In the area of Kruševac, in the 1970s, a hoard of medieval silver coins was found (Popović, D. 1969: 252).

Also originating from Novi Slankamen is the finding of a drachma from the Greek city of Dyrrhachion (Brunšmid 1912, 265). On the site of Pozadina Jande, the existence of fragments of Roman pottery of provincial crafting was established, as well as Roman bronze coins (Đorđević 2007: 73).

Exceptional strategic advantages have always been the dominant reason for choosing Slankamen as the location for building a fort which would dominate and have control over a wide area. However, the toponym itself clearly indicates that the people were well aware of the properties given to this place by the existence of mineral springs. It is very probable that, during different periods of time, Antiquity included, the springs of Slankamen were exploited by the local population. The confirmed antique cults, that of Jupiter Dolichenus and, probably, Bacchus, cannot be linked directly to healing sources, but we may assume that there will be findings linked to iatric cults in future research on this site.

ERDEVIK

Eneolithic	Baden and Kostolac group	settlement, hillfort	
Older Iron Age	Hallstatt B – C, with Thraco-Cimmerian elements	the site of selište hoard of metal objects	
Older Iron Age	Iron Age II	the site of selište settlement	
Antiquity		the site of kulina bathing pool	

A system of accumulative lakes was constructed on the southern slopes of Fruška Gora, in the area from Sot to Maradik. The largest of those lakes, with a length of 4.5 kilometres, is located near Erdevik, in the valley of Moharač. In the surroundings of Erdevik, and especially in the area of Banja Kulina, there are several hot springs.

In the vicinity of the lake, remains of a prehistoric settlement were researched. The site is located ca 2,200 metres to the northeast of the centre of Erdevik, in the area of Lica (more precisely, Gornja Lica). It is located on an elevated terrace. The rough dimensions of the site are 500 x 200 metres. The prehistoric settlement was developed in horizontal stratigraphy, and buildings were set at large distances. A field survey on the site was conducted in 1980, with rescue archaeological excavations in the following year (Поповић, Д. 1995/1996: 7).

Archaeological research has shown that this prehistoric settlement was inhabited in the Eneolithic period, within the cultural frame of the Baden and Kostolac groups, as witnessed by pottery findings. Flint and bone material tools are few. On the other hand, unprocessed remains of animal bones are very numerous, which would indicated that husbandry and hunting had a more dominant economic role in this settlement than farming. From metal findings, a needle with a biconical head was found (Поповић, Д. 1995/1996: 11-12).

Discovered immobile objects were most frequently found as forms dug into the virgin soil, which can most probably be defined as pits. Only in one case was it a pit house, in which there was a partially preserved oven. Also, the existence of a house above the ground was registered, only in one case, with a partially preserved, coated floor. On this site, smaller pieces of the flooring, as well as house daub and wattle were found, which indicates that there were other objects built above the ground as well. Dug-in objects of the pit house type belong to the Baden group, while the objects built above the ground are linked to the Kostolac group. D. Popović puts the prehistoric settlement of Erdevik into the group of "fortified cities from Fruška Gora", as a simpler type, in which traces of earthen fortifications are not abundantly present. This type of settlement is represented by several dozen sites on the southern slopes of Fruška Gora and on high loess terraces of the Danube (Поповић, Д. 1995/1996: 11-13).

The site of Selište is located on the periphery of Erdevik, on a hill through which a stream is running. On the side facing the valley, the hill has a steep fall, while the other three sides are at more or less the same height as the surrounding area. A small hoard of bronze objects found on this site is kept at the Museum of Srem in Sremska Mitrovica. Chronologically speaking, the hoard belongs to Hallstatt B–C, and it also contains some Thraco-Cimmerian elements (Vinski i Vinski-Gasparini 1956: 90).

During the field survey, performed by the Institute for Protection of Cultural Monuments in Sremska Mitrovica, in 1972, mobile archaeological material was registered on the surface. The material indicates the existence of a multi-layer

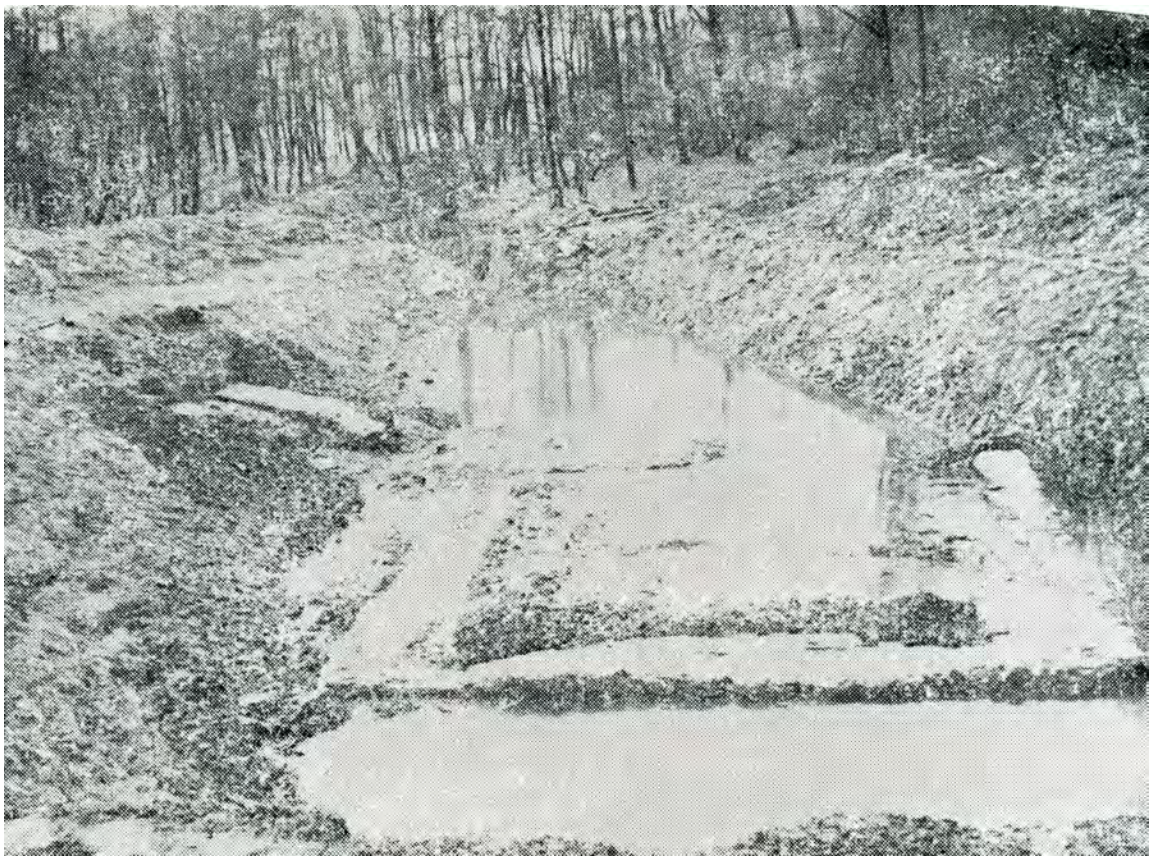

Fig. 8. The pool at Banja Kulina, near Erdevik, according to: Radenović Pejović 1985: T. LVI, sl. 1.

prehistoric settlement, also including a cultural layer from the older Iron Age, dated to the period of the Iron Age II. The findings are kept at the Museum of Srem in Sremska Mitrovica (Popović, D. 1981: 17).

The existence of Roman ruins at Erdevik was registered in the 18th century, more specifically in 1798, when it was noted that, not far from the settlement (in the direction of the village of Divoš), there were some remains of a Roman building complex with ramparts, arches and pillars (Сремац 2014: 10). The toponym *Banja* (spa) at Erdevik was noted a bit earlier, more precisely, in 1736, hence, we may assume that there was a bath, a healing spring or a spa resort. Also in this vein is the toponym of *Toplice* (again, spa). It is interesting to note the toponym Male Kalile as well, deriving from the Turkish word denoting a place where water can be found even during droughts, which indicates the possibility of a settlement formed near a regular water spring (Сремац 2008: 318).

In 1982, the Museum of Srem conducted archaeological excavations at the site of Banja Kulina near Erdevik, a small lake with several hot springs, converted into a spa by the Romans. The site was registered during works to widen the lake, and inlay it with stone. On this occasion, a Roman wall was discovered, after which archaeological research followed.

The existence of five walls was registered on the site, as well as two building phases. One wall belongs to a more recent building phase, while the remaining four form a vast pool, oriented along a north-eastern to south-western axis. The walls are 12.5 metres long, and the largest width is 2.90 m. They were made of brick, joined with mortar. The room represents a part of a larger complex. The eastern and the southern walls were dividing walls, while the western and the northern ones

bore the roof construction. In the corners of the pool, a wooden, grill-like construction was discovered. The object is dated to the 3rd–4th century (Radenović-Pejović 1985: 108).

Two fragments of plumbing pipes and an iron nail were found. In the pool and its immediate vicinity there are several hot springs, hence, it is believed that the Romans may have used it as a spa bath. Mobile archaeological material was registered in the immediate vicinity, including coins minted during the reign of Antoninus Pius, as well as the remains of two built tombs. A. Jovanović notes that, according to the data from the archive of the Museum of Srem, arms (spears) were found in the tombs, which is why they are classified into the late Antiquity grave type – with tools and arms, connected to foreign funerary elements. Analogies for this construction were found at Varaždinske Toplice, at the site of *Aquae Iasae* (Radenović-Pejović 1985: 109; Đorđević 2007: 31; Јовановић, А. 1994: 123).

This overview of sites and findings suggests the possibility that the mentioned hot springs were known of and used during Antiquity. It is the task of future research, both in the field and in theory, to find more specific evidence to definitely confirm this highly substantiated supposition.

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REZIME
ANTIČKI ARHEOLOŠKI LOKALITETI REGISTROVANI U OKRUŽENJU TERMALNIH IZVORA DUŽ DUNAVSKOG LIMESA U SRBIJI

KLJUČNE REČI: LIMES, DUNAV, ARHEOLOŠKI LOKALITETI, TERMALNI IZVORI, ANTIKA, SRBIJA, MILUTINOVAC, BOLJETIN, VIŠNJIČKA BANJA, LEŠTANE, VRDNIK, SLANKAMEN, ERDEVIK.

Duž rimskog limesa (deo u sastavu današnje Srbije) postoji više termalnih izvora. Pored nekih od njih registrovani su arheološki lokaliteti koji ukazuju na mogućnost korišćenja termalnih izvora u antičkom periodu. U radu su predstavljeni lokaliteti i nalazi pronađeni u okruženju termalnih izvora u Milutinovcu, Boljetinu, Višnjičkoj Banji, Leštanima, Vrdniku, Slankamenu i Erdeviku.

U Milutinovcu, na mestu gde je dunavski Ključ najuži, nalazilo se ranovizantijsko utvrđenje, uslovno identifikovano sa Timenom, zabeleženom kod Prokopija. Kanic navodi da se na ovom mestu nalazio izvor „prilično ukusne tople slane vode“.

Na prostoru Boljetina postojao je vojni logor, korišćen od I do VI veka, pri čemu je dva puta obnavljan (u III i VI veku). Moguće je njegovo identifikovanje sa Smornom, zabeleženom kod Prokopija. U okviru utvrđenja konstatovano je postojanje rimskog kupatila, nad kojim je podignut hrišćanski verski objekat. Pronađena je i nekropola iz XII-XIV veka, u okviru čijeg istraživanja je utvrđeno i postojanje rimskih grobova, kaom i ostava nakita iz X-XI veka.

Na prostoru Boljetina konstatovano je postojanja vojnog logora, korišćenog od I do VI veka. Izgrađen je u prvoj polovini I veka, kao zemljano utvrđenje sa palisadama. Tokom druge polovine I veka podignuti su zi-dani bedemi. Utvrđenje je u II veku, možda za vreme Hadrijanove vladavine, napušteno. Prvi put je obnov-ljeno neposredno pred Aurelijanovo napuštanje Dakije. Razrušeno je u velikom požaru tokom prvih decenija V veka. Po drugi put je obnovljeno za vreme velike Justinijanove obnove u VI veku.

Najstariji nalazi sa prostora Višnjice i Višnjičke Banje potiču iz perioda metalnih doba. Brojni su nalazi koje svedoče o životu u antici − nakit, novac, votivni natpisi, antefiksi, zidane grobnice, a možda i manja fortifikacija. Nesumnjivi su ostaci ranovizantijskog utvrđenja na lokalitetu Gradine, koji se možda može identifikovati sa Octavumom, koji pominje Prokopije. Poznati su i nalazi slovenskih peći, dok srednjovekovni ostaci i predanje ukazuju na postojanje kružne kule i manastira.

Antički nalazi su malobrojni da be se moglo govoriti o horizontu u Leštanima. Postojanje praistorijske nekropole ukazuje na kultno mesto, moguće povezano sa termalnim izvorima. O daljem kontinuitetu ovog kultnog mesta i eventualnoj eksploataciji termalnih izvora, odgovor mogu dati samo buduća istraživanja.

Prostor Vrdnika obiluje arheološkim lokalitetima. Najstariji tragovi naseljavanja potiču sa višeslojnog praistorijskog nalazišta Pećine, sa slojevima iz eneolita, bronzanog doba i starijeg gvozdenog doba. Iz atara Vrdnika poznato je više nalaza antičkog novca. Antički lokalitet Gradište ukazuje na mogućnost da se na ovom mestu nalazilo utvrđenje sa nekropolom. Iz epohe srednjeg veka imamo utvrđeni grad Vrdnik, čiji prvi pomen datira iz 1315. godine. Priču o srednjem veku Vrdnika zaključuje manastir Vrdnik-Ravanica, koga predanje vezuje za kneza Lazara, mada je najverovatnije podignut krajem XV − početkom XVI veka.

Na području Slankamena registrovan je veliki broj lokaliteta iz perioda metalnih doba, antike i srednjeg veka. Posebno skrećemo pažnju na keltski opidum, antički Akuminkum i srednjovekovno utvrđenje na lokalitetu Gradina.

U okolini Erdevika, posebno na potesu Banja Kulina, nalazi se više termalnih izvora. Arheološka istraživawa potvrđuju da se život u praistorijskom naselju na lokalitetu Lice odvijao u periodu eneolita. Na lokalitetu Banja Kulina otkrivene su

dve građevinske faze. Mlađoj fazi pripada prostrani bazen, građen od opeka povezanih malterom, koji je izvesno bio povezan sa obližnjim termalnim izvorima.

Pregled lokaliteta ukazuje da su neki od navedenih termalnih izvora izvesno bili poznati i korišćeni tokom antičkog perioda.

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EIN BEISPIEL DER SPÄTEISENZEITLICHEN ORLEA-MAGLAVIT FIBEL AUS DER IMRE PONGRÁCZ SAMMLUNG

ZUSAMMENFASSUNG

Imre Pongrácz (1849-1903) war Major bei der Honvèd Infanetrie und Militärkommandant des Orşova Hafens. Während seines Lebens sammelte er über 6000 Antiquitäten, die überwiegend vom rechten Donau-Ufer, aus heutigem Serbien, stammen und von den sog. "Schatzjägern" gesammelt wurden. Immerhin fehlt für die meisten Objekte aus der Sammlung eine Fundplatzbestimmung. Ein bedeutender Bestandteil der Sammlung schließt unterschiedliche Fibeln mit ein, darunter auch etwa achtzig späteisenzeitlicher Fibeln. Die hier präsentierte Fibel gehört dem sog. "Orlea-Maglavit" Typ, der während der Späteisenzeit in Gebieten um die Donau auf dem Balkan vertreten war. Obwohl einige "Orlea-Maglavit" Fibeln schon veröffentlicht sind, werden im hiesigen Text einige Aspekte (Tragweise, Geschlechtsbestimmung der Fibelträger usw.) angesprochen, die bisher ungeklärt blieben.

SCHLUSSWÖRTER: FIBEL, ORLEA, MAGLAVIT, SPÄTEISENZEIT, DONAU, SAMMLUNG.

Imre Pongrácz oder Emerich von Pongrácz (1849-1903) war Major bei der Honvèd Infantrie und Militärkommandant des Orşova Hafens. Nachdem er in 1902. ohne Erfolg versuchte, seine Sammlung an das Banat Museum der Geschichte und Archäologie zu verkaufen, starb er plötzlich im folgenden Jahr. Nach langen und schweren Verhandlungen mit Pongráczs Erben gelang es dem Museum allmählich die Finanzmittel zu erzeugen, mit denen es über 6000 Antiquitäten kaufte, die einen Sammlungsbestandteil des gestorbenen Majors ausmachten. Die Mehrheit dieser Antiquitäten, die von Pongrácz gesammelt wurden, stammt vom rechten Donau-Ufer, aus heutigem Serbien. Dort hatte der Honvèd Offizier Verbindungen mit lokalen "Schatzjägern". Obwohl für die meisten Objekte aus der Sammlung eine Fundplatzbestimmung fehlt, erwähnt I. Pongrácz für einige die Leute, die sie ihm verkauft haben und auch den Fundort aus dem die Objekte stammen. Einige von den Späteisenzeitlichen Funde aus der "Pongrácz Sammlung" wurden früher kurz erwähnt und in dem Sinne veröffentlicht.

Schon im 19. Jahrhundert wurden alle Funde aus der Imre Pongrácz Sammlung gezeichnet, darunter auch die Fibel, die hier weiter präsentiert wird (Abb. 1). Sie trägt die Inventarnummer 1729 (Abb. 2) und wurde aus Bronze hergestellt. Ihre Dimensionen sind: L: 5,2 cm, B: 1,0 cm, Bügelbreite (maximal): 2,0 cm.

Der Fuß und die Nadel fehlen, sowie eine Hälfte der Spiralwindung.

Dieses Stück gehört zu dem sog. Orlea-Maglavit Fibeltyp. Die Hauptmerkmale dieses Typs sind ein Kopf mit Spiralwindung (üblicherweise sechs Spiralen), ein langer, oval oder rhombisch verbrei-

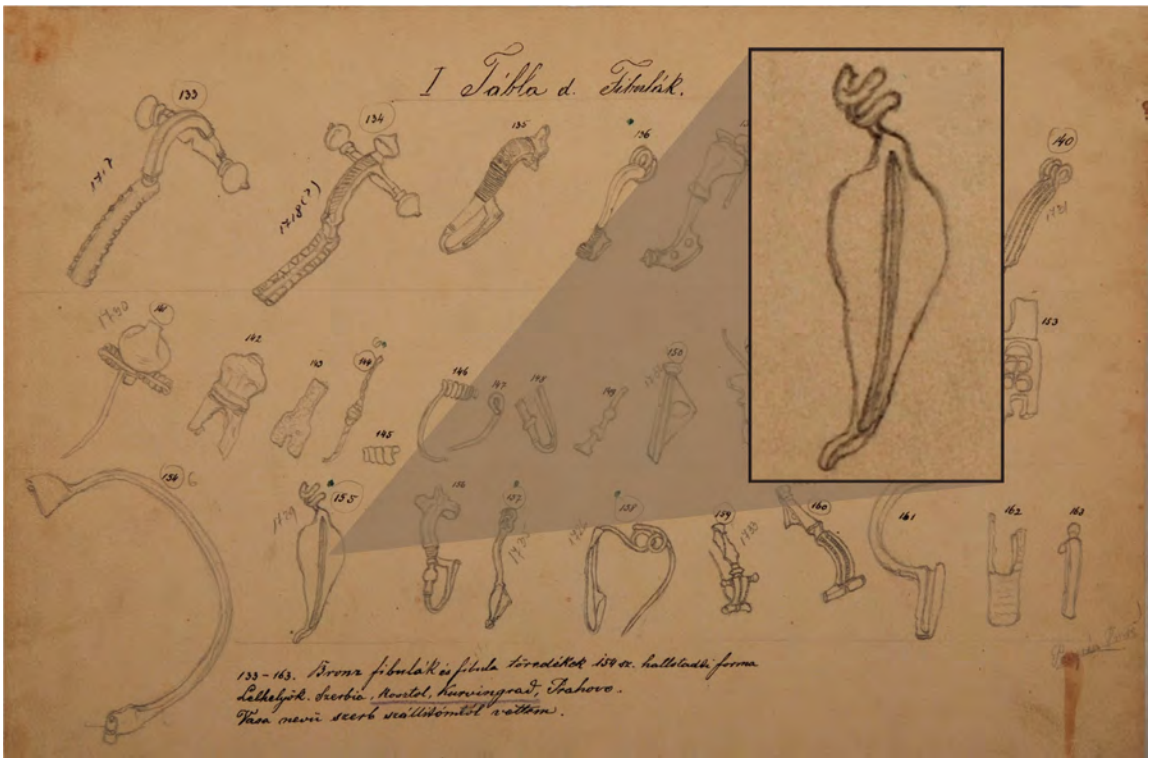


Abb. 1 - Zeichnung der Fibel Inv. Nr. 1729 aus der Imre Pongrácz Sammlung (Archiv des Muzeul Naţional al Banatului, Timişoara).

teter Bügel mit einer länglichen Rille, zurückgezogener Fuß mit einer kugel- oder bikonischen Verdickung und eine längliche und verdünnte Endung, die fast bis zum Bügelknie hinreicht. Manchmal tragen solche Fibeln eine eingeritzte Verzierung von kleinen Dimensionen. Sie wurden aus Bronze hergestellt und werden in Spätlatène C/Frühlatène D Zeit datiert, bzw. die erste Hälfte des 1. Jh. v. Chr. (Rustoiu 1997, 38, Popović 1992, 321).

Die Orlea-Maglavit Fibeln treten häufig auf dem Territorium der Padea-Panaghiurski Kolinii Kulturgruppe auf, das als ihr Entstehungsgebiet gilt (Rustoiu 1997, 38). Die meisten Stücke wurden im Donaugebiet ausgegraben, im Süden Olteniens, Nord und Nordwesten Bulgariens und am Eisernen Tor. In anderen Worten sind die Fibeln von diesem Typ für die östlichen Grenzgebiete der keltischen Welt typisch, bzw. südwestliches Rumänien, nordwestliches Bulgarien und Ostserbien. Sie werden als "keltisch" bezeichnet, obwohl sie manchmal schwer mit ihren Parallelen im keltischen Kerngebiet in Zusammenhang zu bringen sind. Vor allem ist dies wegen großen chronologischen Unterschieden. Die Bevölkerung, die in den Grenzgebieten siedelte, war wegen Ferne, aus politischen oder anderen Gründen häufig nicht in der Lage, die letzte Mode und Trends, sowie technologische Neuigkeiten des Kerngebietes zu folgen. Außerdem kam es zu Konservativismus, überwiegend bei den Adeligen, die die Herstellung einiger schon veralteten Typen für eine längere Zeit beibehielten. Bestimmte, aus keltischen Beispielen stammende Fibeltypen, besaßen eine eigene, lokale Entwicklung und sollten eigentlich als unabhängig betrachtet werden.

Dies geschah ebenso mit den Fibeln vom Typ Orlea-Maglavit, die an das Ende des 2. und in die erste Hälfte des 1. Jh. v. Chr. zu datieren sind (Popović 1992, 322). Ihr Ursprung ist bei den Frühlatènefibeln mit rhombischem Bügel zu suchen und deswegen besaß dieser Typ schon bei seiner Entstehung eine archaische Form. Eine ähnliche chronologische Bestimmung ist auch bei Rustiou zu finden (Rustoiu 1997, 38), der weiter-

Abb. 2 - Fibel Inv. Nr. 1729 aus der Imre Pongrácz Sammlung (Foto V. Ilić).

hin seine Bestimmung auf denjenigen von Zirra (Zirra 1971, 544) basiert.

Die Rolle der Orlea-Maglavit Fibeln wurde von Rustoiu diskutiert. Er betrachtet sie als skordiskisches Einfluss auf die Daker, das im 2. Jh. v. Chr. vom Gebiet der kleinen Skordiskern in Richtung Osten und Südosten verlief. Solche Einflüsse sind angeblich mit militärischen Bewegungen in Zusammenhang zu bringen, während dessen auch Moesi und Triballi beeinflusst wurden. Geografisch gesehen, umfassten die Einflüsse das nord- und nordwestliche Bulgarien, das Donaugebiet am Eisernen Tor, Oltenien, westliches und südliches Muntenien und das südwestliche Transsylvanien (Rustoiu 1997, 78) (Karte).

Obwohl die Fibeln aus der Pongracz Sammlung ausnahmslos Einzelfunde ohne archäologischen Kontext darstellen, ist es bekannt, dass sie aus der Umgebung oder direkt aus Orşova stammen. Die hier besprochene Fibel vom Typ Orlea-Maglavit Fibel passt, geografisch gesehen, ausgezeichnet in den oben genannten Rahmen des Donaugebietes am Eisernen Tor.

Analogien wurden in Serbien (Kostolac-Pećine, Mala Vrbica-Ajmana), Bulgarien (Carevec, Ivanski-Zlokučen, Malamir) und auch Rumänien (Govora-Sat, Saltia, Maglavit, Orlea, Cetace, Lişteava) gefunden (Popović 1992, 323-324).

Die Tragweise der Orlea-Maglavit Fibeln ist völlig schwer zu erschließen. In diesem geografischen Raum und im Gegenteil zu Römerzeit fehlen diesbezügliche bildliche Darstellungen. Da die Orlea-Maglavit Fibeln immer als Einzelstücke zutage kamen, kann ausgeschlossen werden, dass sie paarweise getragen wurden. Trotzdem ist nicht klar, ob sie als Verschluss- oder Zierspange gedient haben. Bei einem hochgewölbten Bügel besteht zwischen Bügel und Nadel ein genügend

großer Raum, um zwei Lagen selbst eines dicken Stoffes einzuschließen (Riha 1979, 41). Daher könnten Typen mit hochgewölbtem Bügel als "Mantelspangen" bezeichnet werden. Ebenso entsteht genügend Raum bei einem geknickten oder bei einem langen, gestreckten Bügel, wie gerade der Fall mit der Orlea-Maglavit Fibel aus der Pongracz Sammlung ist.

Neben Tracht - und Schmuckfunktion konnte den Fibeln auch eine magische Bedeutung zukommen, so Stücken mit apotropäischen Zeichen («Augen», Tierköpfe, Mondsymbole) (Riha 1979, 42). Mit diesem Gedanken können auch die Fibeln vom Orlea-Maglavit Typ in Zusammenhang gebracht, da einige von denen, wie z. B. das Stück aus Mala Vrbica - Konopište, mit "Augen" geschmückt sind (Popović 1992, 325, Taf. 1/12). Selbst die Rille mitten auf Bügeln dieser Fibeln könnte als Mondsymbol gedeutet werden.

In Anlehnung an diese Tragweise wird auch hier, genauso wie für die anderen Fibeltypen angenommen, dass der Fibelkopf nach unten, der Fuß nach oben gerichtet war. Es könnte aber sein, dass bestimmte Typen, sogar auch der hier besprochene, auch anders gerichtet, z. B. quergestellt, getragen wurden.

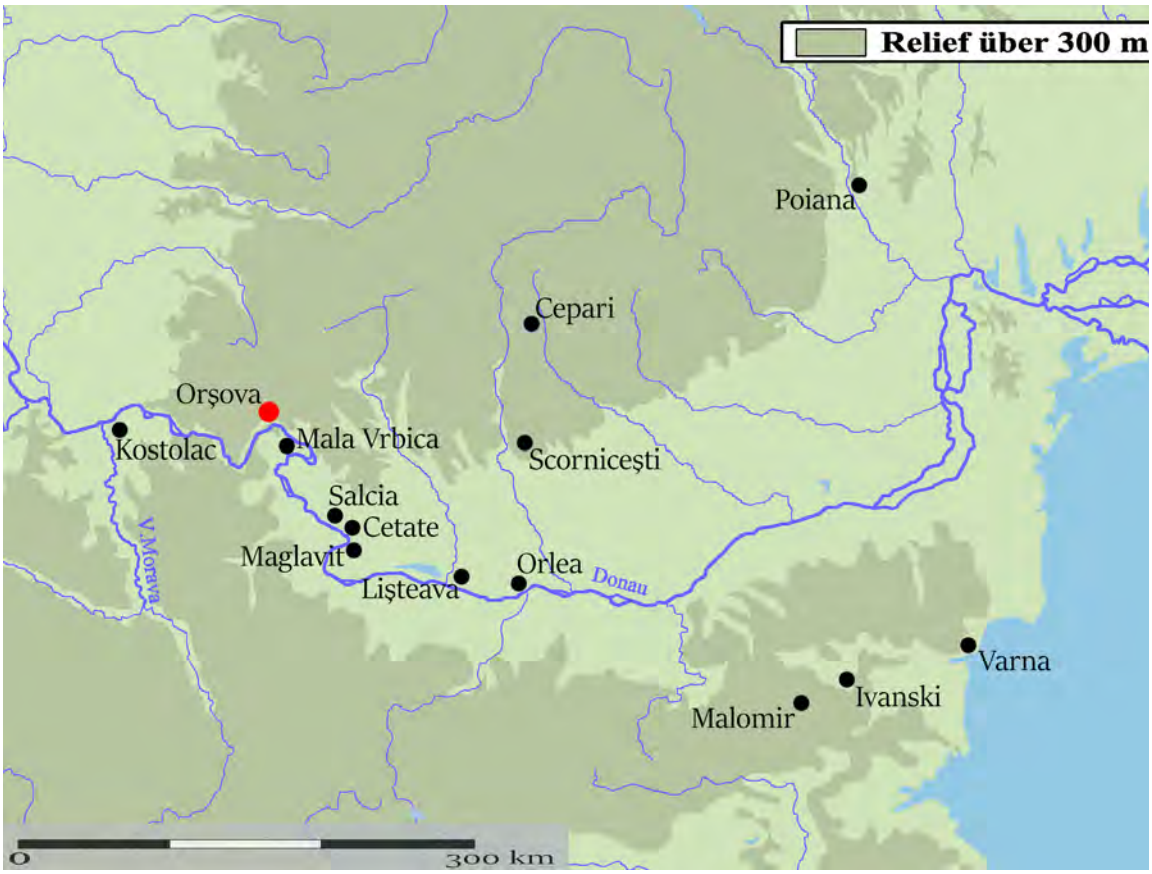
Weiterhin blieb es immer noch unbekannt, ob sie zu Frauen- oder Männertracht gehörten. Die meisten Funde der Orlea-Maglavit Fibeln gehören zu Einzelfunden, wie diejenigen aus Orlea, Maglavit, Salcia, Lişteava und Scorniceşti (Măndescu 2004, 13). Als Grabbeigaben, wie etwa aus der Nekropole Mala Vrbica - Ajmana (Popović 1992, 323), kommen sie immer in Gräbern mit geschlechtunspezifischen Funden vor, wie Tongefäßen oder Messern.

Neben der Tatsache, dass die Fibeln der La Tène Scheme üblicherweise für eine Datierung und Chronologie anderer Funde genutzt werden, werden sie auch als eine Art ethnischer Indikatoren bezeichnet. Die Fibeln der Spätlatèneschema werden generell den Kelten aus Mitteleuropa zugeschrieben, die unter anderem ebenso nach Osten umsiedelten (Zirra 2011, 4). In einem solchen Falle und als ein isoliertes Kriterium, können die Orela-Maglavit Fibeln keinen nötigen Beweis anbieten, um ausschließlich und ohne weiteres den Ostkelten, bzw. den Skordiskern, zugeschrieben zu werden. Sie können eher als eine lokale Entwicklung, die in einer ethnisch gemischten Umgebung entstand, bezeichnet werden.

SUMMARY
AN EXAMPLE OF LATE IRON AGE BROOCH OF THE ORLEA-MAGLAVIT TYPE FROM THE IMRE PONGRÁCZ COLLECTION

Imre Pongrácz (1849-1903) was a major of the Honvèd Infantry and the commander of the Orşova harbor. During his lifetime and his service as an officer, he collected over 6000 antiquities, mostly coming from the right Danube bank, actually from modern Serbia. All of the finds were collected by the so-called "treasure-hunters" and this is why most of the finds lack precise data regarding places of their origin.

An important part of the Imre Pongrácz collection, kept at the Muzeul Naţional al Banatului in Timişoara (Romania) consists of various fibulas. Among them, some eighty fibulas belong to the Late Iron Age. The fibula presented in this paper belongs to the so-called "Orlea-Maglavit" type, that was spread during this period along the Danube valley in the Balkans. Several "Orlea-Maglavit" fibulas were already published and their dating and ethnic belonging were discussed. However, in this paper, several other aspects have been discussed, like the way in which they were worn or the gender of people who wore them. These and some other aspects remained unclarified and unknown.



Karte - Fundorte der "Orlea-Maglavit" Fibeln (Karte teilweise nach Rustoiu 1997, S. 179 und Măndescu 2004, Fig. 2).

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REZIME
PRIMERAK KASNOLATENSKE FIBULE TIPA ORLEA-MAGLAVIT IZ ZBIRKE "IMRE PONGRAČ"

Imre Pongrač (1849-1903) je bio pešadijski Honved oficir i vojni komandant luke u Oršavi. Tokom života, a pre svega tokom oficirske službe, sakupio je preko 6000 predmeta koji većinom potiču sa desne obale Dunava, iz današnje Srbije. Sve te predmete su pronašli tzv. "lovci na blago", pa zbog toga za većinu nalaza iz ove zbirke nedostaje precizno definisano mesto nalaza.

Značajan deo ove zbirke se čuva u Narodnom muzeju Banata u Temišvaru (Muzeul Naţional al Banatului – Timişoara), a sastoji se od velikog broja različitih fibula. Među njima je oko osamdeset fibula iz kasnog gvozdenog doba. Fibula koja je ovde predstavljena pripada tzv. tipu "Orlea-Maglavit", koji je tokom kasnog gvozdenog doba bio rasprostranjen u oblasti balkanskog Podunavlja. Nekoliko fibula tipa "Orlea-Maglavit" je već publikovano, tako da je određeno njihovo datovanje i postojali su pokušaji određivanja njihove etničke pripadnosti, kao i način na koji su nošene i pol osoba koje su ih nosile. Ipak, mnogi od ovih faktora ostali su nerazjašnjeni i nepoznati.

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CONTRIBUTION TO THE STUDY OF THE FUNERARY ICONOGRAPHY IN UPPER MOESIA – REPRESENTATIONS OF PHYSICAL CONTACT ON ROMAN SEPULCHRAL MONUMENTS

ABSTRACT

Roman tombstones were exhibited in a public space along the main roads directly outside towns and settlements. Carved reliefs and inscriptions on them provided information about the deceased and created the desired image of them using symbolism that was recognisable throughout the entire Roman Empire. This paper will inspect representations of physical contact on tombstones from the territory of the province of Upper Moesia. Dextrarum iunctio and family embraces were detected, occurring mainly on family portraits, within the same iconographic scheme as in other Danube provinces of the Empire.

KEY WORDS: FUNERARY MONUMENTS, ICONOGRAPHY, UPPER MOESIA, DEXTRARUM IUNCTIO, THE ROMAN PERIOD

INTRODUCTION

A special relationship with the past and a feeling of piety toward ancestors were deeply rooted in Roman society[1]. Awareness of the inevitable and often premature death put funerary customs and rituals of paying respect to the deceased at a very important place in Roman culture. One of the characteristics of Roman funerary practices were tombstones with engraved epitaphs and relief decorations with various motifs - floral ornaments, mythological scenes and characters, attributes of deities, portraits of the deceased, symbolic depictions and various other objects. This method of commemoration is characteristic of Roman culture, a custom which was carried along to the provinces with the migrations of the population.

Roman tombstones are an important source for studying the art of this period, as well as the social relationships and values of Roman society. Tombstones in the Roman period were exhibited in the necropolises, along the main roads leading to cities. Since the monuments were visible and displayed in a public space, they were often used as a medium through which the messages were transmitted to the local community, using commonly known visual symbols (Carroll 2013: 560). It was a place where people and their families could show how they saw themselves and how they wanted others to remember them.

Portraits (single or family) are one of the favourite motifs on Roman funerary monuments in the territory of the entire Empire (George 2005: 37; Mander 2012: 65). The images of the deceased are somewhat personalised, so, in addition to the standard portrayal, they can show specific elements of

1 The article is the result of the project: *Viminacium, Roman city and military camp – research of material and non- material culture of inhabitants by using the modern technologies of remote detection, geophysics, GIS, digitalization and 3D visualization (no 47018)*, funded by The Ministry of Education, Science and Technological Development of the Republic of Serbia.

local costume, certain symbolic gestures or objects. For this reason, tombstones in Roman provinces can be indicators of social changes created by the interaction of the Roman and local populations.

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In this paper we will discuss tombstones from the territory of the province of Upper Moesia, as well as provinces formed in its territory after administrative reforms at the end of the 3rd century. Family portraits showing physical contact will be analysed, while mythological scenes will be excluded from this study. The chronological framework of this research is the period of the 1st century, that is, the time of the formation of the province, until the 4th century, when the latest monuments relevant to the topic are dated in the given territory.

PHYSICAL CONTACT IN ROMAN FUNERARY ICONOGRAPHY

The population of the Roman Empire shared a specific set of values, and the social norms were clear and expressed in a visible and recognisable way, both in speech and grammar, and in behaviour - the established symbolism of gestures and body language. Knowing these symbolic actions and the manner in which they are represented in art provides a better understanding of the culture of which they are a part (Corbeill 2004: 2).

Roman funerary iconography is uniform in its composition, but certain regional differences are reflected in the details, such as the type of costume, hairstyle, jewellery, as well as in the representation of certain poses and meaningful gestures, particular attributes or motifs. These peculiarities on tombstones often signified an affiliation to certain social groups or pointed to the family ties of various actors in the scene. Representations of physical contact on tombstones of the Roman period are fairly rare and represent an exception to a rule (George 2005: 43; Mander 2012: 68; Boatwright 2005: 305). The analysis of funerary monuments from Italy and the western provinces of the Empire shows that physical contact can have different meanings depending on the context, despite the fact that we are often tempted to interpret each of them as an expression of closeness and familial affection (Mander 2012: 67). Depictions of physical contact between parents and children, as well as between spouses have been noted. The type of contact that occurs is *dextrarum iunctio*, or the handshake motif, and family embrace, a hug represented with a hand on the shoulder.

The motif of the handshake has been found on numerous objects of ancient art. It appears in Assyrian iconography, from which it was transferred to ancient Greek, and then to Etruscan and Roman art (Kuzmanović-Novović 2017: 115). This motif had a different meaning depending on the socio-cultural context and the chronological framework, but also on the type of object on which it was shown. In Greek funerary art, this motif, the so called *dexiosis*, occurs on stelae and lekithoi, where it symbolised the connection between the living and the dead, the separation in death and reunification in the afterlife (Davies 1985: 639; Kuzmanović-Novović 2017: 116). This motif appears frequently in Etruscan sepulchral art, primarily on urns and sarcophagi, and rarely in painted tombs. In this context, the motif symbolised parting in death, often between spouses, but also the promise of reunion in the otherworld. It can also be associated with marriage, emphasising the bond between the depicted individuals and symbolising marital happiness (Davies 1985: 631-632).

In Roman art, the *dextrarum iunctio* motif appears on a number of different objects - sculptures, coins, engagement rings and sepulchral monuments. In funerary art it is represented on sarcophagi, often within complex, biographical scenes, and on tombstones with family portraits. The display of this motif on Roman tombstones appears almost exclusively on the spouses' portraits. As part of the wedding ceremony, *dextrarium iunctio* in this context signified *concordia*,

matrimonial harmony. Apart from the affection and the close bond of the depicted persons, this motif could also indicate the separation of the spouses due to the death of one of them, and the allusion to loyalty and love even in the afterlife (Davies 1985: 632-633; George 2005: 44; Mander 2012: 67-69).

The family embrace, which is expressed by laying a hand on one's shoulder, represents an act of closeness and affection between the spouses or parents and children. This meaningful gesture, however, may also be the symbol of parting due to death, a sign of mourning or of strengthening of the family ties, but also a way of highlighting the significance of some of its members. Choosing the type of contact, as well as the person initiating it, may be a mere coincidence, an artistic freedom, or a signature mark of the workshop, but it is more likely that it is a significant gesture that the ordering party requested (Mander 2012: 67-69).

DEPICTIONS OF PHYSICAL CONTACT ON MONUMENTS OF UPPER MOESIA

There have been several authors who have researched Roman tombstones from the province of Upper Moesia. During the first half of the 20th century, N. Vulić made the greatest contribution to this topic, publishing inscriptions from this province on several occasions, sometimes with sketches and photographs, together with a brief description and commentary. Great success was achieved in the field of epigraphy, where the greatest contribution was made by Miroslava Mirković, Petar Petrović and Slobodan Dušanić. The most significant collection of published epigraphic monuments is the five publications of the Center for Epigraphics and Numismatics in Belgrade, *Inscriptions de la Mésie Supérieure*. Funerary monuments were also the research topic of a few doctoral dissertations and master theses (Kondić 1965; Pilipović, 2007), while several individual articles dealt with types of tombstones, or the symbolism of particular motifs on them (Ђорђевић 1990; Milovanović 2001; Milovanović 2008; Milovanović 2013; Milovanović, Mrđić 2008; Pilipović 2004; Pilipović 2012; Tomović 1991).

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Prior to the Roman conquest, there was no custom of raising stone tombstones with inscriptions and reliefs in the central Balkan region. This form of commemoration appeared with the arrival of the Roman army, which brought with it master masons. The earliest appearance of tombstones in Upper Moesia is recorded in the southern part of the province and coincides with the first deductions of veterans in the *Scupi*, at the end of the 1st century AD (Petrovic 1975: 122). Big urban centres in other parts of the province soon developed their own workshops, probably in the 2nd century. At that time the workshops in *Singidunum*, *Viminacium*, *Ratiaria*, *Naissus*, *Ulpiana* and *Scupi* probably existed (Tomovic 1993: 29). During the second half of the 2nd century, workshops in smaller town centres, such as *Timacum Minus*, probably developed. The most intensive production of tombstones is recorded during the 2nd and the first half of the 3rd centuries (Petrović 1975: 123-124). At the end of the 3rd and the beginning of the 4th century, tombstones in the provinces formed in the territory of the former Upper Moesia are very scarce.

Among the Upper Moesian tombstones, the largest number was made in limestone, which was suitable for processing, long lasting and more affordable than marble. The most common form of monument is a funerary stele with a pediment (Petrović 1975: 49 - 50).

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Depictions of physical contact were noted on 8 out of more than 50 tombstones, mostly displaying family portrait reliefs, from Upper Moesia[2]. Only one monument has a representation of the

2 Monuments from the Bulgarian part of Upper Moesia were excluded from this study due to the unavailability of appropriate literature.

Fig. 1 - Stele of *Larsinia Ingenua, Singidunum*
(http://www.ubi-erat-lupa.org)

Fig. 2 – Family stele, *Singidunum*
(photo by I. Kosanović)

Fig. 3 - Stele of *Nunius Priscianus, Singidunum*
(photo by I. Kosanović)

dextrarum iunctio motif, while the others show an embrace with a hand on the shoulder.

On the stele of *Larsinia Ingenua* from *Singidunum* (cat. No. 1; fig. 1), two busts are shown in the niche below the pediment (Mirković, Dušanić 1976: 64-65). The spouses shake their right hands, and the woman lays her left hand on the right shoulder of the man. This is the only scene with a *dextrarum iunctio* motif on the tombstones from Upper Moesia.

A monument from *Singidunum* (cat. No. 2; fig. 2) shows three busts on a pediment – an adult man and two children. A man with both hands hugs the children, the girl with the right, and the boy with his left hand. The girl is bigger than the boy, which corresponds to the ages of the children listed in the inscription. The parents dedicated the monument to their children and to their father's colleague or brother (Mirković, Dušanić 1976: 60). The man shown is probably the late *Aurelius*

Fig. 4 - Monument of *Aurelia Procla*, Sopot (photo by I. Kosanović)

Fig. 5 - Funerary stele, Smederevo (https://mus.org.rs/)

Eumenetus, who may be the related to the children, so contact could signify family bonds, in this life and the next, since all three depicted persons are deceased.

On the stele of *Nunius Priscianus*, a young decurio of *Singidunum* (cat. No. 3; fig. 3), six people are shown in the niche below the pediment. There are two women and one man in the top row, with three children in front of them. The number of represented individuals does not correspond to the number of persons mentioned on the inscription (Mirković, Dušanić 1976: 71). An adult man and a woman in the middle placed their right hands on the shoulders of the children in front of them. The monument was raised by a man and a woman, probably the parents of the deceased; the inscription is partially damaged (one part is missing), so the nature of the contact is not clear enough.

The relief on the monument of *Aurelia Procla*, from Sopot (cat. No. 4; fig. 4) depicts a woman and two children, a bigger and a smaller one, in a rectangular niche. The woman is in the middle, hugging the children with both hands. The representation is not in accordance with the inscription, since the husband consecrates the monument to the wife, and the children were not mentioned (Mirković, Dušanić 1976: 135). It is interesting that the monument of the woman is dedicated by a soldier of the *Cohors II Aureliae Novae*, who was still in service. It is possible that the display marks the parting of the deceased mother from the children, and they could be, for some unknown reason, not listed on the inscription.

On the funerary stele from Smederevo (cat. No. 5; fig. 5), seven busts are shown in a rectangular niche - in the top row there are two men and a woman, and four children in front of them (Mirković 1986: 170). This stele displays contacts between several people - all the adults have one or both hands on the shoulders of children in front of them. One of the children is shown slightly larger than the others and partly between the two lines of busts; it is possible that it is an older child, or someone who is different from the others in some way. Unfortunately, apart from a dedication to the gods of the underworld, the inscription is not preserved, so the shown contacts cannot be interpreted.

The spouses, an augustal and his wife, are

Fig. 6 - Stele of *Titus Baebius,Viminacium*
(photo by N. Mrđić)

shown on the stele of *Titus Baebius* from *Viminacium* (cat. No. 6; fig. 6). The monument is dedicated by an augustal, *Titus Baebius Ascabantus*, to his *Titus Baebius Eutychus* and his wife, *Baebia Marcela*. The augustal is married to his *libertina*, who also bears his name; her jewellery suggests a Celtic origin (Milovanović, Mrđić 2008: 92). Laying a hand on the shoulder of a husband potentially symbolises the separation due to his death, as only the husband is deceased at the moment of the monument's erection.

On the late Roman monument from Ravna (cat. No. 7; fig. 7), a relief shows three busts and three whole figures. The three busts are shown in the first row – two women and one man. There are two symmetrically shown horsemen in front of them, between whom there is a standing male figure with a corona on his head (Petrovic 1995: 91). The monument is dedicated by the parents and the sister to the deceased. A male individual in the upper row, probably the father, hugs his daughter, shown in the middle, with his right hand; the figures of horsemen probably denote the deceased sons. In this case, the physical contact may symbolise the strengthening of ties between the living members of the family.

The monument from Aleksinac (cat. No. 8; fig. 8), shows three persons in a niche, a man, a woman, and a child between them in the second row. The man is on the left, his face is not visible due to damage; his left hand is on the child's shoulder. On the right is a woman, her right hand is on the right shoulder of the man (Petrović 1979: 114). This monument is a consecration to the deceased son, and the touch potentially indicates parting in death.

CONCLUDING REMARKS

As previously discussed, family portraits on Roman tombstones are characterised by the standardisation of the composition, but also by the differences in specific details. Most often they depict spouses, sometimes with children, and rarely members of a wider family. Gestures, types of display and the position of individuals show different

Fig. 7 - Family stele, *Timacum Minus* (http://www.muzejknjazevac.org.rs)

levels of identity of the depicted persons, and emphasise the type of connection between them, as well as the family hierarchy (Mander 2012: 78).

The analysis of the distribution of physical contact motifs on Roman tombstones from the territory of Europe has distinguished two regions where this motif is frequent, Rome and Italy, and the Danube provinces. In other Western provinces, these motifs are extremely rare - from the territories of Gaul, Britain, Germany and Spain, there are a total of only 7 monuments with contact displays (Mander 2012: 70). The results are similar in Upper Moesia as in the Danube provinces. The number of monuments with depictions of contacts from this territory is insufficient for any statistically valid analysis, but it is useful to observe them from the perspective of provincial art, the system of values of the Roman society and Romanisation.

Among the analysed monuments, only one depiction of the *dextrarum iunctio* motif was noted. In this case, it is a monument that the former *signifer* and veteran of the *legio IIII Flavia* dedicated to his wife (cat. No. 1). Depictions of spouses' handshakes are common in monuments of military veterans and freedmen, because they emphasised a legally recognised marriage, a status that these groups did not have for a long time. It was probably a way to publicly show a newly acquired right of *conubium* (George 2005: 38-40; Mander 2012: 70, 80-81). Both persons on the Singidunum monument are Roman citizens, but the husband is a veteran of the legion, so it is possible that the *dextrarum* was used here to emphasise the recently gained right of legal marriage as well as the marital harmony of the couple.

Other analysed monuments (cat. Nos. 2-8) display the family embrace, expressed by laying a hand on one's shoulder. On all monuments the arm is shown anatomically inaccurately, in an unnatural position. The stonemason apparently did not intend to imitate natural movement, but rather show a gesture that denotes the bond and closeness. The display of the embrace contributed to the overall impression of a loving family, and in this way em-

Fig. 8 - Stele of *Publius Aelius Victor*, Aleksinac (http://edh-www.adw.uni-heidelberg.de/edh/foto/F024586)

phasis was placed on the *pietas*, mutual respect and emotional commitment of spouses, as well as parents towards their children and vice versa (George, 2005: 41). On the Upper Moesian monuments these motifs, besides family harmony and closeness, could symbolise mourning and parting due to the death of one of the depicted persons, on whose shoulder the arm is usually placed. A unique case is the monument from *Timacum Minus* (cat. No. 7), where an embrace is shown between a father and a daughter, his only living child. In this case, the embrace could signify the strengthening of bonds between surviving family members.

A particular hierarchy in terms of initiating a contact is noted in all of the monuments. In a relationship between adults and children, the adults always initiate the contact, while in the relationship between husband and wife, the initiator is always the wife. Six monuments (cat. Nos. 2-5, 7-8) show adults who hug children and, two (cat. Nos. 6, 8), show women who put their hand on the shoulder of the husband. On the monuments from the region of Rome and Italy, women usually initiate contact, while in the Danube provinces the iconography is somewhat more dynamic. This is striking in the case of Dacia, which shows a great deviation from the rules, because the contact is reciprocal on all monuments, that is, both spouses participate equally (Mander 2012: 73).

The distribution of the motif of physical contact points to a greater concentration in the eastern and northern parts of Upper Moesia, while these scenes are not recorded on monuments from the southern parts of the province. Monuments originate both from larger urban centres and from smaller settlements. Most of them are dated to the period of the 2nd - 3rd century, while only one from *Timacum Minus* is late Roman.

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In conclusion, it can be said that the motif of physical contact on Roman tombstones is a matter of strong regional affinities, and Upper Moesia fits into the wider picture of art in the Danube provinces. The depictions of physical contact in the funerary iconography indicate a very high degree of Romanisation in Upper Moesia, as early as the 2*nd* century. This would indicate that, apart from mere artistic influences, elements of non-material culture were transferred to this province along with the developed, accepted and understood symbolism of these kinds of motifs, which reflected the social norms of the Roman Empire.

ABBREVIATIONS

IMS I – Inscriptions de la Mésie supérieure I. Singidunum et le Nord-Ouest de la province
IMS II – Inscriptions de la Mésie supérieure II. Viminacium et Margum
IMS III/2 – Inscriptions de la Mésie supérieure III/2. Timacum Minus et la Valée du Timok.
IMS IV – Inscriptions de la Mésie supérieure IV. Naissus — Remesiana — Horreum Margi

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REZIME
PRILOG PROUČAVANJU FUNERARNE IKONOGRAFIJE U GORNJOJ MEZIJI – PREDSTAVE FIZIČKOG KONTAKTA NA RIMSKIM NADGROBNIM SPOMENICIMA

KLJUČNE REČI: NADGROBNI SPOMENICI, IKONOGRAFIJA, GORNJA MEZIJA, DEXTRARUM IUNCTIO, RIMSKI PERIOD

Rimska funerarna ikonografija obiluje simboličkim predstavama i motivima, koji su bili prepoznatljivi širom čitavog Carstva. U radu su analizirani prikazi fizičkog kontakta na rimskim nadgrobnim portretima sa tla provincije Gornje Mezije. Među ovim spomenicima na 8 primeraka uočen je fizički kontakt između pojedinih osoba, a registrovani su *dextrarum iunctio*, tj. rukovanje supružnika i zagrljaj izražen polaganjem ruke na rame. Ovi motivi doprinosili su celokupnom utisku ljubavi i porodične sloge, a mogli su da simbolizuju i tugu, rastanak usled smrti neke od prikazanih osoba, bračnu harmoniju, ojačavanje porodičnih veza. Analizirani spomenici pokazuju podudaranje sa vizuelnom simbolikom i sistemom vrednosti u Rimu i podunavskim provincijama. Predstave fizičkog kontakta u funerarnoj ikonografiji ukazuju na veoma visok stepen romanizacije u Gornjoj Meziji, uključujući elemente duhovne kulture, već u II veku n. e.

cat. No.	selected bibliography	represented individuals	inscription	location	date
1	IMS I, 35	spouses	*D(is) M(anibus) / Larsinia In/genua vixit / annis XXXX P. Ae(lius) / Dionysius ve(teranus) / le(gionis) IIII F(laviae) f(elicis) ex si(gnifero) co/ niugi bene / merenti pos(uit)*	*Singidunum*	the second half of the 2nd century
2	IMS I, 28	one adult and two children	*D(is) M(anibus) / Aur(eliae) Diogeniae / vix(it) ann(os) IIII et / Aur(elio) Diogeniano / vix(it) [an]n(um) I / Aur(elius) Demetrius str(ator) / co(n)s(ularis) leg(ionis) IIII F(laviae) et / Val(eria) Marcella f(iliis) kariss(imis) / et Aur(elio) Eumeneti str(atori) / leg(ati) leg(ionis) eiusd(em) v(ixit) a(nnos) XL / contirunc(ulo) fratri / b(ene) m(erenti) p(osuerunt)*	*Singidunum*	the 2nd century
3	IMS I, 45	three adults and three children	*Dibus Manibus / Infernis Nun/nio Prisciano / dec(urioni) col(oniae) Sing(iduni) qui / vix(it) ann(os) XXXVI / non dignus / c<e>lerius / inf/<r>a decessit / Aur(elius) Priscillianus / et Sept(imia) Lupercilla*	*Singidunum*	the second half of the 3rd century
4	IMS I, 119	one adult and two children	*D(is) M(anibus) / Aur(elia) Procla / vixit ann(is) / XXXIII tit(ulum) p(osuit) / Aur(e)l(ius) Victor / mil(es) c(ohortis) II Aur(eliae) n(ovae) SA/ COR c(oniugi) b(ene) m(erenti)*	Sopot	the second half of the 2nd – the first decades of the 3rd century
5	IMS II, 190	three adults and four children	*D(is) M(anibus)*[---	Smederevo	end of the 2nd – 3rd century
6	Milovanović, Mrđić 2008	spouses	*D(is) M(anibus) / T(itus) Baeb(ius) Eutychi / Aug(ustalis) Mun(icipii) Ael(ii)Vim(inacii) / qui v(ixit) a(nnis) LXV et / Baebiae Marcel / lae eius / T(itus) Baeb(ius) Abascan / tus aug(ustalis) eiusdem / mun(icipii) patronis*	*Viminacium*	middle of – the second half of the 2nd century

cat. No.	selected bibliography	represented individuals	inscription	location	date
7	IMS III/2, 42	two adults and three children	*D(is) M(anibus) / Aurel(ius) Marcus eq(ues) Ro[m(anus)] / vix(it) an(nis) X[--] / et Aurelius Marcianu[s] / vix(it) an(nis) VII[±?] / Aurel(ius) Martian[us] / vir egregiu[s] / pr(a) ep(ositus) coh(ortis) II / A(ureliae) D(ar)d(anorum) pater / [et] / Aurelia Donata / mater et Aurel[i]/a Severina / soror se(!) su/pervivent[es] / fili(i)s b(ene) [m(erentibus)] p(osuerunt)*	*Timacum Minus*	the second half of the 3rd –the first half of the 4th century
8	IMS IV, 95	two adults and one child	*D(is) M(anibus) / P(ublius) Ael(ius) Vic/tor vix(it) an(nis) / XVIII tit(ulum) p(osuerunt) / P(ublius) Ael(ius) Ius/tinus et Ae/lia Claudi/a parent(es) / fil(io) pient(issimo) / et sibi sit / t(ibi) t(erra) l(evis)*	Aleksinac	middle of the 2nd century

Table with the catalogue of the stelae

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STEREOTYPES AS PROTOTYPES IN THE PERCEPTION OF WOMEN: A FEW REMARKS FROM HISTORY AND FOLK TRADITION

ABSTRACT

The perception of women in past centuries has often been based on preconceived ideas, models and patterns of behaviour, all of which formed stereotypes concerning women. Many stereotypes originated in the patriarchal environment and according to Christian moral principles. Not even ladies from imperial circles were spared of being labelled with different stereotypes, one of the most frequent being their modest provenance, and of being called harlots, courtesans or prostitutes. This perception was later taken to a new, deeper level in the centuries-long folk tradition, where women, often of foreign origin, from notable families or in high positions in the state, were considered cursed or guilty for something that a man was not supposed to be blamed for. These women were the objects of many legends and were often associated with demonic creatures and considered fairies or witches.

KEYWORDS: STEREOTYPE, WOMAN, EMPRESS, COURTESAN, WITCH, FAIRY, DEMONIC CREATURE, HISTORY, LEGEND, FOLK TRADITION.

INTRODUCTION[1]

Stereotypes in the centuries-long perception of women in society go back to the distant past, i.e. to the time when Christianity as a religion was establishing models, standards and patterns of behaviour, and some of these stereotypes haven't changed to this day. Starting with the archetypal male fear of paralysing female powers connected to Medusa, i.e. the Gorgons, to horrifying executions of "witches" in the Middle Ages, all the way to the universal labelling of prostitutes, some of the stereotypes have been generally accepted in human language and conscience to the present day. Attempting to unravel at least some of the questions concerning stereotypes in the perception of women in society, in this short study we will look back at the origin of the appearance of the usual stereotypes, which can be tracked through the emergence and rise of Christianity, as well as through the forming of myths and legends in folk traditions, which, as we shall see, are based on historically generated stereotypes.

1 The article is a result of the project: *Viminacium, Roman city and military camp – research of material and non- material culture of inhabitants by using the modern technologies of remote detection, geophysics, GIS, digitalization and 3D visualization (no 47018)*, funded by The Ministry of Education, Science and Technological Development of the Republic of Serbia.

STEREOTYPES IN HISTORICAL SOURCES

One of the first Christian reports of a negative image of a woman was one concerning Romula, Galerius' mother. Due to the notorious persecutions of Christians by Galerius in 303, Christian authors fostered a distinctively negative attitude towards the emperor and his mother, who was described as a superstitious woman, venerating mountain deities and organising daily sacrificial feasts in their honour, which is something that Christians refrained from and, therefore, this hatred towards Christians allegedly instigated her son to destroy them (Lact. *De Mort*. XI: 1-2).[2] Surely, these descriptions and the negative attitude of Christian written sources need to be taken with caution, although architectural structures, as well as the ornaments from Felix Romuliana support the idea that Romula venerated the mountain deities Liber and Libera, i.e. Dionysus as the counterpart of Liber, the deity that occupies the central part in the iconography of artistic decorations of the Gamzigrad palace (Живић 2010: 107–140) (Fig. 1, a-c). It seems that the tendency towards a negative attitude of the authors from Antiquity in regard to empresses who were not of noble descent resulted in the creation of a specific form of venerating women, emperors' mothers, that began during the tetrarchy. The gradual occurrence of female figures in politics or in public events in the Empire, generally speaking, could probably be interpreted as a reaction to the dominance of male figures and the militaristic atmosphere during the era of "barrack emperors" (Valeva 2009: 67–76). However, Galerius used his mother to create a legend about his divine discordance with the god Mars. In this way he glorified himself as the new Romulus, so that he did not even mind that such a legend would publicly shame his mother for adultery.[3] In the wake of the legend of Galerius' divine conception, his mother Romula, becoming thus known as an adulteress, turned into the pivot of the glorification of the emperor's origin and his connection to Romulus, and even Alexander the Great. This fact, as well as the act of erecting a palace in his mother's honour, could testify that in Galerius' ideological concept of the cult of the emperor, the new Romulus, Jupiter and Heracles, the veneration of the mother figure also took the form of a cult, which could neutralise the negative image formed by the subjects, created by this legend or by the hostility towards Christians.

The first Christian empress, and one of the most famous, Helena, the mother of Constantine the Great, not only became a model of piety for all future Byzantine empresses, but was also celebrated as a saint. Although her origin was glorified and mostly based on myths in written sources from later periods, according to the importance that she gained with time (ASS *Aug.* III: 580-599), in contemporary sources, Helena's name was associated with negative connotations.[4] The negative attitude of contemporaries towards the empress' origin is visible in the allegations that she was an innkeeper, even a prostitute, and Constantine's rival Maxentius ridiculed him as a "son of a harlot", indicating that he was not worthy to be proclaimed Caesar (Lenski 2012: 62). According to Eusebius' assertions that she died at the age of eighty, after her pilgrimage to Jerusalem, it could be assumed that she was born around 248/9 (Euseb. *Vita Const*. 3.46.1). It is not known where and when Helena met Constantius Chlorus, but it is possible that they were never in an official marriage, but in some sort of concubinage, permitting a relationship between two partners from different social classes (Drijvers 1992: 17–19). Constantius found a politically more convenient choice of partner in Theodora, daughter of Augustus Maximi-

2 See more on this in: Поповић 2010: 479–489.

3 Galerius' divine descent originates from the god Mars, who was his father, Romulus being his brother, and his mother Romula, just like Olympias, mother of Alexander the Great, conceived him with the god himself, who approached her in the form of a dragon (Lact. *De Mort*. IX. 9; *Epit. De Caes.* 40, 16).

4 She was not only described as a waitress in an inn, but also as a prostitute. Concerning sources on this matter, see: Lenski 2012: 59.

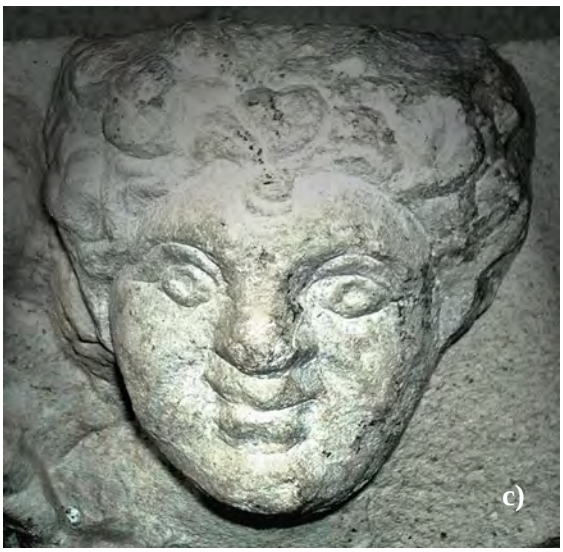

Fig. 1 – a) View of the Gamzigrad palace b) Inscription FELIX ROMULIANA on the discovered archivolt at the site c) Capital with the so-called portrait of Romula (Documentation of the Institute of Archaeology)

anus, whom he married ca 289 (likewise, Galerius married Valeria for similar reasons), which permitted a closer relationship between the Augustus and the Caesar (Barnes 1982: 125-126). However, since Constantine was proclaimed Augustus in York, Helena became a significant support for her son and an active participant in religious matters (Drijvers 1992: 35–38). Having become one of the tetrarchs, Constantine, like his father before him, ruled from Trier (Augusta Treverorum), the city in which legends about Helena's noble descent started to develop, which is why it is presumed that it is here that the empress joined Constantine's court (Freisenbruch 2011: 211). Unlike Romula, who, according to historical sources, directly influenced Galerius' decision to persecute Christians by her veneration of mountain deities, Helena's support for Christians, as stated by written sources, was instigated by her son Constantine (Euseb. *Vita Const*. 3.47). As previously mentioned, since the time of the tetrarchy, the attitude of emperors towards their mothers became particularly emphasised, not only in some political or religious matters, but also in art. Thanks to the support that Helena had as the empress mother of the first Christian monarch, her modest provenance was quickly forgotten, and, aside from her rise to the higher status of Augusta in 324, the image created of her as a pious woman was even more important (Fig. 2). The shift in regard to her descent, thanks to her benefaction, the churches she had erected, her journey to the Holy Land and the legendary finding of pieces of the True Cross, contributed to the empress Helena acquiring the reputation of a great Christian and coming to be a role model to future Byzantine empresses, who, by their actions, became "new Helenas".[5]

The empresses of the Theodosian dynasty, each in their own way, fulfilled the traditional ideal of imperial domination and, like the empress Helena, became models of good Christian be-

Fig. 2 – Solidus of the empress Helena from the National museum of Belgrade (After: Antički portret u Jugoslaviji 1987, 244)

haviour.[6] However, at the beginning of the 6th century, the question of the lowly origin of empresses was opened again, in one of the most well-known works of Procopius of Caesarea, *Secret History* (*Historia Arcana*).

Euphemia, the wife of the Emperor Justin I, was a Byzantine empress between 518 and 523/524. In light of Procopius' *Anecdota*, and considering his aversion towards women from the imperial circle, we discover that Justin, before reaching a high position in the army, married a former slave of barbaric origin and a concubine, Lupicina (Proc. *Hist. arc.* 6, 17). The meaning of this name can be linked to a word designating a prostitute,[7] so that, shortly after Justin's installation on the throne, the members of the demos chose a more respectable name for the empress – Euphemia (Theophanes, *Chronicle,* A.M. 6011). If this name was chosen in honour of Saint Euphemia of Chalcedon, it can be presumed that, in this symbolic way, the newly elected emperor and empress declared themselves

5 More on this in: Drijvers 1993: 85-90; Brubaker 1997: 52-75; James 2001: 14, 149-150, 153-154; Coon 1997: 97-103, 118-119, 134-135; Herrin 2001: 1-2, 21.

6 More on this in the study on Theodosian empresses: Holum 1982.

7 The Latin noun *Lupa* is linked to the cult of the she-wolf who brought up Romulus and Remus, in whose orgiastic rituals during the festival of *Lupercalia* people celebrated the fertility of the annual cycle. Brothels across the Empire were called *Lupernalia* (Grahn 1993: 139).

Fig. 3 – Bust of the empress Euphemia
from the National museum of Niš
(After: Antički portret u Jugoslaviji 1987, 104)

as adhering to the orthodox principles, and thus put an end to the support of monophysitism by former emperors (Cameron 1976: 145). During her reign, empress Euphemia was known and celebrated as a devout and respectable Christian (Vasiliev 1950: 91). Her death could be dated in the same year or several years before Justin's abolition of the law that forbade marriage between a member of the senatorial class and an actress or a slave (in 524), which made the matrimony between Justinian and Theodora possible, which Euphemia was opposed to (Vasiliev 1950: 91, 98). Euphemia herself, as a former slave and concubine, was not subjected to the terms of this law, most probably because the emperor retroactively proclaimed her a free person since birth (Daube 1967: 385-386). Euphemia falls into the circle of empresses of lowly origin who gained respect as a notable Christian and pious empress (Fig. 3).

One of the best-known Byzantine empresses, Theodora (527–548), the wife of the Emperor Justinian I, has remained equally intriguing to scientists and the wider public to this day. Theodora's power was not as great as that of the former empresses Ariadne and Euphemia and her heir Sophia, and the popularity that she gained later was mostly based on Procopius' *Secret History* (McClanan 2002: 121). According to Procopius' report on the empress' past, we discover that Theodora, as the daughter of an animal keeper, more precisely a bear keeper, belonged to the lowest rank of the Byzantine society, and that, after her father's death and subsequent poverty, became an actress, as well as a courtesan.[8] After being a concubine of the governor of Lybia Pentapolis, she also engaged in prostitution in Alexandria and across the Middle East, and afterwards came back to Constantinople, where she met Justinian, became his mistress, and was elevated by him to the patrician status (Proc. *Hist. arc.*, 9, 27–30). Theodora's connection to brothels is also expressed by her close friend and protégé, the monophysite bishop John of Ephesus (John Eph., *Lives, PO* 17. 188–9). Written sources also mention Theodora's frequent pregnancy terminations, as well as a son and a daughter born before her marriage to Justinian (John Eph., *HE* 2.11, 5.1; Proc. *Hist. arc.*, 17.16–23). As mentioned above, the marriage between Theodora and Justinian was made possible by the introduction of a special law, and it could be dated into the period after Euphemia's death in 523 or 524. Theodora's influence on religious matters was mostly carried out through unofficial channels, while, according to written sources, Justinian's infinite love made her a dominant political and state governing partner, so that she was described as the emperor's co-ruler (Garland 1999: 29-30). Taking her cue from former empresses, Theodora's philanthropy encompassed the restoration and erection of many churches and monasteries, hospitals and orphanages, together with the Emperor Justinian or on her own, and the empress' benefactions included the protection of the monophysite community, especially women,

8 Procopius gives a detailed description of her services and her behaviour on stage: Proc. *Hist. arc.* 9, 3-26. Other sources concerning Theodora's youth give a more morally acceptable image of the empress and establish a new legend about the empress' origin; cf.: Evans 2002: 18-19; Evans 2011: 7–9.

Fig. 4 – Mosaic depiction of the empress Theodora from the basilica San Vitale in Ravenna (photo by: N. Mrđić)

referring thus to her origin.[9] The negative image of women loved by emperors seems to culminate in Procopius' *Secret History* and the historian's hostile tone in describing the empress Theodora. The empress' intriguing personality captured the imagination of later generations of researchers, artists and writers. Nevertheless, in many studies, the authors who treated the personality of the empress Theodora implemented their knowledge and pursued different approaches to this problem in order to revise the legendary image of her, established for centuries (Fig. 4).[10] The precedent concerning the implementation of the law that permitted the wedlock of Justinian and Theodora, as well as the empress' influence on the emperor's decisions, as in the case of the Nika riots, demonstrate the strong personality of this woman.[11] Theodora is one of the rare examples in Byzantine history of a woman who started out as a dancer, from the lowest status, and arrived at the court, and who, as an outsider, unlike the empresses born in the purple and raised and prepared for the role of the Augusta, came to the position of power through marriage (Herrin 1993: 167–189). Just like Justinian erected Justiniana Prima in his mother's honour, following the model of his predecessors who honoured their respective mothers in a similar way, in the same way Theodora's well-doing and beneficence followed the tradition of the empresses from former dynasties; it is also important to emphasise her active involvement in resolving matters of women, especially prosti-

9 More on Theodora's beneficence and foundations, as well as on the attitude of the writers from Antiquity on this matter, in: McClanan 1996: 50-72.

10 Cf: Allen 1992: 93-104; Brubaker 2004: 83-101.

11 Theodora's intrepid personality showed when she dissuaded Justinian from abdicating and escaping during the Nika riot in 532, with the speech that she gave before the emperor and his councillors, using her legendary words: "The purple is a fine burial shroud". Procop. *De bellis,*. 1.24.33–37.

tutes, which resulted in the official adoption of the law of protection of women in the famous *Codex Justinianus* (Garland 1999: 15–18).

MYTHOLOGICAL PATTERNS IN CREATING THE IMAGE OF WOMEN IN LOCAL TRADITIONS

Different interpretations of myths, legends, historical sources and images have, over time, led to the creation of patterns and models in folk tradition, according to which certain types of behaviour have been interpreted. Thus, Jerome A. Voss writes that archaeologists have excavated and examined many monuments during the last few centuries, but the history of their interpretation in folk tradition was much longer (Voss 1987: 80–85). Folk interpretations of monuments are usually different from their real function, due to the fact that people know very little or nothing about them and ignorance opens the possibilities to folkloric expressions of understanding nature and society, mostly associating the place with strange, supernatural or mysterious forces (Voss 1987: 80285). Although magical stories from oral folklore are impossible to explain by rational researchers, it seems that tradition, as a phenomenon that exists between reality and imagination, still reproduces a certain degree of truth (Koumarianou 2007: 171).

Some authors believe that legends are simply a continuation of traditions and rituals that began in the time when the monuments were being built, so they often attribute a significant complexity to ancient societies, based on present-day stories. Others think that the Christian connection to these places exists solely because they used to be important before Christianity. Ultimately, the only thing with constancy and continuity is the lore itself, which, although imperfect, conserves some traces of the past times. Imprecise knowledge enabled folk to find alternative and flexible explanations according to views and concerns belonging to their time, just like today, when the past is interpreted according to present habits and tendencies. Folklore teaches us about the way people ponder their history and helps us understand today's motivations and drives (Voss 1987: 80–85).

Pavlovica and Jelica – antipodes of Christian ethics

One of the most interesting legends of the Braničevo region in Serbia is set in the time of Prince Lazar, and is referred to in Serbian oral poetry, in a poem belonging to the non-historic cycle: "God Settles All Scores" (Радовановић 1997: 238). This legend is linked to several monasteries, springs and toponyms, among which are the monasteries Rukumija in the village of Bradarac, Sestroljin in the village of Poljana, Zaova and Bradača, also associated to the cult of sister Jelica, originating from this region (Бојковић, Ђокић 2016: 99–108).[12]

The lore associated with the origin of these monasteries is consistent with the aforementioned poem, recorded by Vuk Karadžić. According to the lore, not far from the place where the monastery of Zaova is situated today, two brothers lived, the noblemen Pavle and Radule Radić with their families, and their sister Jelica. The execution of Jelica, condemned by her brothers Pavle and Radule to be drawn and quartered by horses, after a false accusation by her sister-in-law Pavlovica, happened, according to the lore, on August 2nd 1385, on Saint Elias' Day. According to the poem, where a part of her body fell, a church appeared. However, according to a legend, a year after this event, when Prince Lazar heard of what had happened, he visited Jelica's grave - the spot where her head fell, above which he erected the monastery of Zaova, and in addition, three more monasteries: her chin generated the monastery of Bradača, her hand – the Rukumija monastery, and her eyes – the monastery of

12 More on this cult in: Спасић 1996: 219–226.

Sestroljin. (Јовић 2014: 260–262). Leontije Pavlović also wrote about the cult of sister Jelica and recounted the legend about the origin of the four monasteries. According to this lore, the hill of Sopot was owned by the noblemen from the Radić family, vassals to Prince Lazar and, although they lived in Belgrade, they had a summer house on the hill. Pavle was also called the prince of Stig (Павловић 1965: 221). Field research shows that this lore still exists among folk (Јовић 2014: 260-262; Павловић 1965),[13] but only in the Braničevo region (Мирковић 2012: 15–17).

The existence of a hand as a relic in the Rukumija monastery was noted by Josif Veselić in the 1860s,[14] while Joakim Vujić and Milan Đ. Milićević make no mention of it. The previous hegumen of the monastery, Father Sava, recounted that he had a memory of this relic and that he used to come with his parents from Klenovnik to Rukumija to attend the service, at a time before World War I, and used to kiss this hand, which was partly coated in silver and placed in a wooden reliquary in the church. During the war, the hand disappeared, and rumour had it that it was taken away by the Bulgarians (Мирковић 2012: 10–12).

On the other hand, it is interesting to establish a link between the interpretation of the epic poem and the use of a spolia with the representation of Medusa built into the façade of the monastery in the 19th century. Thus, even in the title of the poem itself, "God Settles All Scores", we can feel a certain warning. The poem relates a family harmony between the brothers Pavle and Radule and their sister Jelica, which was disturbed by the arrival of Pavlovica (Pavle's wife). Pavlovica, as a foreign element in the family unity, jealous of the love and attention that the brothers (her husband included) show to their sister Jelica, perpetrates a series of crimes in order to place the blame on her sister-in-law, from killing her husband's horse and falcon to murdering her own child. The brothers, misled by her accusations, sentence their sister to be drawn and quartered and, despite the injustice, Jelica accepts the verdict without complaint. From the standpoint of patriarchal and Christian ethics, Pavlovica's intention to "sow hatred" between the brother and the sister is recognised as a sin and adequately punished by illness. Although it is the brothers who killed Jelica, the transference of the sin of her killing to the sister-in-law can be interpreted in the spirit of traditional representations of the ambivalent nature and destructive powers of women, so Pavlovica's character is structured according to the model of a demonic female being (Бошковић 2005: 77). Furthermore, all the elements in the poem relating to Pavlovica and her punishment – the appearance of a lake as a chthonic place, the image of death caused by an illness lasting nine years, snakes as chthonic animals hatching inside her body or consuming her eyes, as an indication of blindness (i.e. witch's blindness) and her activities during night-time – indicate her demonic nature, and the murder of a child in the cradle opens the possibility of interpreting this character as a witch (Бошковић 2005: 79-80). As a consequence of all of the above mentioned, it could be expected that a woman without a personal name, known only by the female variation of her husband's name, Pavlovica, finds a visual representation in the image of Medusa, shown between two doves in a pediment, together with horsemen in the acroterion of a Roman marble stele, by no means fortuitously built into the southwest wall of the Rukumija monastery just beneath the cornice. However, though she is a demonic creature, Medusa's image has been humanised over the centuries and, in art, since antiquity, it has been considered as a significant motif because of its apotropaic purpose, so the folk interpreted the head of the female figure on the façade of the monastery as a personification of the unfortunate Jelica, and the horsemen as representations of her brothers (Milovanović, Anđelković Grašar 2017: 176-177) (Fig. 5).

13 This legend was also described by Josif Veselić in his work published in 1861, *Monasteries in Serbia*, 140–143.

14 Veselić wrote that in the church there was "a holy object, i.e. a hand of a holy person, generally believed to belong to that girl who was slain despite being innocent." Веселић 1861: 144.

Fig. 5 – Spolia from the façade of Rukumija monastery with the depiction of Medusa and horsemen (After: Milovanović, Anđelković Grašar 2017, Fig. 19)

Another spolia with a representation of Medusa is associated with the Nimnik monastery. Since there is no reliable data concerning the time of the origin of this monastery in the village of Kurjače nor concerning its ktetor, it is assumed that it was built during the last decades of the autonomous Serbian state, as a foundation of some lower nobleman, and folk tradition ascribes it to Prince Bogoslav, a contemporary to Despot Đurađ Branković. In a piece of writing from 1734, Exarch John dates it to the time of Prince Lazar. In the Nimnik monastery there is a chapel named "Svetinja" with the grave of a holy man of unknown identity. According to the legend documented by Josif Veselić in 1861, hajduks killed a boy named Nikolaj, the son of a monk. The monks buried him, and later the hajduks built a house above the tomb. However, the house "turned into a chapel", so that "the folk still bring their ill here at any time of year, seeking help for various illnesses" (Веселић 1861: 147). "A family of hajduks still lives in the area and restores this tomb from time to time", writes Veselić (*loc. cit.*). Later stories about a little girl named Nikolina superseded the lore about the boy Nikolaj. The new hero is a Vlach girl Nikolina, killed by hajduks according to one version, or Turks according to another. Since the story of the hajduks is more widespread, it is probable that the lore originated in the 19th century, when the term "hajduk" designated bandits who attacked anyone with money. According to the lore, the hajduks went to pillage the monastery, but didn't know how to reach it. In a nearby Vlach village they came across a little girl who was guarding sheep and asked her where the monastery was. To every question, she persistently kept answering "Nu šću nimik", which, in Vlach language, means "I don't know anything". Later, when the hajduks found the church after all and pillaged it, a member of the hajduk gang who was the little girl's godfather said that she must have recognised him, so the leader ordered him to kill her. Since the girl never came home, the villagers went to search for her. In the distance they saw a bright light, and then the little girl's body on a tree, engulfed in flames. However, when they tried to take the oxcart carrying the girl's body, in the direction of the village, the oxen wouldn't move. Someone suggested they should head towards the monastery, the oxen started moving, so the little girl was buried next to the monastery. After penitence above her grave, her godfather built a chapel, and the monastery was named Nimnik, as a reference to the words that the girl repeated to the bandits. Thus, Saint Nicholas fell into oblivion and in his place the boy Nikolaj appeared, and later the girl Nikolina (Бојковић, Ђокић 2016: 90–92). The legend of the little girl's suffering was related in the poem "Holy Relic of the Nimnik Monastery". There are no written records concerning this poem, but it probably originated at the beginning

of the 20th century (Спасић 1998: 318). The other fragmented pediment of the Roman stele with Medusa's head was built into the lower part of the southern wall of the monastery of Nimnik (Fig. 6). Similar to the aforementioned example of the monastery of Rukumija, the memory of the unfortunate girl was evoked by the delicate and subtle image of the Medusa (Milovanović, Anđelković Grašar 2017: 177).

Fairies

Beliefs in imaginary beings with supernatural powers are deeply rooted across the entire region of northeast Serbia (Зечевић 1993: 257-258; 1981: 8-9). Cults – as the worship and veneration of a certain mythical subject (a plant, animal, force of nature, object, mythical being or a deceased person), as well as rituals that were performed as a set of rules and procedures within the cult itself and expressing veneration, secretly or publicly, represent an important element when researching the intangible cultural heritage of a specific area (Зечевић 1973: 43). According to Slobodan Zečević, eastern regions of Serbia keep a much clearer and fresher memory of demons than the western regions of the Dinaric Alps (Зечевић 1981: 6). He states that the church invested lots of effort into erasing the memory of pagan gods and idols and, thus, neglected the beliefs related to "lower mythology", i.e. demonic creatures, which could explain why local folk conserved more memories of demons than Slavic pagan deities. They did not reach the Serbs in their original form, but changed constantly under foreign influences and assimilations with the beliefs of other ethnicities (*op. cit*. 175-176).

Fairies as mythical beings, i.e. nature demons, exist in the beliefs of Slavic folk, as well as Germanic folk and people in Antiquity. According to Slobodan Zečević, they are pan European mythical beings, and in Serbia, the beliefs of the native population blended with those that the Slavs brought from their land of origin (*op. cit.* 9, 40). The fairies are exclusively female, and look like beautiful young girls, who often gather around springs to frolic, dance, sing and bathe. Their supernatural power lies in their hair or the garment that covered their head and wings on their back. It was believed that they could bring a dead person to life using medicinal herbs. However, their attitude to humans could be either friendly or malevolent, depending on their current mood, but also on the behaviour of humans towards them. A punishment of death or the deprivation of certain bodily functions was reserved for those who accidentally saw them bathing or enjoying some other pleasure, which was the ultimate transgression, because these events took place in locations that were taboo for mortals (*op. cit*. 41–43, 179).

Specific places in the landscape associated with different memories were based on certain elements of the environment that fascinated ancient societies, elements that people were familiar with or intuitively felt the presence of many generations. These places were often linked to rituals, and their spatial relationships, significance and functions mainly originated from certain historical values, common memories and the notions of origin and ancestry (Roymans et al. 2009: 338-340). Almost as a rule, water was an accompanying element to cult places; the people attributed to water, especially spring water, healing effects and sacredness. Thus, numerous legends related to healing are present in the local population of specific regions, but there are also some places whose fame extends to a wider area. People visit them often, and in large numbers on certain holidays, when these places become "gathering places, fairgrounds and playing grounds" (Радовановић 1997: 237).

In the village of Rečica, near Kostolac, at the location whose toponym is "Dušnik"[15] there is an

15 In the "Braničevo Journal" from 1467, Dušnik was listed as a village of six houses in Lučica Nahiye, and Momčilo Stojaković locates it west of the village of Biskuplje, noting that a hill named Dušnik still exists (Stojaković 1987: 192). It is the same location that

Fig. 6 - Spolia from the façade of Nimnik monastery with the depiction of Medusa (After: Milovanović, Anđelković Grašar 2017, Fig. 20)

acacia believed to have supernatural powers. Folk believe that every tree that differs from others by its size, appearance or position represents a potential residence of souls, spirits and mythical beings. A tree overgrown with vines is believed to be a "fairy tree". The acacia at "Dušnik" has a "fairy wreath" that sets it apart from other trees. It is believed that fairies gather around trees like this one and do harm to humans who hurt them. Thus, the tree itself is taboo as a fairies' meeting place, and any harm done to the tree would bring about the fairies' revenge. This belief system regarding "fairy trees" is a part of the traditional religious system of the Serbs (Ђокић, Јацановић 1992: 65).

"Svetinja" is a place on the left bank of the old riverbed of the Mlava in the village of Kostolac. It is considered sacred, the land is not supposed to be cultivated and it is forbidden to cut down trees in this location. In the central part there was an elm, where people hung icons, and believed that this place had healing properties for many diseases. A lot of people, especially young women, from the entire area used to come here, wash their face, place offerings on the elm and light candles. Since the elm was situated on the rampart of a fortification from the Roman period, it withered with time, and cult functions were transferred to three smaller elms nearby. When archaeological excavations began at the site of "Svetinja", none of the locals wanted to remove the remains of the old elm, and scarcely anyone was willing to work on the excavation site. All the hardships that the archaeological team subsequently encountered were attributed by the locals to the archaeologists' activities in this area, where the existence of Roman, Early Byzantine and Slavic settlements with a necropolis have been confirmed (*op. cit.* 73). Some villagers believed that this was the exact spot where fairies lived and even used to choose some of the local inhabitants as spouses; these

Miljković and Krstić define as the area under Dušnik Hill, at the tripoint of the territory of the villages of Rečica, Kličevac and Kurjače (Миљковић, Крстић 2007: 134).

men would then visit this place during night-time. Incidentally, it is a common belief in Serbian demonology that fairies can have intimate relations with humans (Зечевић 1981: 9, 179). In the village of Kostolac, some residents believe that fairies also appear at two local crossroads.[16]

Jerina

The Despotess Jerina was the wife of the Despot Đurađ Branković; she was Greek, and her original name was Irene Kantakouzene. Her foreign origin in the country that found itself in difficult political circumstances, on the verge of being occupied by the Turks, carried negative connotations in the mentality of the folk, similar to the story of Pavlovica, who, as a foreign element in a family, destroyed the harmony between the brothers and their sister Jelica. Notwithstanding the feeling of closeness to the Greeks, which existed among the folk, thanks to the Orthodox religion, in traditional culture, any foreigner was equated with the category of foreignness, associated with evil and demons (Коњик 2006: 59). Thus, in folk poems, the Despotess Jerina, as a foreign woman, was described as a damned person, blameworthy of family misfortune and the political ruin of the Despotate and, furthermore, her powerful role of a woman who surpasses the household sphere certainly contributed to the negative image created in poetry. The folklore not only emphasises her arrogance in constraining the people to forced labour for building medieval edifices, but also imputes to her the frequent company of young men that she took as lovers and then killed, until finally one of them, Đurađ, became her husband. These stories created a message conveying unacceptable behaviour, which could be transmitted from generation to generation (Гузина 2011: 84-85). This way of establishing a negative image and memory of this woman was deepened in oral poetry about the Branković family, where Jerina and her daughter Mara Branković were described as the damned female part of the family and accused of blinding Grgur and Stefan. In these poems, Jerina is also considered as being solely responsible for the marriage of her daughter to a Turkish ruler, an infidel; namely, the absence of men in contracting this marriage meant failing the patriarchal norms, which by default announced trouble and misfortune (Стамболић 2017: 222-224).

The names of two towers of the despot's court are associated with Roman sculptures which were built into them: "Jerina's Tower" was named after a statue of a Roman goddess situated in the niche in the first tower at the court entrance, in which the medieval population "recognised" the Serbian Despotess Jerina; and "Jezava Tower", i.e. "Nine Brothers' Heads Tower" and "Seven Brothers' Heads Tower", named after built-in sculptures taken from Roman tombstones (Цветковић 2009: 29-31) (Fig. 7). Petar Popović indicates Roman sarcophagi, sculptures, plates with inscriptions and architectural fragments, and highlights the aforementioned statue of a Roman goddess, saying that "every *good* Serb had a duty to throw a stone at it, because it was believed that the figure represented the Damned Jerina, so in this way they would take revenge for the forced labour of their ancestors during the construction of this fortress. The villagers were even supposed to use *their own carriage and oxen* and the labour took so long that Old Man Novak had to rebel and join the hajduks" (Поповић 1931: 52).[17] "The poor Despotess Jerina – Irene – they laid all the blame on her, as a Greek, believing that the wise and good Đurađ wouldn't be so heartless" (*op. cit.* 52-53). In order to justify the actions of their ruler, the folk laid the blame on the foreign woman, his wife. During the bombing in World War I, the sculpture of the goddess fell down and broke, revealing an inscription on the back of the pedestal, copied by a certain Mr Milijević, but the copy was ruined during the war.

16 According to the stories of locals.

17 This shows how folk legends are often a blended mixture of events and characters. Namely, Old Man Novak was born in the 16th century, so he couldn't be a contemporary of the construction of the Smederevo fortress.

Fig. 7 - Sculpture of the Roman goddess Vesta, so-called Jerina, spolia from Smederevo fortress (After: Цветковић 2009, 32)

The fallen sculpture, as well as others assembled in one place in Veliki Grad, was taken away by the occupiers (*op. cit.* 53).[18] Negative associations to the unfortunate despotess still live among the Serbian folk in the saying: "Evil deeds were done by Đurađ's Jerina, she did evil but lived to see worse" (Гузина 2011: 84). Outside of folk tradition, historically speaking, the Despotess Jerina's destiny was not any better. She died a year after Despot Đurađ's death, in 1457, possibly as a consequence of poisoning or while trying to escape from the court, and the sole heir to the Serbian throne became Lazar Branković (Спремић 2013: 905-906).

18 An interesting story about the interest of foreign armies in antiquities in Smederevo is related in an article (Kovács, Prohászka 2016: 59-63). A Hungarian soldier, a teacher by profession, sent a postcard to the Hungarian National Museum in Budapest, describing an inscription on a Roman tombstone that the soldiers in his unit found near Smederevo, and inquiring about the possibility to transfer it to Budapest by boat. It is unknown what became of the monument, but given the fact that this inscription has not been published anywhere, it was probably never transported to Budapest and remained in Smederevo, where it was destroyed or reused later for something else.

CONCLUSION

Based on everything we mentioned above, it is possible to conclude that, throughout history, women were perceived in different ways, but often according to preconceived patterns. Even when they belonged to the imperial circles, they could not escape being judged and their origin, as well as the way they arrived at the throne, being questioned. References to women's activities in historical sources often appear in narratives that primarily do not concern women, and were written by men. However, women fought in ingenious ways and managed to overcome the limitations of their rights and a life in a militaristic society, defying preconceived stereotypes, which were often overlooked and forgotten when these women would include Christian values in their life (Herrin 1993: 167–189; James 1997: 123–140).

The label of harlot and a woman's libertine behaviour became, with time, usual patterns of negative attitudes, associated to the primary, instinctive principles in women and often connected to demonic notions. Associating women to demonic beings, most often fairies and witches, was one of the generally accepted models of stereotypes in folk tradition. Besides the fact that there existed ordinary, innocent women who suffered because of these associations, the fear and awe that these mythical beings inspired in people can be linked to one of the oldest fears that men experienced with regard to women, the fear of female generative powers (*gynophobia*) (Irwin 2007: 13–23). One of the incarnations of this relationship with the fear of female powers was the image of Medusa, who, as a demonic creature, became demystified even during the Roman period. Although a being of demonic nature, but carrying a significant

apotropaic character, it was accepted in the Christian world, through folk tradition, as a symbol of the triumph of justice, repentance and punishment for the culprits, harmonising pagan religious principles with Christian ones, and linking Medusa's image to two legends from the Braničevo region, those of the sister Jelica and the little girl Nikolina (Milovanović, Anđelković Grašar 2017: 177).

Due to the fear of otherworldly forces and the destructive powers of female demonic creatures, it was believed that during the construction of every important edifice it was necessary to make a sacrifice to these beings, mostly fairies, who would otherwise, during night-time, destroy everything that had been built during the day. In the village of Kostolac we have recorded a legend which is a mixture of the variant of this Balkan motive, present also in the poem "Building the City of Skadar" and the motive from the poem "God Settles All Scores". In the legend we have recorded three brothers were erecting a monastery, but everything that the masons had built during the day, a fairy would "bring down" during the night. In order to appease the fairy, according to her request, the brothers built the youngest of their three sisters into the wall. As folklore was distancing itself from mythology, the act of creation was being transferred from gods to humans. However, the model of creation remained the same and, in order to "copy" the primordial cosmogonic act in all of its segments - the victory of the Creator over the incarnated Chaos, i.e. tearing apart the mythical monster and shaping the world out of its body parts - the institution of the building sacrifice was established (building a human body into the foundations of the future edifice) (Бошковић 2005: 74).

The characters can, thus, be mixed up, their names and names of places forgotten, but the memory of the elements of the poems bearing the basic values remains. Legends as specific folkloric forms can offer a wide range of evidence concerning the sociocultural characteristics of a population and a time period, while folkloric forms enable us to learn more about the beliefs, values and customs of a specific cultural community and reveal the way in which they directed and formed the behaviour and convictions of people. Legends preserve the tradition and the consciousness of identity of a population, and in their core they preserve the memory of real events (Гузина 2011: 83).

As a result of all of the above, we can only imagine what it must have been like for women to withstand a centuries-long heritage of stereotypes and how close they constantly were to being punished, not only for their behaviour, but precisely for the stereotypes through which they were perceived. Although such examples are many in legends, lore and epic poetry, even historical figures could not escape becoming a part of cultural models, and in this case part of the stereotypes, one of the best examples being the Despotess Jerina and, subsequently, Mara Branković as her offspring. These two women were characterised through typical categorisations of lower female deities, particularly fairies and witches. Since many evil deeds were ascribed to Jerina, from constraining the people to forced labour, marrying her daughter to a Turk, to being an intermediary in the blinding of her sons, the folk found an analogy with the actions of witches, evil women of demonic nature, who attack their own male children, and introduce their daughters to the "witch company" (Стамболић 2017: 225–227). On the other hand, in the character of Jerina we can also recognise some attributes of fairies, like the abovementioned demand for sacrifice during the construction of a city. Furthermore, Veselin Čajkanović considers Jerina as possibly the oldest fairy, or Mother Earth, or a cursed girl condemned to wander among ruins for eternity, which explains the fact that, aside from Smederevo, many other city fortresses are named Jerina's City (Чајкановић 1994: 276; Стамболић 2017: 228).

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REZIME
STEREOTIPI KAO PROTOTIPI U PERCEPCIJI ŽENA: NEKOLIKO PRIMERA IZ ISTORIJE I NARODNE TRADICIJE

KLJUČNE REČI: STEREOTIP, ŽENA, CARICA, KURTIZANA, VEŠTICA, VILA, DEMONSKO BIĆE, ISTORIJA, LEGENDA, NARODNA TRADICIJA.

Stereotipi koji prate žene već vekovima su uobičajeni i odomaćeni u patrijarhalnim društvima, kakvo je i naše. Osuđivanja i tzv. „etiketiranja" nisu zaobilazili ni dame carskog kruga, a posebno su bile osuđene one žene, čije se ponašanje ili poreklo, kosilo sa hrišćanskom etikom.

Ranohrišćanske carice najčešće su u izvorima opisivane kao bludnice i prostitutke, neznatnog porekla, koje su moralnu sliku sticale udajom za cara i aktivnostima vezanim za crkvu, što je rezultiralo uzornim hrišćanskim ponašanjem i izmenjenom percepcijom društva prema njima. Ova vrsta stereotipa nije zaobišla ni najpoznatiju hrišćansku caricu, majku Konstantina Velikog, koja je postala uzor svim dobrim, budućim hrišćanskim caricama, i ženama uopšte. Ovi narativi uglavnom su pisani od strane muškaraca, a slika o ženama, kakva je stvorena i o carici Teodori u Prokopijevoj Tajnoj istoriji, teško se menjala, a često ostajala prisutna u sveti ljudi vekovima.

Sa druge strane, narodna tradicija pokazuje istu moć stereotipa, ovoga puta onih koji nisu zapisani, već usmeno prenošeni generacijama i često vezani za legendu, a ponekad opevani u narodnoj poeziji. Mnoge žene koje u svojim sredinama nisu bile prihvaćene ili su svojim ponašanjem rušile uvrežene modele ponašanja u strogo koncipiranom patrijarhalnom društvu bile su povezivane sa demonskim bićima, i to najčešće sa vilama i veštica-ma. Zato i ne čudi da je u dva primera lik Meduze, kao jednog od takvih demonskih bića, uzet za asocijaciju na dve žene za koje su vezane legende o kažnjavanju i žrtvi, Jelicu i Nikoliju, te da je usaglašavanjem paganskih sa hrišćanskim moralnim načelima i ovaj demonski lik duboko humanizovan u odnosu na njegov inicijalni izgled.

Zastrašujuće ženske demonske moći u narodu su izazivale strahopoštovanje, a verovanje u vile i veštice, bilo je sveprisutno, do te mere, da je bilo koja žena iole drugačijeg ponašanja mogla da bude smatrana upravo ovakvim bićem. Narod je verovao u čin prinošenja žrtve vilama tokom graditeljskih poduhvata, što je zabeleženo u više legendi i narodnih pesama. Jedna od najpoznatijih je i ona o građenju Smedereva, zbog čega je vizantijska carica Irina Kantakuzin, u narodu prozvana prokleta Jerina. Zbog prisilnog rada i velike žrtve koju je narod podnosio radi ovog građevinskog poduhvata, Jerina je bila smatrana vilom, dok su osobine veštica pripisane i njoj ali i njenoj ćerki Mari Branković, najviše zbog toga što su ih smatrali odgovorinim za oslepljenje Grgura i Stefana, te i propast cele dinastije Brankovića.

Stereotipi o percepciji žena, vekovima su stvarani na mitološkim, istorijskim i kulturološkim obrascima, a razvijali su se u pogodnoj klimi hrišćanske moralnosti i patrijarhalne sredine. Čak i kada je ponašanje žene bilo uzorno, ona je mogla biti osuđena iz bilo kojih pobuda, najčešće jer je bila okarakterisana kao strankinja, u zemlji, društvu, porodici i zbog toga je morala da bude kažnjena.

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DEVELOPMENTS AND TRENDS IN THE HISTORY OF ASTROLOGY AND THEIR IMPACT ON THE POPULARISATION OF THE ZODIAC MOTIF IN VISUAL CULTURES OF THE ANCIENT WORLD

ABSTRACT

Although the zodiac as a concept was invented in Babylonia, during the time of the Achaemenid Empire, its earliest visual representations are found in the Hellenistic period. However, the majority of surviving examples of images of the twelve signs date from the Roman Imperial Age. In this paper, we will analyse correlations between important phases in the history of astrology and the appearances of the zodiac motif in different visual forms and periods throughout Antiquity. It is our contention that the increased production of objects and monuments with zodiacal decoration corresponds to periods of increased astrological activity, its presence among the highest echelons of power, their positive attitude towards it, as well as the accessibility of the lower strata of society to the knowledge and practice of astrological theory.

KEYWORDS: ASTROLOGY, ASTRAL DIVINATION, ZODIAC, VISUAL CULTURE

The concept of the zodiac originated in Babylonia. Devised as an imaginary belt encircling the line of the ecliptic, it was used as a coordinate system for determining the position of celestial bodies. It found application in various disciplines, such as astronomy, chronometry, medicine, but its invention had a significant impact on astral divinatory techniques and the formation of astrological theory. Even though both astrology and the zodiac stem from the Achaemenid Empire, the oldest images of the signs date from the Hellenistic period. Whilst only a few examples have survived from this era, most of them have been relegated to a later period by some scholars.[1] Whichever dating of these monuments we accept, it does not change the fact that the majority of the surviving examples of the zodiac in ancient art belong to the Roman Imperial period. Images of the twelve signs abound in the visual culture of the Roman Empire, where they could be seen all across its vast territories, rendered in various techniques and in different forms. In this paper, we will argue that the popularity of this motif was, to a large extent, influenced by developments and the democratisation of astrological theory and practice. To that end, we will present a brief overview of the history of astrology, as well as an outline of representative ancient monuments containing zodiacal imagery. Thus, we will be able to demonstrate a

1 Such is the case with one of the earliest dated images of the zodiac on the “Brindisi disc” (4th to 1st century BC, Kerenyi 1976: 386; *cf.* the end of the 2nd century AD, as proposed by Gury 1986: 475, ft. 164). The spoliated frieze on the western front of the Little Metropolis Church in Athens with the images of zodiac signs and personifications of Attic months has mostly been dated to the I century BC (Webster 1938: 6; Simon 1983: 6-7), but there are scholars who propose a date in the new era (see Boyancé 1942: 195, ft.2.), some even as late as 138/9. AD (Palagia 2008).

synchronicity between the periods of increased representation of the zodiac in visual media and improvements in astrological calculations, and their availability.

ASTROLOGY AND ASTRAL DIVINATION IN THE ANCIENT WORLD

From the period of the Babylonian empire, we find the earliest indications of attempts at foretelling the future from the stars. Even though most of them cannot be considered astrology proper, material evidence points to Babylonia as a place of origin of many fundamental elements of astrological learning. In Old Babylon, various celestial phenomena, such as eclipses of the Sun and the Moon, conjunctions of the moon with planets, meteorite strikes, and even certain meteorological events, such as thunder, were considered to be portents from the gods, which is why this form of divination is often called "omen astrology" (Beck 1997: 11). By closely observing and studying these omina, Babylonians started noticing regularities in the movements of the Sun, the Moon and the planets, and soon they were able to develop methods for predicting some of these phenomena. Predictions based on them were recorded and collected, forming a group of some seventy clay tablets known by the name of *Enuma Anu Enlil*. They were made in the 7th century BC, but it is believed that some of their material dates back to the second millennium BC (Campion 2008: 48).

Following the Persian conquest of Babylon in 539 BC, significant achievements were made in the astral sciences. From the tablets made after that time, we can discover that they were able to predict the relative positions of the Sun and the Moon, and the precise dates of conjunctions of planets. However, the greatest advancement was certainly the invention of the zodiac. Even though its development was long and gradual, we can say with certainty that the zodiac of twelve equal 30° parts, dates back to the 5th century BC. These parts, known as the signs of the zodiac, correlate to a period of time during which the Sun is located in the section of the ecliptic allotted to them. The names of the signs are based on the names of the constellations lying on the path of the Sun, to which they only roughly correspond. The names of these constellations can be found written on tablets from around 1100 BC and among them we can discover "Bull of Heaven", "Great Twins", "Scales", and "Scorpion" (Hunger and Pingree 1999: 50-57).

The invention of the zodiac is one of the major Babylonian contributions to astronomy, allowing for the application of mathematical methods to the astronomical data collected through observation (Powell 2007: 5). It also led to the emergence of horoscopic astrology, a type of astrology which is based on "horoscopes"- diagrams or charts displaying positions of the planets at a certain moment in time. Interpretations of events and circumstances related to that moment are made according to these calculations, as well as predictions of future occurrences. It must be emphasised that the distinction between astronomy and astrology, or rather star-gazing for the purpose of divination, did not exist for Babylonians (Koch-Westenholz 1995: 21). They belonged to the same science dealing with all matters relating to the sky, which included methods and objectives that are today considered to fall into domains of meteorology, chronometry, and agriculture.

The zodiac was not used for astronomical and astrological purposes alone. It was employed for determining the time during the night, as we can find out from Aratus in his astronomical poem *Phaenomena* (Aratus: 555). It is in this poem, which is known to be based on the lost treatise of Eudoxus of Cnidus dating from around 370, that we find the earliest mention of the zodiac in Greek sources (van der Waerden 1956/7: 216). This means that the Greeks came to be acquainted with the zodiac soon after its invention. They adopted Babylonian names for the signs, translat-

ing and adapting them, as well as their visual representations. The Greek contribution to astrology was immense, mostly in terms of the application of advances they made in the field of astronomy. They were the first to introduce the spherical concept of the Earth. In the 2nd century BC, Hipparchus discovered the precession of the equinoxes. He also wrote astrological works, which have not survived. Like the Babylonians, the Greeks did not make distinctions between astronomy and astrology, and they used both terms interchangeably (on the uses of these terms throughout history, see Pines 1964: 343-346). Even though names and fragments of works of some of the Greek astrologers are preserved, the Greeks considered as most authoritative the works falsely ascribed to Egyptian authors (most of them were legendary figures such as Nechepso, Petosiris and Hermes Trismegistus). However, there is little proof of any indigenous Egyptian astrology. There are no references to astrological ideas in Egyptian mythology (Dieleman 2003: 140). Ancient Egyptian art is also devoid of astrological motifs. It is only during the time of the Ptolemaic Kingdom that the images of the zodiac started to be represented in temples. The Egyptian contribution to the development of astrology was, in fact, very meagre and was reduced to the introduction of decans-a chronometric tool for determining the time of night which, after the zodiac was imported from Babylon, became 10° divisions of the zodiac.

Romans, likewise, imported astrological learning, whose presence in Rome is referred to by Latin sources already at the end of the 3rd century BC (Tester 1987: 30). The first expulsion of astrologers from the city occurred in 139 BC. Roman intellectual circles were, for a long time, suspicious of astrological theories. Adherence to astrological beliefs was often derided in Latin literature (Cicero: I, 30; Petronius: 39; Juvenal: VI, 552-589). These literary accounts testify to the extent to which astrology had permeated Roman society, but also of the persistence of opposing views towards it. Ambivalent attitudes existed among the highest instances of the Roman government as well. Almost all of the Roman emperors employed court astrologers (Tester 1987: 50). Some of them were very famous and influential, like Thrasyllus, the astrologer to the emperor Tiberius, or Balbilus, astrologer to emperors Claudius, Nero, and Vespasian. From the time of Augustus, the influence and popularity of astrology grew steadily. This influence was recognised by the first emperor and used for his own propaganda. Augustus issued coins with the images of Capricorn, the sign which was of particular importance to him (Barton 1995). In the year 11 AD, when rumours of his impending demise started to circulate, to dismiss those insinuations, he publicly issued his horoscope (Cramer 1954: 83). That same year, Augustus issued an edict which proscribed consultations on certain topics, such as the death of any person, and he also prohibited consultations taking place between the client and astrologer alone (Cassius Dio: 55, 31, 2-3). Such restrictions became common later on and even more strict; in the 1st century alone, astrologers were expelled from Rome and Italy six times (Tester 1987: 51). These banishments were not a sign of distrust towards the validity of the astrologers' creed, on the contrary, they were the result of the desire of emperors to withhold the knowledge of the future from anyone but themselves (Cramer 1954: 236; Mavroudi 2006: 70). Nothing is more illustrative of the nature of the imperial attitude towards astrology than the example of Septimius Severus, whom Cassius Dio claims had the ceiling of every reception hall in his palace painted with his nativity, so that everyone could see the splendid future fate had in stall for him (Cassius Dio: 77, 11, 1). The ascendant was, however, displayed in a different position in every hall, to confuse those who wanted to predict the time of his death. Certain emperors were even believed to be practicing astrologers themselves, and some sources claim that of the emperors Tiberius and Hadrian (Cassius Dio: 55, 10a; *Scriptores Historia Augusta*: I, 16, 7).

The practice of astrology flourished throughout the Empire, as we can deduce from the great number of extant horoscopes. A bulk of horoscopes on papyri have survived from the 2nd century CE. Most of them display unique features and methods, perhaps indicating that at the time there was no single standardised form of astrology or a book that enjoyed the status of an authoritative astrological handbook (Tester 1987: 46). That was about to change when, in the second half of the 2nd century, the famous Ptolemy wrote his *Tetrabiblos*, which was to become one of the most canonical books on astrology for centuries to come. Ptolemy, a famous geographer and astronomer from Alexandria, was also considered to be the foremost authority on astrology for almost a millennium and a half. For those who apply modern scientific criteria to pre-modern periods that might seem peculiar, however, for Ptolemy himself, and for many generations after him, astronomy and astrology were complementary disciplines. Although we have other influential 2nd century astrologers, like Vettius Valens, no one contributed to the development of astrology as Ptolemy, who systematised the existing body of knowledge and endeavoured to provide a rational and scientific explanation for the functioning of its principles. He successfully demythologised astrology, avoiding mythological references and mystical notions. He went on to explain how planets exert their influence on the events on Earth, as if discussing any other physical law of nature. Even though there were other Greek thinkers who expressed a naturalistic understanding of astrology, Ptolemy was the first to do so in a systematic and comprehensive manner, in accordance with current philosophical and scientific ideas. Also, by separating astrology from the realm of Greco-Roman gods and hermetic mystical speculations, he made it acceptable for adherents of different religions, particularly Christianity and Islam, in whose hands the future of astrology lay.

Religious cults in Antiquity also played an important part in the promotion of astrological ideas. Even though we do not have any scriptural accounts attributed to worshipers of Mithra, astrology must have been a significant element in their belief system, as can be inferred from the abundance of zodiacal and astral imagery in their devotional art. The same can be assumed for many other cults in the Roman Empire. Other material evidence also points to the practice of astrology within some religious groups. In the village of Grand, in the French province of Lorraine, pieces of ivory tablets carved with the images of the zodiac and decans were excavated from the bottom of a well in the late 1960s. The village of Grand housed a sanctuary dedicated to Apollo Grannus, where pilgrims sought healing and assistance from the god. Ivory fragments found in the well just outside the city walls were a part of an astrologer's board that were most probably destroyed on purpose around 170 AD (Evans 2004: 5). Similar ivory fragments bearing figures identified as zodiac signs were found in the Nakovana cave on the Pelješac peninsula in the year 2000 (Forenbaher and Jones 2011). Since the latest of the finds from this cave sanctuary are dated to the 1st century BC and the results of the systematic field survey suggest this area was uninhabited during the entire Roman period, due to ravaging during the Roman military campaigns in Illyria that started in 35 BC, that same year can be taken as a *terminus ante quem* for the deposition of the engraved ivory plaques in the cave sanctuary. Direct radiocarbon dating also supports such an early date, which makes the Nakovana zodiac the oldest known astrologer's board (*ibid.*: 433). Both the Grand and Nakovana tablets are thought to have been produced in Egypt, as is the Tabula Bianchini, a marble fragment containing segments of concentric zodiac rings which was found on the Aventine Hill in 1705, and is now preserved in the Louvre Museum (Evans 2004: 7). Perhaps the most famous Egyptian zodiac is the one represented on the ceiling of the chapel dedicated to Osiris in the Hathor temple in Dendera, now also in the Louvre. The zodiac could also be seen in the tem-

ples of Edfu and Esna (Plunket 1903: 231; Clagett 1995: 126). The presence of astrology in Egyptian temples is conveyed by Clement of Alexandria, who claimed that astrologers participated in the ceremonials and that the priests were well versed in Hermetic literature (Clement: VI, 4, 35-36). Material support for Clement's accounts is provided by astrological ostraca excavated from the temple in the village of Narmouthis, today's Medinet Madi, and an ostracon found near the sanctuary in Tebtunis, all of which are dated to the 2nd century CE (Evans 2004: 26). Astrological ideas were also present in the cult of Sarapis; a great number of gems engraved with the images of Sarapis and astral symbols might point to the practice of astral magic among the followers of this cult (*ibid.*: 20, 22). The receptivity of various cults to astrology reveals how this divinatory technique exhibited a twofold appeal: it could provide "scientific" rules and explanations for a correlation between everyday events and the stars, but it could also possess a mystical-religious character of revelation which was transmitted through Hermetic literature and other pseudo-epigraphic texts.

VISUAL REPRESENTATIONS OF THE ZODIAC IN THE ANCIENT WORLD

As we can see in the previous section, images of the zodiac dated to the years before our era are rare, and among the few securely dated examples are the fragments of an astrologer's board from the Nakovana cave. Whilst the dating of most other examples is a matter of controversy, none of them are dated to the time before the Hellenistic period (see ft. 1). Although representations of individual signs can be found in Assyro-Babylonian visual culture, there are no indications that the zodiac with the twelve signs was depicted on their monuments and objects, nor that it was even conceived as an individual motif. Some of the animals belonging to the circle of the zodiac, such as lions, bulls, scorpions, and goats, were represented on kudurrus, but their zodiacal meaning or any astral connotations cannot be confirmed (Iwaniszewski 2003).

The twelve signs depicted together in their standardised and recognisable form are found on monuments and objects from the first half of the 1st century. Images of the signs were used in the decoration of private spaces and objects, such as the "Zodiac vase" made in the municipium of *Calagurris* in modern Spain (Barrata 2014) and wall painting of Domus Uboni and Casa di Sirico in Pompeii (on frescoes from both houses, signs are depicted on the shield of Achilles in the scenes of Thetis in the forge of Vulcan, Hardie 1985: 18). In a much more public setting, the signs were displayed on the ceiling of the southern adytum of the temple of Bel in the city of Palmyra in Syria. The temple, which was consecrated in 32 AD, was almost completely destroyed by members of the Islamic State in 2015, and along with it, the monumental zodiac which surrounded the flat dome filled with relief fields showing the busts of the personifications of the seven planets with the Bel-Jupiter as the central one.

Gods and zodiac signs are often paired together on the monuments of Roman art. They can be seen on the base of a three-sided marble candelabrum from the Augustan age (the candelabrum, which was probably made in Rome, was once part of the Borghese collection, and is now held in the Louvre museum; Long 1987, 16, 38-9, 296-7). On every side, a deity is shown mounted on an anthropomorphised sign of the zodiac. A similar iconographic formula of gods riding the zodiac signs is repeated on a 3rd century mosaic from Hellín in the province of Albacette, now on display at the *Museo Arqueologico Nacional* in Madrid (*idem* 1989: 592-3). One of most famous monuments containing images of the twelve gods and twelve signs is the so-called "Altar of Gabii". It was excavated at the forum of the ancient town of Gabii, east of Rome, in the spring of 1792 and was later purchased as a part of the Borghese collection by

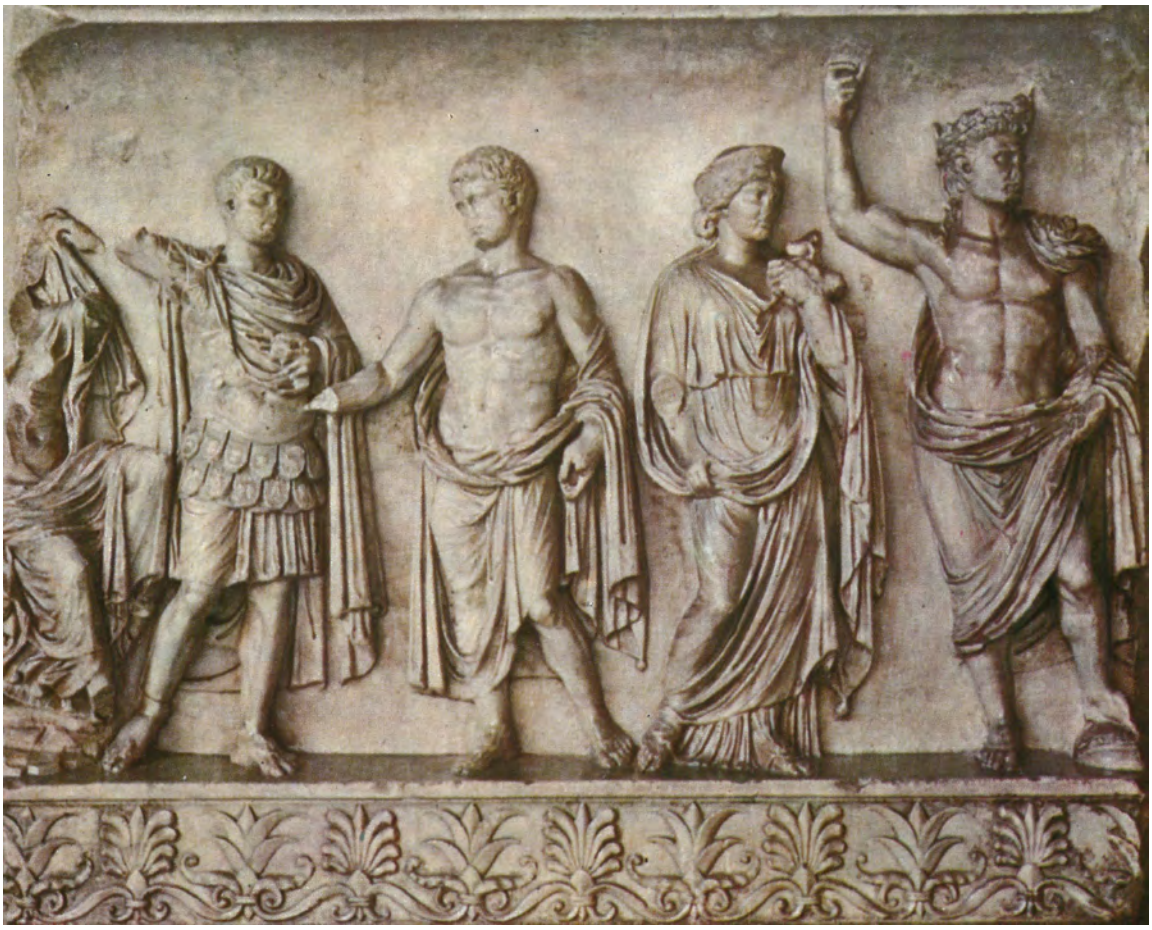

Fig 1. "Ravenna Relief", Museo Nazionale di Ravenna
(after Keler 1970: 93)

Napoleon and taken to the Louvre Museum (Long 1987: 14, 294). Charlotte Long assumes it was made in the Hadrianic period; she doubts that it had a cultic purpose or, as was also presumed, that it was used as a sundial, since horizontal sundials were rare in Antiquity (*loc. cit*).

The zodiac signs can be seen on time-measuring and time-keeping devices, but more often in their written form. The names of the signs are inscribed on the bronze plates of the so-called Antikythera Mechanism. This object, which was found by a Greek sponge-diver in a shipwreck off the coast of this small island, has proven to be a very sophisticated instrument which could determine the movements of certain planets, as well lunar and solar eclipses. It is dated to the 5th century BC by some scholars and to the 2nd century BC by others (see Hannah 2009: 29-31). The names of some of the signs were also recognised in bronze Greek letters uncovered on Campus Martius by Edmund Buchner in 1976. They were a part of a Horologium-Solarium which Augustus had set up in 9 BC (for the history of the excavation and different theories regarding this complex, see Jacobus 2005: 376-9).

Images of the signs can be observed on the *cippus Colotianus,* a 1st century marble column representing a kind of rustic calendar, recording for every month of the year the number of days in the month, the position of the Sun, the tutelary deity, festivals and agricultural activities. All this information is organised in columns, and on top of each column is placed a figure of the zodiac sign ruling over that month (it is held in the National Archaeological Museum in Naples. Long 1987, 267; of similar design and content was the now lost *menologium rusticum Vallense*. *Idem* 1989:

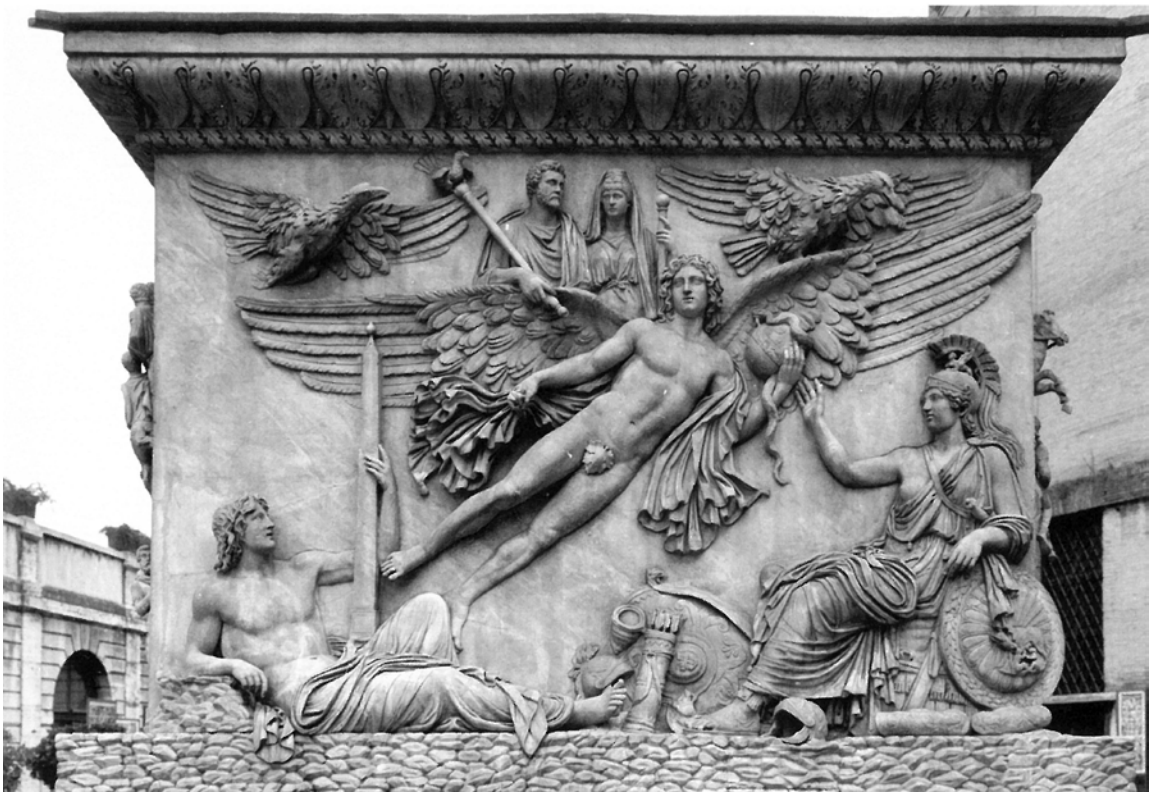

Fig. 2a. Column of Antoninus Pius, apotheosis relief, Rome
(after Davies 2004, fig. 33)

589). Zodiac figures could also be seen on parapegma, a type of calendar in which data was recorded by means of pegs inserted into holes chiselled next to the days of the week, months, phases of the Moon, etc. A 4th century parapegma was excavated in 1812 in a house near the Baths of Trajan, later converted into an oratory dedicated to Santa Felicita. Since it was inscribed in graffito on the wall of the shrine, which was destroyed in 1822, it is known to us through plaster casts and other reproductions (Lehoux 2007: 16, ft. 33, 34). The zodiac signs filled the segments of the circle in the centre, while busts of seven deities presiding over seven days were represented above.

Zodiacal imagery was present on some of the earliest star maps in Antiquity. Among the most famous is certainly the "Farnese Atlas" in the National Archaeological Museum in Naples, which is a 2nd century Roman copy made after a Hellenistic model whose dating is still debated (Schaefer 2005; Duke 2006). As on other uranographic images, the figures of the zodiac are shown together with the other constellations. In the 2nd century AD another type of globe appeared, whose only figural ornamentation were the images of the signs. They were usually a part of a larger work of art, yet there are some that are preserved on their own, such as a large marble globe from *Sala dei Busti* in the Vatican or a smaller example kept in the *Landesmuseum Württemberg* in Stuttgart (Bodnár 2007: 100). A similar zodiac globe can be seen on the famous "Ravenna relief" (*Museo Nazionale*, Ravenna, fig. 1). Once belonging to a larger monument, possibly an altar, this relief shows various members of the Julio-Claudian dynasty (Torelli 1992: 78). While the identity of some of the figures has been disputed, the figure on the far right is undoubtedly Divus Augustus (Pollini 2012: 218). The Ravenna relief is sometimes called the Apotheosis of Augustus, which

Fig. 2b. Column of Antoninus Pius, apotheosis relief, Rome, detail (after Davies 2004, fig. 62)

Fig. 3. Marble portrait of Commodus in the guise of Hercules (after Elsner 1998, fig. 132)

some scholars believed to be its subject matter (Keler 1970: 92). In fact, images of the zodiac are often present on scenes of Apotheosis. A zodiac globe can also be seen on another famous Apotheosis relief, the one on the base of the column of Antoninus Pius (fig. 2. a, b). The globe is held by a winged nude male, who carries the emperor and his wife Faustina heavenward. Five stars, a crescent moon and a zodiacal band are carved on the globe. The signs that are visible are those of Pisces, Aries, and Taurus. Their choice was not arbitrary. As Penelope Davies had pointed out, it was under the sign of Pisces that Antoninus Pius died, and his heirs, Marcus Aurelius and Lucius Verus, who commissioned this column, acceded to the throne. Also, these signs designate spring, thus symbolising a spring like regeneration that the rule of Antoninus' adoptive sons was to bring about (Davies 2004: 99). A zodiac globe can also be seen on the portrait of the last emperor of the Antonine dynasty. It is placed at the base of the bust of Commodus represented as Hercules, now in the *Palazzo dei Conservatori* (fig. 3). This globe is also decorated with band showing three zodiac signs, but they are not displayed in their chronological sequence. It has been assumed that the signs, representing Taurus, Capricorn, and Scorpio, had a particular importance for the emperor (see Hannah 1986: 337, fts. 3, 4). Robert Hannah proposed a calendric interpretation of these signs, relating them to the constellations visible on the horizon during the month of October, the constellations of the Bull and Scorpion, and that of the Capricorn which was culminating at the time, equidistant between them, just as they are represented on the globe (*ibid.*: 341). The month of October held a particular significance for Commodus. It was in this month, in 166, that he was named Ceasar; in October of 172 he was given the title of Germanicus, and in October of 180 he was

Fig. 4. "Apotheosis Relief", British Museum, London (after Elsner 1998, fig. 11)

officially proclaimed Emperor (*loc. cit.*). Commodus even renamed this month Hercules. He represented himself in the likeness of this mythical hero and with his attributes on other monuments as well, he even used the titles Romanus Hercules or Hercules Commodianus on public inscriptions (*loc. cit.*; Nasrallah 2010: 174).

Another testament of Commodus' devotion to Hercules is the temple he built and dedicated to this hero in Sabratha, a town in modern day Libya. Italian archaeologists who conducted excavations before the Second World War, uncovered traces of painted decoration. On the fragments of plaster in the calotte of the western apse, a representation of Marcus Aurelius could be reconstructed. The fresco depicted the scene of his Apotheosis, on which the emperor was shown with a sceptre and a wreath, being carried to heaven on the back of an eagle. The scene was framed by a circle in which the signs of the zodiac were alternating with the figures of human heads, in medallions (Eric Moormann believes these medallions represent imitations of gems and cameos, while Francesca Ghedini sees them as personifications of the twelve months. Moormann 2011: 144, ft. 97; Caputo and Ghedini 1984: 70, 77-9). Images of Hercules himself can be found within the circle of the zodiac, as on the funerary monument of the Secundini family in Igel, near Trier. On the monument, which was made *c.* 250 AD, Hercules is shown carried in a quadriga upward to Minerva extending her hand towards him and welcoming him to the abode of the gods, of which the zodiac encircling the scene is indicative. Another instance of Apotheosis with the zodiac is found on the late antique ivory relief from the British Museum (fig. 4). The so-called "Apotheosis relief" shows the consecration of an unknown emperor or a state dignitary, and is generally dated to the 5th century (for various theories regarding the date and identity of the consecrated figure, see Cameron 2011: 719-728; Kiilerich 2012: 207-8). In the right hand corner of the relief, a segment of a circle is carved showing six of the twelve signs of the zodiac. This relief was probably a part of a diptych, whose other half contained the rest of the zodiac signs. Behind the signs, a nimbed figure can be seen, who is sometimes identified as Sol (Cameron 2011: 719).

Images of Sol are sometimes accompanied by the zodiac. The Sun god is shown within the circle containing the signs on a floor mosaic discovered in the ruins of a Roman villa in Münster-Sarmsheim, dated to mid 3rd century (Bullinger 1976;

Fig. 5. Mosaic from Münster-Sarmsheim, Rheinsches Landesmuseum, Bonn (after Hachlili 2009, Pl. III- 12a)

fig. 5). The central part of the mosaic is on display in the *Rheinisches Landesmuseum* in Bonn. Zodiac signs also encircle the figures of Helios and Selene on the 4th century floor mosaic from a triclinium of a Roman villa in Sparta (Hachlili 2009: 53). They also surround the image of this goddess on a votive relief from Argos, whose architectural setting is unknown, and whose dating is also a matter of dispute (Stephen Patterson insists on a 2nd century date, while William Brashear suggests a later date, as well as Gnostic origins. Patterson1985: 440; Brashear 1990).

Zodiac signs adorned representations of other deities as well. Many statues of the Artemis of Ephesus carry the signs, particularly on the chest area. Since all of the surviving statues belong to the Roman period, it is not certain whether the zodiac motif was a Roman innovation, or if it was present in Hellenistic representations of the goddess (LiDonnici 1992: 407, ft. 74, fig. 6). Other Greco-Roman gods can also appear with the zodiac. Such was the case with Jupiter, as in the aforementioned temple of Bel in Palmyra, but also on some of the later examples, such as the much restored 2nd century relief of Jupiter from Villa Albani (fig. 7). Jupiter together with Juno was placed in the midst of zodiac signs on the Arch of Dativius Victor in Mainz, dating from the middle of the 3rd century. The arch that stands in the park in Mainz is a replica, while the original was built into the city walls in the 4th century and is now housed in the town's *Landesmuseum* (Cassibry 2008: 421).

Another divinity which was often shown with the zodiac was Aion. Its name was tied to a philosophical concept relating to the idea of eternity, and its image was also considered a personification of the same idea (for different meanings and connotations of the term aion in ancient literature and philosophy, see Keizer 2010; for different mythological associations, see Levi 1944: 275-278). As the oldest securely dated image of Aion with the zodiac, Doro Levi suggests the relief on the base of the column of Antoninus Pius, whose winged figure the author, as do many others, identifies with Aion (Levi 1944, 310-311, ft 126; for an overview of different theories regarding this figure, see Davies 2004, 97, ft. 74). A comparable

Fig. 6. "Beautiful Artemis", Efes Müzesi, Selçuk (after Elsner 1998, fig. 134)

Fig. 7. Relief of Jupiter within the zodiac circle, Villa Albani, Rome (after L'Orange 1953, fig. 67)

image of a nude youth can be seen on Hadrian's aureus of 121, on which a figure holding a globe with a phoenix on top is placed inside the zodiac band and marked with the inscription SAEC(VLVM) AVR(EVM) (Levi 1944: 294; Gury 1984: 7). The zodiac also accompanies Aion on the Arch of Galerius in Thessaloniki. On the relief on the eastern side of the southern pier, depicting the Sacrifice of Galerius and Diocletian, behind the draped semi-naked figure identified as Aion (Pond Rothman 1977: 440, 447) an elliptical band with the signs can be discerned (Rees 1993: 196).

Apart from the works of public imperial art, Aion with the zodiac band can be encountered in private settings, represented on a great number of mosaics found in villas throughout the Empire. Among the more renowned examples are those from Sentinum- modern Sassoferato in Italy, and the mosaic from the Villa Silin in Leptis Magna in modern Libya. Both mosaics are dated to the 2nd century, as is the mosaic from a triclinium of a house in Trinquetaille near Arles (Parrish 1995: 180). From the 4th century, several examples of mosaics decorated with images of Aion holding the zodiac wheel can be found in the towns of North Africa: the mosaic from Hippo Regius, in Algiers and, in Tunisia, mosaics from Carthagena and from Haïdra (*ibid.*).

A similar motif can be seen in different media, as can be observed on the silver Parabiago plate (fig. 8). The function of this plate remains unknown, although it was most probably funerary, considering it was found in a grave, covering the mouth of an amphora containing the ashes of the deceased (Alvar 2008: 141. Various dates have been proposed for this plate, ranging from the 2nd to the 4th century, see *ibid.*: 139-140, ft. 344). The plate is decorated with imagery associated with the cult of Cybele and Attis, and among many other figures, Atlas is shown carrying the zodiac ring, inside which stands a half draped young man holding a sceptre, generally interpreted to be Aion (*ibid.*: 140-141, ft. 346). Images of Aion are present in the art of other cults as well. Some of them are considered to belong to the art of the cult of Mithra, such as the statue of Aion found in Arles, whose torso is carved with the signs of the zodiac (Vermaseren 1956: 305-6, mon. 879). Mithra himself can be shown with the circle of the zodiac, as

Fig. 8. "The Parabiago Plate", Castello Sforzesco, Milan (after Elsner 1998, fig. 136)

Fig. 9. Marble relief with Tauroctony, London Museum
(after Elsner 1998, fig. 143)

on a couple of reliefs thought to depict his birth; on the reliefs from Trier and Housesteads the god is portrayed alternatively as a boy and as a young man within the circle (*ibid*.: 327, mon. 985; 298, mon. 860). Zodiac signs can also be seen overarching or framing Tauroctony scenes (fig. 9).

Not only gods, divinised heroes and emperors, but ordinary citizens could also be placed within the circle of the zodiac. On three sarcophagi from the first half of the 4th century, portraits of the deceased are framed by a band with the twelve signs. While the examples preserved in Dumbarton Oaks and Campo Santo in Pisa show images of marital couples, a sarcophagus kept in the National Museum in Sassari displays a portrait of a young woman inside the zodiac (Parodo 2015).

CONCLUSION

As we can see from the overview of monuments, objects, scenes that included the images of the zodiac, their contexts and purposes were diverse, as were the connotations and the function of the motif itself. The multivalent meaning of the images of the signs was the result of their application in different fields. As the concept of the zodiac was used in astronomy, astrology, and chronometry, the visual renditions of its signs appear on different instruments employed by these disciplines: stellar maps, astrologer's boards, calendars, etc. However, as has been noticed, on some of the devices, particularly those for determining the time of day or the position of the stars, the names of the signs are more often found than their images. Zodiacs were also conspicuous on

Fig, 10. "Seasons sarcophagus", Dumbarton Oaks Collection, Washington DC
(after L'Orange 1953, fig. 62)

commemorative monuments and funerary objects. They are frequently found on scenes of Apotheosis. In these cases, the signs of the zodiac designate the destination of the souls of the departed (Parodo 2015: 410). In various cosmological theories, the zone of the fixed stars, to which the constellations of the zodiac belong, represents the outermost sphere of the universe (Wright 2000: 99- 102). This sphere has been identified as the abode of the gods ("*caelus hic, in quo duodecim dii habitant, in totidem se figuras convertit, et modo fit aries",* Petronius: 39. 5; some scholars believe that this notion was already present in Plato's thought when he connected the Olympian gods with the zodiac in Phaedrus, Cornford 1935: 76). Greek mythology, unlike Babylonian, was not set on a celestial stage. It is with the appearance of Erathostenus' Catasterisms that a mythological explanation for some of the constellations and astral figures is provided. From the Babylonians, the Greeks also adopted the custom of naming planets after gods. Yet, it was the Romans who established the uniform nomenclature of the planets by the end of the Republican age. When they started referring to planets not as *stella* or *sidus Iovis, Saturnis, Martis,* etc., but as *Iuppiter, Saturnus,* or *Mars*, this change signalled not merely a linguistic shift, but rather a different understanding of the planets and their identification with the gods (Cumont 1935: 34-35). Since, according to astrological notions, planets, by exerting their influence, determined the course of events on Earth, they were considered *cosmocratores*-rulers of the universe, a term first encountered in the 2nd century Anthologies of Vettius Valens (Cumont and Canet 1919: 318, ft. 3). Since the movements of the planets, including the Sun and the Moon, determined the sequence of time, they were also considered *chronocratores* (*ibid.*: 320). Thus, the old Olympian gods, by their associations with the planets and astrological conceptions, came to be represented as universal rulers (Koester 1995: 152). This was made visually manifest on some of the aforementioned examples, such as the Jupiter from Villa Albani, but also on coins, on a compositionally similar reverse of a bronze medallion issued by Alexander Severus in Perinthus, Thrace (Vermeule 1982: 65). The zodiac was also represented on the images of other gods, some of them of oriental origin. While we have mentioned the preponderance of zodiacal imagery in the cult of Mithra, the zodiac also framed images of Sarapis, Isis, and Astarte on a number of coins issued by Antoninus Pius, Julia Maesa and Julia Paula (Geissen 2005: 168, ft. 13; Bijovsky 2010: 99). This

iconography can be seen as an effort to promote a certain deity beyond local boundaries of origin and to represent it as a universal ruler (Patterson 1985: 440). It can be viewed against the background of the highly competitive atmosphere of religious pluralism in the Roman Empire, in which a large number of cults wanted to demonstrate their dominance and superiority. The power over elements credited to some of them, as well as the ability of its priests to predict the future, was undoubtedly a potent way to establish this supremacy.

Even though not all meanings of zodiac images in the ancient world was astrological, in this paper we contend that the influx and development of astrological ideas played a significant part in the popularity of the visual renditions of the signs and the zodiac motif as a whole. While the dating of most Hellenistic examples is contested, an object which is thought to have contained an entire circle of the zodiac is securely dated to the 1st century BC and is believed to be an astrologer's board. Coincidentally or not, in astrological theory, the zodiac signs are not merely constellations lying on the path of the Sun, or its segments used for determining the positions of the stars and for designating time, they determined the fates of individuals, states and entire nations. It was mostly with predictions concerning the future of the state and the sovereign that the Babylonian proto-astrologers dealt with. Their number could have never been great, for their expertise required literacy and years of education. Thus, their services must have been costly and only available to the most affluent, perhaps solely to the head of state. Democratisation of astral divination ensued with the invention of the zodiac, which facilitated the production of astrological calculations and allowed a greater number of people to obtain predictions from astrologers. They came to be acquainted with visual renditions of the signs which already in the 1st century AD started to be represented in the decoration of private spaces and objects. From the 1st century dates the earliest astrological work preserved in its entirety- *Astronomica* by Marcus Manilius. This work was dedicated to an emperor, Augustus or Tiberius, perhaps even commissioned by one of them (Cramer 1954: 95-6). From the time of Augustus, individual zodiac signs were depicted on coins. However, the whole circle of the twelve signs is encountered for the first time on coins issued by Antoninus Pius. In the 8th year of his rule (144/145 AD), a series of bronze coins was minted in Alexandria, showing the busts of Sarapis, or Sarapis and Isis together, as well as Helios and Selene framed by the zodiac signs. The same mint, in the same year, issued a series of drachmes with twelve types of reverses each showing one of the signs of the zodiac together with one of the planets (Sayles 1998: 98). Whatever the occasion for the issuing of these coins was (see Geissen 2005: 168, ft. 13), it is during the reign of Antoninus that Ptolemy wrote his *Tetrabiblos* and Vettius Valens his Anthologies. From the 2nd century onward, we witness an increase in zodiacal representations, particularly on works of public imperial art. While there are certainly other factors contributing to the popularisation of this motif, such as its presence in cosmological and eschatological theories of the Classical world, many of them were imbued with astrological notions. As Porphiry tells us, followers of the Mithraic cult believed that the soul on its descent to Earth and ascent to Heaven, passed through the gates that are situated on the zodiac (Porphiry: 11), a belief also present among other groups and thinkers (DeKonick 2013: 55-65).

After the fall of the western part of the Roman Empire, the zodiac would not be seen on artefacts produced in its territories for almost five centuries. Like the art of casting horoscopes, the images of the signs were also forgotten. When they re-emerged, the signs of the zodiac were seen on the pages containing astrological predictions in a 9th century manuscript from Fulda (Basel, Universitätsbibliothek F III 15a. Obrist 2001: 3-4). Also, a surge of zodiacal imagery can be witnessed on the facades and in the interiors of Romanesque churches, as Western Europe was being reintroduced to astrological texts

via translations from the Arabic manuscripts. Likewise, a revived interest in astrology during the Renaissance, following the influx of Greek books brought by Byzantine refugees, coincided with an increase of astrological and zodiac motifs in the visual arts. Throughout the entire pre-modern era, a similar tendency can, thus, be perceived; that the appearance and preponderance of visual representations of the twelve signs is concomitant with major developments in the history of astrology. From the historical overview and the material presented in this paper, it can be ascertained that those tendencies were already present in Antiquity.

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REZIME
ETAPE I TENDENCIJE U ISTORIJI ASTROLOGIJE I NJIHOV UTICAJ NA POPULARIZACIJU MOTIVA ZODIJAKA U VIZULENIM KULTURAMA STAROG VEKA

KLJUČNE REČI: ASTROLOGIJA, ASTRALNO PREDVIĐANJE, ZODIJAK, VIZUELNA KULTURA.

Zodijak je nastao na području Vavilonije, kao koordinatni sistem za određivanje položaja nebeskih tela. Primarna namena mu je bila astronomska, iako je upotrebljavan u hronometriji, poljoprivredi, medicini, kao i u različitim divinatornim tehnikama. Uvođenje zodijaka od dvanaest jednakih delova u petom veku p.n.e. dovelo je do nastanka horoskopske astrologije, koja će postati dominantni vid predviđanja budućnosti na području Ahemenidskog carstva, odakle će se ubrzo proširiti i u druge oblasti.

Premda za neke od predstava možemo pretpostaviti da prikazuju pojedine znake zodijaka ili

njihova korespondirajuća sazvežđa, u asirsko-vavilonskoj vizuelnoj kulturi ne nalazimo nijedan sačuvan prikaz čitavog zodijaka. Najstariji spomenici na kojima se može videti ovaj motiv se mahom datuju u period helenizma, ali je većina starovekovnih primera nastala na području Rimskog carstva. Već u prvim decenijama vladavine Julievsko-klaudijevske dinastije, zodijak se može uočiti u dekoraciji privatnih prostora i predmeta za ličnu upotrebu, ali i u hramovima i na javnim spomenicima. Od perioda vladavine Hadrijana i njegovih naslednika, zodijak se sve učestalije sreće na carskim spomenicima i novcu. Ovaj motiv će postati prisutan i u umetostima različitih kultova širom carstva, kako onih istočnjačkog porekla, tako i onih posvećenim božanstvima grčko-rimskog panteona. Tokom čitavog carskog perioda, zodijak će se pojavljivati i u funerarnom kontekstu, budući da je često prikazivan zajedno sa preminulim carevima, divinizovanim herojima, ali i običnim građanima. Sve do pada njegovog zapadnog dela, zodijak je predstavljao popularan motiv u vizuelnoj kulturi Rimskog carstva.

U ovom radu težimo da pokažemo kako je na popularnost ovog motiva u velikoj meri uticao razvoj astrološke teorije, njeno širenje, dostupnost, kao i preovlađujući stavovi prema njenom praktikovanju. Iako su datovanja najstarijih predstava zodijaka predmet sporenja u nauci, nijedna od njih nije nastala pre doba helenizma, tokom kog su ostvareni i najznačajniji pomaci u oblastima astronomije i astrologije. Od uspostavljanja carske vlasti u Rimu, astrologija je stekla veliki broj pristalica među širim stanovništvom, ali i među carevima koji su je upotrebljavali u propagandne svrhe. Poznato nam je da je Avgust, kao i njegov nasledik, Tiberije, koristio usluge astrologa. Tokom vladavine jednog od njih nastalo je i najstarije astrološko delo sačuvano u celosti- Astronomika Marka Manilija. Tiberije je i sâm vršio astrološke proračune, kao i Hadrijan, kako nam prenose pojedini izvori. Tokom Hadrijanove vladavine, zodijak se može uočiti na spomenicima poput „Oltara iz Gabija", kao i na primerima novca ovog cara čiji su reversi nosili natpisi SAEC(VLUM) AVR(EVM). Dok su na nekim primercima tog novca znaci zodijaka samo naznačeni, svih dvanaest znakova mogu se videti na novcu iskovanom u kovnici u Aleksandriji za vreme vladavine Antonina Pija. Tokom njegove vladavine nastala su i najznačajnija dela „naučne" astrologije, čije su metode i principi bili usklađeni sa prirodnom filozofijom tog vremena. U pitanju su Ptolomejev Tetrabiblos i Antologije Vetija Valensa. Veliki broj horoskopa sačuvanih iz ovog vremena takođe svedoči o stepenu popularnosti koji je astrologija uživala među rimskim stanovništvom. Astrologija je bila praktikovana i u okviru pojedinih kultova, dok su mnogi od njih zastupali verovanja prožeta astrološkim idejama, kako saznajemo iz pojedinih izvora i kako zaključuju kasniji istraživači. Iako primarno značenje većine kompozicija koje uključuju predstave zodijaka nije astrološko, rasprostranjenost astrologije i poznavanje njenih načela uticalo je na zastupljenost motiva u različitim sferama vizuelne kulture Rimskog carstva.

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COINS FROM THRACIAN AND LOWER MOESIAN MINTS FROM THE VIMINACIUM NECROPOLIS OF PEĆINE

ABSTRACT

During the extensive archaeological rescue excavations of the southern necropoles at Viminacium, at one of them, Pećine, 17 coins were found from provincial issues of Thracian mints, issued by eight mints, and two pieces from Moesia Inferior, originating from one mint. Out of a total of 19 pieces, 11 were found in graves, and the others in the layers of the necropolis.

KEYWORDS: ROMAN PROVINCES COINAGE, THRACE, MOESIA INFERIOR (LOWER MOESIA), VIMINACIUM, PEĆINE, VIŠE GROBALJA.

Due to the necessity of building the power plant Kostolac 2, extensive archaeological rescue excavations were carried out, starting in 1977[1], in the area of southern necropoles.[2] At the site of Pećine, three Roman necropoles were registered, the most recent one of them having been established in the middle of the 1st century, where burials of cremated and inhumed deceased individuals were practiced in parallel. At the same time, another necropolis was established at Pećine, where only cremated deceased individuals were buried, with the exception of a few inhumation burials, which were all children’s graves. The change in burial ritual, which occurred approximately around the middle of the 3rd century, lead to the abandonment of these cemetery zones and the formation of new ones, in which inhumation became the only form of burial. At that time, the necropolis of Burdelj was established, as well as the third necropolis at Pećine, the former of which was in use up until approximately the middle of the 4th century, and the latter up until the middle of the 5th century (Vojvoda, Mrđić 2015: 9, ref. 3-4; Vojvoda, Mrđić 2017: 9, ref. 3).

During the already mentioned research at the necropoles at Pećine, a total of 3,865 coins were discovered.[3] Out of this total, 3,497 pieces were available for examination (Vojvoda, Mrđić 2017: 10, Table 1), ranging from 32/31 BC (Marcus An-

1 This paper represents a result of working on the project: IRS – Viminacium, Roman city and military legionary camp – research of the material and non-material culture of inhabitants by using the modern technologies of remote detection, geophysics, GIS, digitalization and 3D visualization (no. 47018), funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Vojvoda, Tapavički-Ilić).

2 Within this area, nine necropoles were identified, of which five belong to the Roman period: Više Grobalja, three necropoles on the site of Pećine, and Burdelj; *cf. Зотовић 1986: 41, ref. 4; 54-55; Зотовић, Јорђовић 1990: 2; Vojvoda, Mrđić 2015: 9, ref. 2.*

3 Coins were retrieved from graves and from layers of the necropolis (sacrifice surfaces formed above individual graves or groups of graves).

Province	Mint	Mint: pieces in total	Emperor or member of imperial family	Cat. no.	Pieces	%
Thrace	Serdica		Lucius Verus	1	1	5.26
		2	Caracalla	2	1	5.26
	Anchialus		Hadrianus	3	1	5.26
		2	Gordian III	4	1	5.26
	Pautalia		Antoninus Pius	5	1	5.26
			Faustina II	6	1	5.26
		4	Caracalla	7-8	2	10.53
	Deultum	1	Gordian III	9	1	5.26
	Byzantium	1	unknown	10	1	5.26
	Hadrianopolis		Caracalla	11-12	2	10.53
		3	Gordian III	13	1	5.26
	Philippopolis	2	Antoninus Pius	14-15	2	10.53
	Perinthos		Caracalla	16	1	5.26
		2	Severus Alexander	17	1	5.26
Moesia Inferior	Nicopolis ad Istrum		Caracalla	18	1	5.26
		2	Elagabalus	19	1	5.26
Total		19			19	100

Table 1 – Coins issued by Thracian and Lower Moesian mints at the necropolis of Pećine.

tonius) up to 423 AD (Theodosius II).4 Imperial coinage is represented with 84.38% and provincial coinage with 15.58% (Vojvoda, Mrđić 2017: 10, Chart 1). By comparing the same results from the necropolis of Više Grobalja, we may perceive a minor difference in percentages, which were, in the other case, 79.61% (imperial) and 20.30% (provincial) (Vojvoda, Mrđić 2015: 10, Table 1).

Out of the 545 pieces from the necropolis of Pećine that were identified as provincial coinage, a total of 19 pieces were registered (3.50%) that were issued from the Thracian (17) and Lower Moesian (2) mints (Table 1). This represents a somewhat lower percentage compared to the neighbouring necropolis at Više Grobalja, where 25 pieces were registered, 4.50% of the total number of coins registered from provincial mints (Vojvoda 2011: 139-152; Vojvoda, Mrđić 2015: 14-15, ref. 12). The difference in the representation of the mints from the two provinces is also notable at

4 An inventory of the entire numismatic material from the already mentioned rescue excavations was made in 2005 and 2006 at the National Museum of Požarevac (M. Vojvoda, D. Spasić-Đurić). It was noted that a certain number of specimens had either been lost or destroyed during the conservation process (367 pieces). A similar situation, found during the making of the inventory, was also noted with specimens from the necropolis of Više Grobalja – according to terrain documentation, 3,161 pieces were found, out of which 2,736 were preserved (*cf.* Vojvoda, Mrđić 2015: 10, ref. 6). We would like to take this opportunity to thank our colleague Dragana Spasić-Đurić for kindly allowing us access to the material and for her involvement.

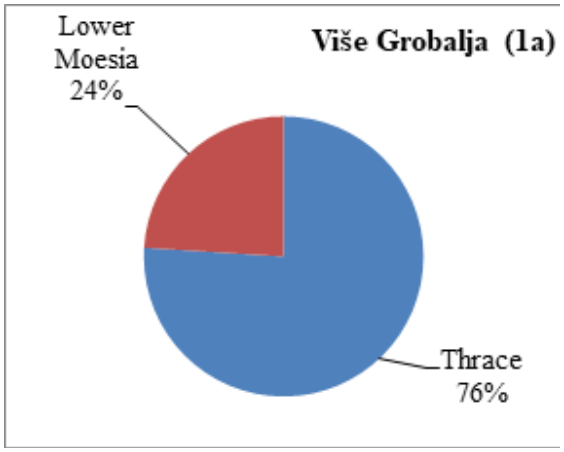
the necropoles of Više Grobalja and Pećine. Coins from Moesia Inferior mints were far more present at the necropolis of Više Grobalja than at the necropolis of Pećine (Graph 1a, b).

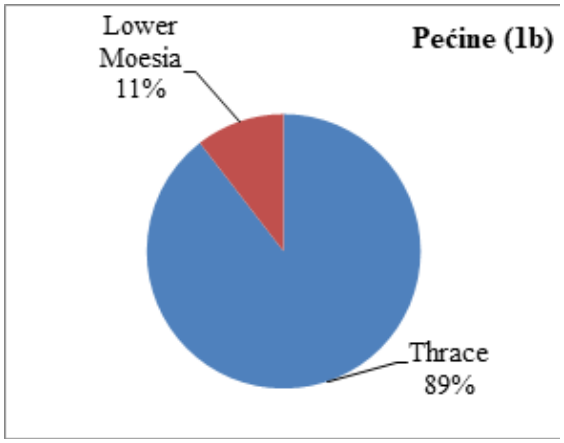
Through a comparative analysis of coin finds issued by mints from Thrace and Moesia Inferior at both necropoles at Viminacium, we can note similarities in several aspects: the presence of coinage of rulers and their family members belongs to approximately the same chronological range: Hadrian (Pećine) /Antoninus Pius (Više Grobalja) – Gordian III (Pećine) / Philip I (Više Grobalja) (Table 2; Vojvoda 2011: 140, Table 2); coins from Caracalla have the highest percentage (Pećine 36.84%; Više Grobalja 20%) and, finally, the most common are issues from the mint of Pautalia (Table 1; Vojvoda 2011: 139-140, Table 1).

Emperor or member of imperial family	Pieces	%
Hadrian	1	5.26
Antoninus Pius	3	15.80
Lucius Verus	1	5.26
Faustina II	1	5.26
Caracalla	7	36.84
Elagabalus	1	5.26
Severus Alexander	1	5.26
Gordian III	3	15.80
Unknown	1	5.26
Total	19	100

Table 2 – Percentage distribution of coin specimens of certain rulers or their family members at the necropolis of Pećine.

Considering the noted similarities, and so as to obtain a better interpretation of these monetary findings, we believe that they should be considered as a whole, especially because of the circumstances regarding the documentation of findings from both necropoles during the research.5 Only after





Graph 1a and 1b – Representation of Thracian and Lower Moesian mints at the necropolis of Više Grobalja (1a) and the necropolis of Pećine (1b).

a detailed examination and publishing of all grave units and findings from both of the necropoles will it be possible to determine with any certainty the zones and chronological frames, though differenc-

5 Extensive and contemporary archaeological excavations at the adjoining sites of Više Grobalja and Pećine, naturally required that a system of documentation of findings be established as well, from the very beginning of the works. As already mentioned before (*cf. supra* ref. 2), during the research at Pećine, zones of three necropoles were discovered, the most recent of which was contemporary with the necropolis at the site of Više Grobalja and they probably represent one unit. Terrain documentation (excavation diaries, inventories of findings, grave numeration, etc.) had been made, from the start, separately for the two sites, and the three necropoles at Pećine were treated as a whole. The numismatic material, as well as other findings, is kept, even today, in thematic units, according to terrain inventories, which don't follow the zones of the three necropoles. The excavations were performed at the same time, and terrain inventory numbers were assigned daily on the basis of numerus currens (Vojvoda, Mrđić 2017: 14-15, ref. 16).

es between them were noted during the research. For the time being, all indications point to the conclusion that the necropolis of Više Grobalja and the oldest burial zone at Pećine, in which cremations and inhumations were practiced at the same time, represented one necropolis at the time they were used. The question regarding a part of the cemetery zone at Pećine, in which there are graves with cremations and child inhumations only, with findings chronologically contemporary with the previous one, remains opened until a detailed analysis of all grave units is performed. It is possible that it was a part of the same necropolis, representing the burial zone of a population which practiced only cremation, but this remains to be confirmed by an anthropological analysis of the osteological material. The third area of burials at Pećine, consisting exclusively of inhumations, certainly represents a chronologically separate necropolis.

Hence, considered as a whole from the total number of coin specimens which were available for examination (6,233),6 1,100 specimens belong to provincial minting, which represents 17.65%. Coins from 16 provinces and 36 mints are present, mostly from Asia Minor and the Balkans. If we observe the presence of coins from certain provinces, Bithynia is by far the best represented, with 58.85%, out of which the largest number came from the mint of Nicaea (55.82%) compared to the total number of provincial mints issues present. It is followed by Upper Moesia (Moesia Superior) and the mint of Viminacium with 19.17%, Macedonia with 13.59% and Thrace and Lower Moesia with 4.50% (Borić-Brešković,Vojvoda 2017: 2, ref. 6).

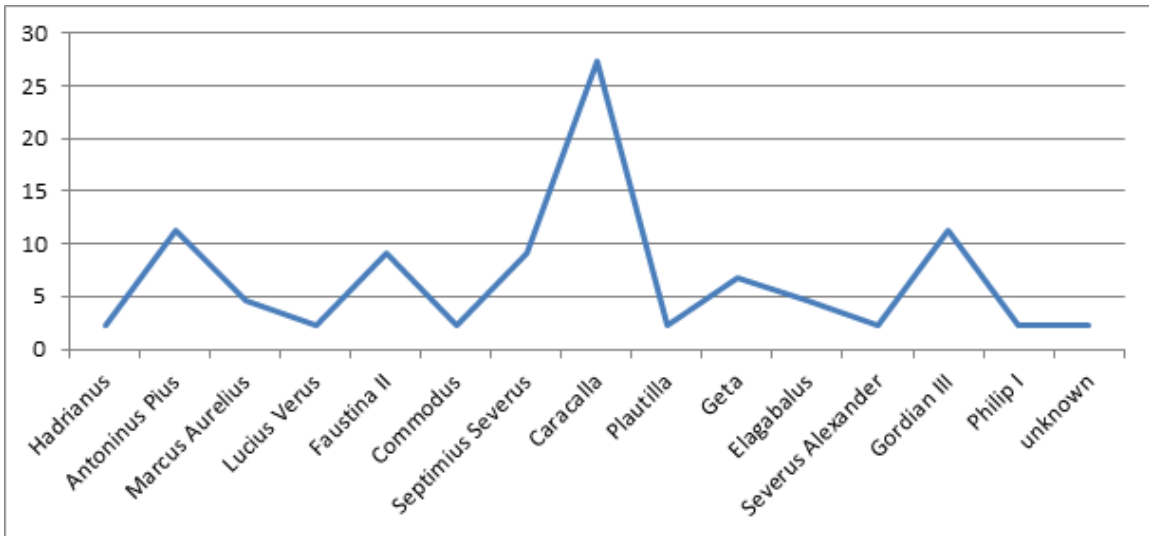
The findings issued by the Thracian and Lower Moesian mints, originating from cemetery zones at the sites of Više Grobalja and Pećine, belong to the chronological range from Hadrianus to Philip I, with a total of 44 pieces (Table 3).

Emperor or member of imperial family	Pieces	%
Hadrian	1	2.27
Antoninus Pius	5	11.36
Marcus Aurelius	2	4.54
Lucius Verus	1	2.27
Faustina II	4	9.10
Commodus	1	2.27
Septimius Severus	4	9.10
Caracalla	12	27.30
Plautilla	1	2.27
Geta	3	6.81
Elagabalus	2	4.54
Severus Alexander	1	2.27
Gordian III	5	11.36
Philip I	1	2.27
Unknown	1	2.27
Total	44	100

Table 3 – Percentage distribution of coin specimens of certain rulers or their family members at the necropoles of Više Grobalja and Pećine together.

We may note an increased influx of coins from the Thracian and Lower Moesian mints at Viminacium from the time of the reign of Antoninus Pius, and the largest influx was noted during the reign of Caracalla (Graph 2). These calculations confirm the already noted lack of bronze coins of imperial coinage in the circulation of Upper Moesia during the reigns of the emperors from Antoninus Pius to Commodus. In this period, the highest presence was noted of provincial coinage from the Macedonian mints, most prominently Stoba, followed by the coins from mints in Asia Minor, Thrace and Lower Moesia. The situation changed during the Severian period, when a far lower presence of imperial issues of bronze coins can be noted as well as twice as many provincial coins compared to the previous period, with the largest number of specimens originating from the

6 A total of 6,233 coins were available for examination (2,736 Više Grobalja; 3,497 Pećine). A certain number of pieces were either lost or destroyed during the conservation process (Vojvoda, Mrđić 2015: 10, ref. 6; Vojvoda, Mrđić 2017, 10-11, ref. 5).



Graph 2 – Distribution of coins from Thracian and Lower Moesian mints at the necropoles of Više Grobalja and Pećine, according to rulers and their family members.

mint at Stoba. After this mint was closed during Caracalla's reign, a significant influx of money can be noted from the Bithynian mint in Nicaea, which culminated during the reign of Severus Alexander. A similar situation continued during the first years of the reign of Gordian III, until the establishment of the Viminacium mint. The beginning of circulation of coins from this mint influenced the influx of coinage from Gordian III from the mint at Nicaea. The analysis of Viminacium monetary findings showed that in the period from Philip I up to Valerian I and Gallienus almost all provincial issues came from the mint at Viminacium, while only three specimens were noted from the mint at Nicaea. It is interesting to note that at the time of the greatest influx of money from Nicaea during the reign of Severus Alexander, notable issues of autochthonous coins were being minted again in Macedonia (Koinon of the Macedonians), which usually had no significant share of the circulation in the territory of Moesia Superior at this time (Црнобрња 1981: 5-6; Војвода, Петровић 2011: 288-289; Војвода, Јесретић 2012: 121-122; Војвода 2013: 156-157; Vojvoda, Mrđić 2015: 14-16, ref. 10-13; Војвода, Бранковић 2016: 108-109; Vojvoda 2017: 135; Vojvoda, Mrđić 2017: 17, ref. 20-23; 58, ref. 105; Borić-Brešković, Vojvoda 2017: 9-10).

When it comes to the presence of coins from certain mints, Pautalia is dominant with 29.50%, followed by Hadrianopolis (13.70), and Philippopolis and Perinthos (with 9.10% each), while others are present in a smaller percentage (Table 4).

Province	Mint	Pieces	%
Thrace	Pautalia	13	29.50
	Hadrianopolis	6	13.70
	Philippopolis	4	9.10
	Perinthos	4	9.10
	Anchialus	2	4.54
	Serdica	2	4.54
	Deultum	1	2.27
	Byzantium	1	2.27
	Augusta Traiana	1	2.27
	Mesembria	1	2.27
	Plotinopolis	1	2.27
Lower Moesia	Nicopolis ad Istrum	7	15.90
	Marcianopolis	1	2.27
Total		44	100

Table 4 – Percentage distribution of Thracian and Lower Moesian mints at the necropoles of Više Grobalja and Pećine together.

Mints from Thrace and Moesia Inferior obviously provided a certain share of small bronze coins in Moesia Superior until the reign of Caracalla, along with the Macedonian mints, which still remained the dominant source. The exceptional appearance of coins from the Bithynian mint of Nicaea, in the money flow of Moesia Superior, during the reign of Severus Alexander, was certainly linked to the earlier provisions from the mint at Stoba and later provincial coinage at Viminacium. Monetary findings from Viminacium, with the large number of pieces and the reliable finding place, contribute largely to solving the questions regarding the boundaries of circulation of provincial coins in this part of the Empire.

CATALOGUE

Notes to the Catalogue

The catalogue is arranged chronologically according to the reigns of the Roman emperors.

Catalogue contains the following data:

Column 1 – Catalogue number.
Column 2 – Obverse legend and description.
Column 3 – Reverse legend and description.
Column 4 – Weight (gr); Size (mm); Axis (sides of the World).
Column 5 – Denomination; *cf*. Abbreviations.
Column 6 – Position of find; *cf*. Abbreviations.
Column 7 – References.
Column 8 – Date
Column 9 – Inventory number (C – number) and additional information (for example: broken, perforated, cmk., NP (not preserved), etc.).

Reference / References:

BMC Thrace - *Catalogue of Greek Coins. The Tauric Chersonese, Sarmatia, Dacia, Moesia, Thrace*.

WBR - W.H. Waddington, E. Babelon et Th. Reinach, *Recueil général des Monnaies grècques d'Asie Mineure, Nicée et Nicomédie.*

Мушмовъ – Н. А. Мушмовъ, Антични монети на Балкански полуостров.

Varbanov III – I. Varbanov, *Greek Imperial Coins.* Vol. III. Thrace.

RPC online – http://rpc.ashmus.ox.ac.uk/coins

SNGvA – *Sylloge Nummorum Graecorum, Deutschland, Sammlung Hans Von Aulock.*

SNG Cop – H. E. Mathiesen (ed.), *Sylloge Nummorum Graecorum. Aarhus University, Denmark,* Copenhagen 1986: Munksgaard.

SNG France – H. Nicolet, *Sylloge Nummorum Graecorum, France*. *Collection Jean et Marie Delepierre*.

SNG Slovenia III – P. Kos, A. Šemrov, Sylloge Nummorum Graecorum Slovenia.

Abbreviations:

Cmk. – countermark
ex – exergue
l. – left
r. – right
stg. – standing
std. – seating
adv. – advancing
hld. – holding
laur. – laureate
rad. – radiate
cuir. – cuirassed
dr. – draped
diad. – diademed
G – inhumations
G1 –cremations
Trench etc. – mark of trench for specimens which have been found in a layer, outside the graves.

Photos

Chosen specimens are presented in photographic form and their numeration on the plates is coordinateed with the catalogue numbers.

THRACE

MINT OF SERDICA
LUCIUS VERUS
AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
1	[AV] [KA]I Λ AVPH-ΛIO OVHPOC Head laur. r.	CEP-ΔΩN Tyche wearing mural-crown std. l., hld. sceptre and cornucopiae.	9,49 27,33 S	G – 818	RPC online, Vol. 4, no. 7396.[7]	161-169	2735

CARACALLA
AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
2	AVT […] - ANTONINOC Bust dr., cuir., r., head laur.	OVΛΠIAC – CEPΔIKHC Asclepius naked to waist stg. r., r. hand on hip, hld. serpent-entwined staff in l. hand.	16,82 29,72 NE	G – 443	Мушмовъ no. 4818.	211-217	1923

MINT OF ANCHIALUS
HADRIANUS
AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
3	Illegible. Bust r., head laur.	OVΛΠIANΩN – [AΓXIAΛEΩN] Fortuna stg. l., hld. rudder and cornucopiae.	15.68 28.64 N	G – 1859	Мушмовъ /	117-138	5223 NP

7 http://rpc.ashmus.ox.ac.uk/search/quick/?q=7396&search

GORDIAN III
AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
4	AVTK M ANT ΓΟΡΔΙΑΝΟ AVΓ CE (around) ex – TPANKVΛ ΛIENA Bust of Gordianus III dr. head laur, r. facing bust of Tranquilllina dr., l.	[OY]ΛΠΙΑΝΩΝ – [AΓX] IAΛEΩN Nemesis stg. l., hld. scales and cornucopiae; at foot, wheel.	14,65 31,66 S	Nivela-tion	Мушмовъ 2956	238-244	4945 NP

MINT OF PAUTALIA
ANTONINUS PIUS
AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
5	AVT KAI T AI AΔPI - ANTΩNINOC Bust dr. cuir. r., head laur.	HEΓEM ΠOMΠEI [OVOΠEICKOV] ex - ΠAVTAΛIΩTΩN Nike driving galloping biga r., hld. palm-branch.	17,38 30,62 S	Trench 340	RPC 4 online no. 8744 (temporary)[8]	138-161	8728 NP

FAUSTINA II
Striking under Marcus Aurelius
AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
6	FAVSTEINA – CEBACTH Bust dr. r., head with band (?), hair waved and coiled on back of head.	OVΛΠIAC - ΠAVTAΛIAC Hygeia stg. r., feeding snake in arms.	6,18 2,94 NE	Trench 343	Мушмовъ 4115.	161-175	8973 NP

8 http://rpc.ashmus.ox.ac.uk/search/quick/?q=8744&search=

CARACALLA
AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
7	AVT K M AVPH –ANTΩNEINOC Bust dr. cuir. r., head laur.	OVΛΠΙΑC – ΠAVTAΛIA Homonoia stg. l., sacrificed on altar from patera and hld. cornucopiae.	19.78 30.88 S	Trench 353	Мушмовъ 4247.	198-217	9970 NP
8	AVT K M AVRH - [ANTΩNEINOC] Bust dr. r., head laur.	OVΛΠΙΑC – ΠAVTAΛIA Woman stg. l., hld. patera. l. hand beside the body.	15,80 29,98 NE	G – 1915	Мушмовъ /	198-217	5344 NP

MINT OF DEULTUM
GORDIAN III
AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
9	IMP GORDIANVS […] Bust dr. cuir. r., head rad.	COL FL PAC – DEVLT Athena helm. stg. l., hld. spear, resting r. hand on shield.	5,70 23,03 S	G – 4200	Similar Мушмовъ 3673-3674.	238-244	11309 NP

MINT OF BYZANTIUM
AE - Unknown ruller

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Date	Vim. Coll.
10	Illegible. Bust r.	BVZAN-TIΩN Bunch of grapes on a stem.	5,07 22,48 N	Trench 444	Caracalla (?)	13437

MINT OF HADRIANOPOLIS
CARACALLA
AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
11	AVT K M ANT ANTΩNEINOC AVΓ Bust dr. cuir. r., head laur.	AΔPIANO-Π-OΛEITΩN (ΩN in ligat.) Tyche stg. l., hld. rudder and cornucopiae.	7,79 26,93 S	G – 1967	Вырбанов III, 3599.	198-217	5483 NP
12	AVT K M AVP […] Bust r., head laur.	[…]AIANO – ΠOΛ[…] Hera stg. l., holding sceptre in l. hand and in r. hand a patera over open cista from which a serpent is rising.	18,20 29,95 N	Trench 309	Мушмовъ 2651.	198-217	5313/3

GORDIAN III

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
13	AVT K M ANT –[…] Bust dr. cuir. r., head laur.	AΔPIANOΠ-O-[…] Artemis adv. l., hld. with boath hands long torch.	10,56 27,97 N	G1 – 1004	Мушмовъ 2704.	238-244	11057

MINT OF PHILIPPOPOLIS
ANTONINUS PIUS
AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
14	AVT AI AΔPIA - ANTΩNEINOC Head laur. r.	HΓE ΓAP[Γ] ANTIKOV ΦIΛIΠΠO ex – ΛITΩN Tyche std. l., hld. patera and. sceptre.	17,46 32,02 N	Trench 340	Мушмовъ 5102.	138-161	8867 NP

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
15	Illegible Head laur. r.	ΦΙΛΙΠΠΟ- ΠΟΛΕΤΩΝ Homonoia stg. l., hld. patera and cornucopiae.	3,56 18,39 S	Trench 380	Мушмовъ 5112.	138-161	11713 NP

MINT OF PERINTHOS

CARACALLA

AE MEDALLION

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
16	[AVT K M AVP CE]OVHP A[NTΩN]INOC A[VΓ] Bust dr. cuir. r., head laur., spear in l. hand.	[ΠE]P[INΘIΩ]N [NE]ΩKOP ex - ΩN Caracalla in slow quadriga on l.; hld. eagle-tipped sceptre.	43,88 40,06 S	G – 4215	obv. like Мушмовъ 4547; rev. like Мушмовъ 4549; BMC Thrace 153, no. 40.	211-217	11326

SEVERUS ALEXANDER

AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
17	AV K M AVP CEV – AΛEΞANΔPOS AV (AV in ligat.) Bust dr. cuir. r., head laur.	ΠEPIINΘIWN IWN (WN in ligat.) – B NEWKOPWN Asklepios stg. l., hld. serpent-entwined staff.	9,40 30,96 S	G – 4215	Мушмовъ 4626.	222-235	11321

MOESIA INFERIOR

MINT OF NICOPOLIS AD ISTRUM
CARACALLA
AE

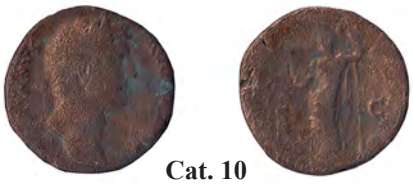
Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
18	AV • K • M • AVP – ANTΩNIN Bust dr. cuir. r., head laur.	VΠ • AVP • ΓAΛΛOV • NIKOΠOΛ ex – ΠPOCIC Caracalla and Geta stg. facing each other, clasping hands.	12,03 26,93 N	G – 4215	Мушмовъ 1101, but diferent rev. leg.	198-217	11327/1

ELAGABALUS
AE

Cat.	Obverse	Reverse	Wt. Size Axis	Position of find.	Ref.	Date	Vim. Coll.
19	[AVT K M AVRH] -ANTΩNEINOC Bust dr. r., head laur.	VΠ NOBIOV POVΦOV – [NIKOΠOΛITΩN ΠPOC] CT / PON (in field l., in two lines) Appolo, naked, stg. l., sacrificed from patera over flaming altar, l. hld. branch.	10,84 26,51 S	G – 2055	like Мушмовъ 1371 and 1374.	218-222	5681 NP

Cat. 1

Cat. 2



Cat. 10

Cat. 12

Cat. 16

Cat. 17

Cat. 18

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REZIME
NOVAC TRAČKIH I DONJOMEZIJSKIH KOVNICA SA VIMINACIJUMSKE NEKROPOLE PEĆINE

KLJUČNE REČI: RIMSKO PROVINCIJALNO KOVANJE, TRAKIJA, MEZIJA INFERIOR, VIMINACIJUM, PEĆINE, VIŠE GROBALJA.

Tokom obimnih zaštitnih arheoloških istraživanja južnih nekropola Viminacijuma, na nekropolama lokaliteta Pećine otkriveno je ukupno 3865 primeraka novca. Od 545 primeraka sa nekropole Pećine identifikovanih kao provincijalno kovanje, registrovano je ukupno 19 primeraka (3,50%) koji su emitovani u kovnicama Trakije (17) i Donje Mezije (2) (Tabela 1). Što predstavlja nešto manji procenat u odnosu na susednu nekropolu Više Grobalja, gde je registrovano 25 primeraka, što iznosi 4,50% od ukupnog broja registrovanih novčića provincijalnih kovnica. Uočljiva je i razlika u zastupljenosti kovnica dve provincije na nekropolama Više Grobalja i Pećine. Na nekropoli Više Grobalja su nalazi novca kovnica Donje Mezije

Uporednom analizom nalaza novca tračkih i donjomezijskih kovnica na obe viminacijumske nekropole, zapažaju se podudarnosti u više aspekata: zastupljenost vladara i članova porodica kreće se u približnom hronološkom rasponu: Hadrianus (Pećine)/Antonin Pije (Više Grobalja) – Gordian III (Pećine)/Philip I (Više Grobalja) (Tabela 2); u najvećem procentu prisutan je novac Karakale (Pećine 36.84%; Više Grobalja 20%) i konačno najzastupljenije su emisije kovnice Pautalija (Tabela 1). daleko bolje zastupljeni u odnosu nekropolu Pećine (Grafikon 1a, b). Nalazi tračkih i donjomezijskih kovnica koji potiču sa grobljanskih areala lokaliteta Više Grobalja i Pećine kreću se u rasponu od Hadrijana do Filipa I sa ukupno 44 primeraka (Tabela 3).

Tračke i donjomezijske kovnice očito su imale izvesnog udela u snabdevanju Gornje Mezije sitnim bronzanim novcem do vladavine Karakale zajedno sa makedonskim kovnicama koje su ipak prednjačile. Izvanredna pojava novca bitinijske kovnice Nikeje tokom vladavine Aleksandra Severa u cirkulaciji Gornje Mezije, svakako je povezana sa ranijim snabdevanjem iz kovnice Stobi i potonjim viminacijumskim provincijskim kovanjem. Monetarni nalazi sa Viminacijuma, svojim velikim uzorkom kao i sigurnim mestom nalaza, u najvećoj meri doprinose razrešavanju pitanja granica cirkulacije provincijskog novca u ovom delu Carstva.

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AN OVERVIEW OF THE STUDY OF TREPANATION IN THE TERRITORY OF SERBIA

ABSTRACT

Trepanations are the oldest known type of surgical intervention on the head of man. The reasons for which they were done were different. These were therapeutic tranches as well as those that were performed for magical purposes.

From the area of our country of trepanation, they come from just a few sites from the Iron Age, through the Roman period, to the Middle Ages. The instruments and techniques that were used for trepanning are differed in different periods. On the other hand, the trepanations did not cease to be practiced even in the younger periods when it comes to the area of our country. They are practiced in these areas even at the time when modern medicine is developing and expanding, which is a unique case in Europe. There is a lot of ignorance about the process of trepanning when it comes to older periods, how it happened and what it all meant. For the period of the 19th and 20th centuries, these data are more precise and they speak about the great representation of this element of health care in Serbia, Montenegro and Albania and possibly they can help to explain the process of trepanning in the previous periods.

In this paper an attempt was made to present all the tranches from these spaces, including all the periods in which they were carried out. Another important segment is to make an attempt to reconstruct as well as to clarify the flow of trepanning in a more precise manner.

KEYWORDS: TREPANATIONS, INSTRUMENTS, SKULLS, TECHNIQUES, SURGICAL INTERVENTION, MEDICAL PROCESS, HISTORICAL PERIODS.

INTRODUCTION

From the aspect of medical history, archaeology and anthropology, trepanation is the oldest surgical intervention on the human head. This technique involves breaking the skullcap with a special instrument and an intervention on the meninges (*Dura mater*).[1] For several millennia, until the modern era, skull trepanation was performed by individuals whose work remained for us to study.

The reasons for trepanation were varied, especially in prehistoric times. They included persistent headaches, various injuries, but also psycho-suggestive magic, i.e. exorcism (banishment) of evil spirits from the body. In time, as demonstrated by the case with the Serbian population, trepanation was performed only as a result of head injuries in combat or in various falls. In Serbia, this technique was successfully practiced throughout the 19th century. It was performed by the so-called folk healers, whose names we managed to obtain, as well as the names of the people who were trepanned several times during their life.

1 The article is the result of the project: *Viminacium, Roman city and military camp – research of material and non- material culture of inhabitants by using the modern technologies of remote detection, geophysics, GIS, digitalization and 3D visualization (no 47018)*, funded by The Ministry of Education, Science and Technological Development of the Republic of Serbia.

The aim of this paper is to investigate this field of health care among the Serbs in the 19th century, since the practice of trepanation performed by folk healers was retained the longest in Europe. We believe that the reasons for that were the socio-historical circumstances at the time, as will be more thoroughly discussed later in this paper. The second objective of this work is to attempt to unravel the process of trepanation, because it represents an unknown when it comes to earlier periods of time.

HISTORY OF RESEARCH

The phenomenon of trepanation is a very complex and demanding topic. For this reason, we will give a brief overview of the findings regarding trepanned skulls in Europe, as well as those from the territory of Serbia.

According to G. Buschan (1937), the oldest trepanations were performed about ten thousand years ago (sites in Dordogne, France). This means that they were performed with some kind of instruments that predated the discovery of metal, which means that only stone tools could have been used (for example silex). Such stone knives have not been found near trepanned skulls, but their existence must be presumed, because they were not post-mortem (but ante-mortem) trepanations.

When it comes to a somewhat later period, for example, the Neolithic in Germany, H. Ulrich and F. Weickmann (1964) found a skull without the skull dome, which was definitely taken off with a stone instrument. However, the preserved metal instrument published by J. Como (1925) was found at the Rhine Limes at Bingen. This is already a historic period, but prehistoric metal instruments which could be reliably linked to skull trepanation in Europe have not yet been found.

Trepanned skulls from historic periods of Europe are numerous. So far, several thousand have been recovered, and their number varies from country to country and from period to period (Hein, P. 1960). So, for example, in neighbouring Hungary, skulls have been recovered from over 50 sites (Nemeskeri, J. 1960).

In Serbia, the oldest trepanned skulls come from the Bronze Age necropolis at Mokrin (Northern Banat). Hungarian anthropologists Farkas, G. and Lipták, P. (1971) published papers dealing with a total of 9 of these specific skulls. The site of Kriva Reka (Western Serbia) yielded one skull from the Iron Age, but it was trepanned three times during the life of that individual (Schulz 1993). From the historical period, we have trepanned skulls from the Antique Viminacium, from the medieval necropolis at Gamzigrad (*Felix Romuliana*) and from the necropolis of the monastery of Davidovica near Prijepolje (Mikić 1998).

The study of the phenomenon of trepanation in Europe is linked to 1873, when Prunieres showed, at a congress in Lyon, one skull found in 1868 (Prunieres, P. 1873). Further information about trepanation was obtained in 1876 at the International Congress of Anthropology and Archaeology, in Budapest. It was then that the French anthropologist P. Broca (1877) introduced the differentiation of “trepanation posthume” and “trepanation chirurgicala”. He also posed the problem of survival after this complicated neurosurgical intervention, which is still valid in the study of trepanation today. In the 20th century, the number of studies increased so much that they exceed the limits of this paper. Let us mention, among other things, that D. R. Brothwell (1981) wrote a significant monograph on trepanation from the aspect of ethno-medicine. It should be noted that the abovementioned author listed several types of trepanation: circular, rectangular and the case when the drilled holes form a circle. When it comes to positions where trepanation was performed, the frontal, parietal and temporal regions are the most common.

For now, the only well preserved instruments used for trepanation from the Roman period come from the site of Bingen upon Rhine (Como 1925, in: Mikić, 2007, p. 1). The tool, the so-called tre-

pan, was a very precise instrument for that time, which maintained the direction of the drilling of the skull.

Another important find is an improved form of instrument for trepanation that comes from an Avaric grave in Hungary (Mezóband). It functioned on the principle of a bow and arrow, where the trepan stood vertically and entered the positioned horizontally bow and, thus, the process of trepanation was faster (Anda 1951, in Mikić, 2007, p. 2).

The very term of trepanation comes from Greek and French, and belongs to newer ethno-medicine, meaning, in short, the piercing of the head (Pahl, 1993).

The first pieces of information about trepanation among the Serbs in the 19th century and, therefore, the beginning of the research, were found in Berlin, where a trained physician, Dr. Vladimir Đorđević (1883), in the context of his article on health care in the Kingdom of Serbia, mentioned trepanation very briefly. Then, the first educated anthropologist from Serbia, Sima Trojanović, also in Germany, in 1900, published an extensive article on trepanation among the Serbs (Trojanović 1900), which he expanded and published in Serbian in Skopje (Trojanović 1922).

It is very interesting to note that, particularly in the second half of the 20th century, the research of trepanation on the recent population does not continue, on the contrary, the focus is on skeletal findings from prehistoric and historic periods. This fact is certainly in contradiction with the fact that trepanation was practiced in the 19th century.

MATERIAL AND METHOD

Considering the fact that one of the aims of this research is tracking a segment of folk medicine among Serbs in the 19th century, the basic material available to us is the corresponding literature of an earlier date, in particular, M. Iličković, from 1940, and M. Brajković, from 1948. By gaining insight into these articles, we can see that they exclusively quote the relative foreign literature, from which we can conclude that they were the pioneers who began to study the phenomenon of trepanation among the Serbs in the 19th century.

We do not have more recent research papers that would delve further into trepanation as a segment of the history of folk medicine, i.e. the health care of the people. It can be concluded from this that, in the second half of the 20th century, this topic was, some reason, ceased to be studied, regardless of the fact that this practice continued until the very beginning of the 20th century. On the other hand, we have published works on trepanation on skeletal material, but they are not directly related to this article.

The method applied in this paper is primarily analytic (Šamić 1988) – interpretative, with the goal of pointing out the designation of special categories such as: folk healers, medicines, patients, instruments, service price and origins of trepanation.

RESULTS

Folk healers, self-taught doctors, were called "*medig*" or simply doctors. The most famous folk healers known for performing trepanations were from the Iličković family from Crmnička Nahija, who, according to sources, trepanned between 200-250 people. Among them, the most prominent were Niko Mićov, and his father and uncle, Pero and Miko. Radovan Bulić from Drobnjaci, Radosav Radičević from Vasojevići and Radosav Petrović from Kuči (died in 1928) were also mentioned.

Aside from the self-taught folk healers, there were, for example, in Montenegro in the 1880s, two "educated" doctors: one captured Greek and one "Turkish Jew".

At the end of the 19th century, in Cetinje, the head of the Medical Service was Dr. Niko Miljanić, educated in Germany. Sima Trojanović used his notes on the trepanation process in his works published in 1900 and 1922.

The patients were "peasants with injured

heads, who usually suffer for 40 days, and if the pain, which often renders them blind, doesn't go away, and they do not expect that they will be able to recover by self-healing, they are subjected to trepanning". Sima Trojanović didn't find any information about the trepanning of individuals with mental health problems.

When it comes to the trepanning of "patients", from a certainly considerable number of names the following list remained: Bajo Karadžić (from Drobnjaci) seriously injured his head in a quarrel. After the procedure he was completely healed.

Radovan Juričić from Vasojevići was trepanned at the age of 55 because of a heavy blow to the head. Then he felt well for the rest of his life.

Veljko Babović from Dulipolja village (the municipality of Konjuška in Montenegro) was successfully trepanned at the age of 84. He lived without any consequences until he passed away in 1878. The first time he "underwent the procedure he was in his middle age".

Jakov Gorašev from Oždmidrjien (a village in Bjelopavlići) had his upper skull crushed. He underwent the procedure and after being "mended" he lived for another 15 years. He died of another illness and was buried at the church in Frutak.

Next we have Borika Savina, born in Morača and trepanned in Dakiši village in Vasojevići. After that, she lived normally without feeling any pain. Nikola Spahov Ručić from Kuči had his head trepanned at a younger age, and died in 1930 at the age of 80 (Barjaktarović 1948, p. 555).

It needs to be pointed out that Sima Trojanović (Trojanović, 1922, p. 4) noted that he deliberately mentioned the burial places of individuals who underwent the procedure of trepanation, "so that their skulls would be transferred to a museum, at a convenient moment, as significant scientific objects". His attempts with fine words and money failed, because people were convinced that it would be a desecration of the deceased. However, on this occasion, his sense of the importance of scientific proof should be emphasised, with the remark that he was the first educated Serbian anthropologist, who received his Ph.D. from the University of Heidelberg.

The basic instrument for this neurosurgical intervention of folk healers, as already mentioned, was called the šara or *trapanj*, depending on the local dialect. It was actually a tube serrated on one side only to scrape (šaronjati) the cranial bone. It used to be made by rural blacksmiths, from a barrel of a pistol or a rifle. The length was ca 12-15 cm, and good medics had several of them with different diameters (to use them as needed).

Razors or blades for removing hair and cutting skin are certainly more standard instruments, but they were also necessary for every trepanation.

To clean the skull from soft tissues beneath the skin, there was a special knife called the *lešper*. It certainly had to have been some type of scraper (skinner). There were also usually three *kukača* (hooked instruments). One was used by the *medig* and the other two by his assistant. These tools were used so that at one point, on a given command, all 3 would be activated in the same way and, thus, raise the bone disc from the skull (which was previously processed with the šara instrument).

A silver spoon was used to collect clotted blood (to remove a hematoma) from the outer meningeal layer. Silk cotton could have been used for the same purpose.

The trepanation instruments were seven in total and comprised: šara or *trepanj*, various knives and blades, *lešper*, hooks, chisel, sewing needle and spoon. Their total number did not have to be the same for every folk healer, and it probably varied depending on how well equipped one was.

Instruments belonging to the folk healers of the Iličković family have been kept in a complete archive at the Surgical Clinics Museum of the Faculty of Medicine in Moscow since 1907 (Iličković, 1940).

Medications should be divided into two groups. The first would include those that had the role of opiates (certain types of anaesthesia), and in the second group would be the preventive, or protective medications.

The second group of medications would include unctions. One was used when the *medig* didn't want to use the appropriate knife to remove soft tissues above the bone (below the skin). Then he would leave the job to a herbal unction to "bite to the bone". The name of this unction remains unknown.

Another unction had a different usage. It was used after the procedure and was called *boletin*. It was used on the wound after restoring and stitching the skin. Its' composition is not completely known and Sima Trojanović (Trojanović, 1922, p. 2) said that he didn't manage to find out all the herbs that were used to make it, but that he knew "they tend to add some wax and "čansa", and then leave it all to rest in oil". *Boletin* would usually remain on the wound for four to five weeks.

It is also interesting to mention the use of the calabash. Its' bark would be cut and shaped and then placed above the trepanned spot when the opening on the skull was large, but it wasn't allowed to come in contact with the meningeal layer (Dura mater).

For such cases it is possible to assume that the folk healers probably knew of some antiseptic and antibiotic effects of the mentioned gourd or pumpkin, and that it was not merely a mechanical protection during the process of bone healing (osteoplastic reaction). Brandy was used as an anaesthetic, 1 litre for men and 3/4 litre for women.

Trepanation could be one of several prices. Basically, *medigs* were paid by arrangement. In cases when the patient was wounded by a "*nekrst*" (Non-Christian or Muslim, Turk), the procedure was free. However, if he was wounded by a Serb, then the Senate (Great Court or *Kuluk*) in Montenegro determined that a penalty fine be paid. In addition, the attacker had to pay some compensation to the injured, for the pain sustained. In Andrijevica, "full blood" was 336 thalers and 6 groschen, and in Zeta this fine was 133 thalers and 2 groschen. This penalty was called *Berberina* or *Berberija*.

In cases when the injured individual died during the trepanation, the killer was obliged "to pay for the blood with his own head or a head of his family, or the so-called settlement" which was called "to settle a šara with a šara". This system was legally sanctioned later, but we were unable to find the precise time when that happened from the data available, except that it is mentioned that in 1856 Prince (vladika) Danilo banned trepanation performed by folk healers. They fled to southern Serbia and Albania at that time.

For cases when the patient died during trepanation, S. Trojanović (Trojanović, 1922, p. 4) quotes the note given to him by J. Cvijić. It refers to Arnauts, whose folk healers also practiced trepanation, and it states that the "*ećim*" (folk physician) was trepanning prominent Arnauts under blood warranty. If a patient died "under the knife", the *ećim* was to pay with his own head. Sometimes, it was, of course, possible to compensate for the lost life with money (Trojanović, 1922, p. 5). The sum that would normally be paid in such cases is not stated.

Forgiveness of blood was also mentioned – the folk healers would ask for it before the "surgery" to secure themselves. The Grbljan Code of Arbitration (Article 103) clearly states: "So that the wounded would not leave a blood debt on a doctor, who is to cut his wound or heal his head, we allow for the doctor who would do the procedure to give his hand to the injured, who would thus testify that doctor's life is his own even if he, the patient, should die" (Vrčević, 1891, p. 40; Barjaktarović, 1948, p. 556).

The process of trepanation

Since we have already identified, systematised and analysed the most important categories, such as folk healers, patients, doctors, instruments, medications and prices, we can now turn our focus to the process of trepanation itself. The *medig* did not work on his patients alone, but with the help of an assistant. The assistant would hold the patient, who sat on a chair, with hands over the ears and fingers on the temples, tightly. It is assumed that anaesthetic was taken first of all (in our case the

above mentioned amount of brandy, perhaps even taken in one shot). Once the hair was removed from the right place with a specific instrument, the skin was open with a cross-cut and soft tissue removed from the designated spot; then the process of trepanation would begin. The folk healer would put more pressure on the wound towards himself, which would make it possible for him to get closer to the outer meningeal layer. Once this was done, he would take the hooks (and/or the chisel) and, together with his assistant, working in unison, raise the bone disc. Then the blood from internal haemorrhaging would be collected (hematoma) and/or tiny bone pieces in cases of larger injuries. When all that was done, the raised piece of skin would be lowered down and sewn with the appropriate needle. This would be followed by placing the balm (*Boletin*), though the skin would not be completely sewn. Folk healers thought that "air access" was needed so that the wound would heal faster.

When the entire surgical part of the procedure was completed, the wound would be bandaged with a *kušak*, which certainly had a compressive protective role as well. It was considered that the wound in strong young men would be healed in 14 days, in the elderly in 40 days, and weaker people would heal in 2 months. It was also said that if the trepanned opening was big, then the skin at the wound area would swell (pulse), while the bone healed.

From this data we can see that the osteoplastic bone reaction was a known occurrence in the human organism.

After this complicated neurosurgical intervention, the patient would not be allowed to do heavy physical work.

It should be added that in relation to the coalescence of the trepanned opening Barjaktarović (Barjaktarović, 1948, p. 555) mentions the "skulls of the dug-out deceased", but does not list them. The data cannot be taken as reliable, so we should rely on a single case presented by Trojanović (Trojanović, 1900, p. 20). It is said that during the exhumation of the grave of a man, who had his skull trepanned three times in the period of ten years, it could be seen how the openings on the trepanned skull gradually healed. On the same occasion, it is said that very few people died during trepanation. However, we do not have reliable data on mortality rates, so this is among the questions that remain open.

Origin

As can be seen from the available literature as the only source of data, the origin of the trepanation can be viewed in two ways. For example, the word šara is of purely Arnauts origin, and *trapanj* (*trapanjanje* or *trapovanje*) is a local modification of the ancient Greek word *trepanon*/*tripanon*. The term *trepanation* was adopted in modern science.

It is most probable that this medical experience began to spread from ancient Greece towards the north in the period of transition from prehistory to the historical period, so that in the 19th century it was still practiced only by the Serbs and Arnauts. We should also mention the Vlachs here, who practiced trepanation in the village of Zlot, in 1907 (Trojanović, 1922, p. 5).

Open questions

After the "scanning" of the phenomenon of the trepanation that we tried to carry out, a phenomenon that lasted for several millennia in Europe – and one that is practiced even today in modern neurosurgery – there are certainly a lot of questions left open. When it comes to the practice and experiences of the Serbs in the 19th century, some of them must be pointed out.

The question of the assistant is one of the first. We could not determine whether it was a permanent assistant who followed the folk healer and learnt on his way, or if it was just a person who happened to be nearby and who helped during the trepanation.

Bone plugs are mentioned, which are removed, by using *kukače* (and chisels), by a simultaneous action of the doctor and the assistant. However, nothing is said about what happened to them after

the trepanation. Were they destroyed or kept? In prehistoric times, they were used as amulets. The question is whether this can be viewed as an analogous phenomenon?

A needle for sewing the wound is also mentioned, but nothing about the thread that was used. It would be interesting to know which material was used for this purpose.

This list of open questions could be continued, because it simply increases with the increase of our interest in this medical phenomenon that was part of the folk medicine but is still present in modern neurosurgery.

An attempt to present the process of trepanation during the 19th century in the territory of Serbia is also an attempt to reconstruct the process of trepanation in the older periods, given the very long history of research this surgical procedure has. It can be assumed that the procedure itself did not change much with time, considering the instruments that were used depending on the technique of trepanation itself. The only difference is in the fact that, in the territory of Serbia, Montenegro and Dalmatia, a skull drilling technique was used, while in earlier periods it was a scalping / scraping technique. On this occasion, we should mention cases of trepanation from Viminacium where, out of a total of 14,000 excavated graves, of which 1/3 were cremations, only three skulls with trepanation were found. These are a skull from the necropolis of Više Grobalja, skull G-1037, then from the necropolis of Pećine, skull G-2570, and from the site of Pirivoj, skull G-130, which was found and processed by the author of this article. The trepanations were carried out using the scraping technique, which represents a more primitive trepanning technique. The osteoplastic reaction is visible, indicating that the deceased lived long after surgery. Since it can be said, at the current level of research, that medicine in Viminacium was developed, the question arises as to why an older trepanation method was used. One of the more acceptable answers is that these people underwent the trepanation procedure somewhere else and that they came to Viminacium afterwards (Mikić, 2007).

On the other hand, another trepanned skull was found in medieval Gamzigrad, which had completely healed from the inside. Again, the scraping technique was used in this case, which means that this primitive technique was still in use during medieval times (Mikić, 2007).

Another observation that must be taken into account is the fact that in the territory of Serbia trepanation procedures were conducted mainly for the purpose of solving health problems (headaches and injuries), while in much earlier periods this practice had a role in magical rituals (symbolic and post-mortem trepanations), when bone discs from the skull were used as amulets. In our surrounding areas, such trepanations can often be found in the territory of Bulgaria (Boev, 1956, p. 55).

The next observation would also refer to the diffusion of trepanations that can be found in locations from Africa, through South America to Europe.

CONCLUSION

As pointed out in the introduction, the aim of this paper was to investigate a segment of health care among the Serbs in the 19th century. This segment is trepanation, which is still a very demanding and complicated neurosurgical intervention.

The results obtained are related to folk healers, patients, instruments, medications, prices, the process of trepanation itself, its' origin among the Serbs, as well as some open questions, and they can be considered as authentic, because the main source of data was Dr Niko Miljanić, a doctor educated in Germany and the head of the Medical Service at Cetinje, and also a great connoisseur of folk medicine in the territory of eastern Herzegovina, Montenegro and southern Dalmatia.

It transpires that the so-called folk medicine was present for a significantly longer time in the contemporary population of that period, compared

to scientific medicine. On the other hand, there are other overall social and historical circumstances (organisation of life and social enlightenment), because of which trepanation was practiced the longest among the Serbs and Montenegrins when compared with the rest of Europe.

The process of trepanation in the territories that were the subject of this paper was explained almost entirely by referencing sources that can be largely considered to be complete. On the other hand, during the Iron Age, the Roman period and the Middle Ages, which were also the subject of this paper, we only know that the trepanation technique was different, i.e. that a scraping technique was used, which represents a more primitive technique. Hence, we can conclude that trepanations which were carried out until the first half of the last century in our region were more sophisticated, and as a possible result of this there was a large number of surviving patients, although we have no written evidence on mortality rates. Also, there is the fact that cemeteries from the 19th century have not yet been the subject of study, and therefore they are inaccessible for anthropological research.

Let us add that after this revision and analysis, the elements obtained will certainly be used for a more reliable reconstruction of trepanation in significantly older periods, and even further, in its' beginnings. In this regard, this was very informative material for a detailed analysis in terms of medical history.

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REZIME
OSVRT NA PRUČAVANJA TREPANACIJA SA PODRUČJA SRBIJE

KLJUČNE REČI: TREPANATIONS, INSTRUMENTS, SKULLS, TECHNIQUES, SURGICAL INTERVENTION, MEDICAL PROCESS, HISTORICAL PERIODS.

Trepanacija lobanje predstavlja jedan od najstarijih hirurških zahvata koji su do sada poznati. Na teritoriji Srbije je konstatovana na svega nekoliko nalazišta. To su praistorijska nalazišta Kriva Reka i Mokrin. U rimskom periodu je na Viminacijumu zabeleženo nekoliko primeraka trepanacija. U srednjem veku se ova praksa nastavlja na srednjovekovnim nekropolama u Gamzigradu i manastiru Davidovica kod Prijepolja. Trepanacije iz tih perioda su bile sprovedene starijom tehnikom trepaniranja. Ipak, trepanacije su se u Srbiji zadržale do 20. veka pri čemu se koristila druga, nešto naprednija metoda. Instrumentarijum je samim tim brojao više instrumenata, a cilj ovog rada je bio da se u što većoj meri rekonstruiše sam proces trepanacija. S obzirom da su se one na području naše zemlje, Crne Gore i Albanije zadržale duže nego bilo gde u Evropi, svakako da je proučavanje ovog fenomena bilo značajno sa više aspekata. Odgovor na pitanje zašto je narodna medicina imala prednost u odnosu na naučnu medicinu treba tražiti u ukupnim društveno istorijskim okolnostima, organizaciji života i društvenoj prosvećenosti koje nisu bile povoljne.

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REBIRTH OF THE PAST – RECREATING VIMINACIUM IN 3D AND PRESENTING ROMAN CULTURAL HERITAGE

ABSTRACT

Recreating invisible or highly damaged archaeological remains in 3D technologies has become one of the best ways to bring the past to regular visitors. The Project ARCHEST was designed to improve the presentation of the site and to, consequently, attract new visitors. The main objectives were supporting the archaeology-related creative sectors to operate transnationally and to increase the knowledge of common Roman history through the most important archaeological sites. Additionally, there was an objective to increase the audience with an integrated approach and modern technology, transforming a non-audience into a new audience and changing the opinion that archaeology is something boring or too elitist. The results of the project have a huge appeal to ordinary audiences and support a better understanding and acceptance of Roman civilization through clear images which, at the same time, do not contradict the scientific concept but, rather, aim to support it.

KEYWORDS: 3D RECONSTRUCTION, VIRTUAL REALITY, VIMINACIUM, ARCHEST.

INTRODUCTION

A visualisation of the past is one of the most important results of archaeology[1]. To make something invisible visible could be viewed as one of the most important scientific "commandments". Archaeologist study and explore ancient remains thoroughly and systematically to understand and interpret sites and events that disappeared millennia ago. However, people who visit sites and museums are not scientists and are not able to understand remains in the same way as professionals. Rubble or rubbish for one is a valuable source of information for others and bridging the divide between science and tourism, or archaeologists and visitors, emerges as a serious problem. The imagination of visitors is often influenced by Hollywood or their own fairytale dreams that are not based on long term studies typical of professional.

This project was aimed at improving the presentation of the site and to attract new visitors using modern technologies that are still being developed in the presentation of the cultural heritage.

Therefore, in order to recreate a city destroyed 16 centuries ago we must use both. A professional approach with decades of excavations and research combined with elements of scientific

1 The article is the result of the projects: *Viminacium, Roman city and military camp – research of material and non- material culture of inhabitants by using the modern technologies of remote detection, geophysics, GIS, digitalization and 3D visualization (no 47018)*, funded by The Ministry of Education, Science and Technological Development of the Republic of Serbia. Project ARCHEST was co-financed by the European Union through the Creative Europe (2014-2020) Culture Sub-Programme Support for European Projects.

imagination should lead to a result that is more understandable for visitors.

METHODS AND RESULTS

Viminacium was among the first projects to involve Geophysical Surveys in their research process. Since 2002, systematic surveys of the legionary fortress, city and suburban zones have been systematically surveyed using multiple methods to get as clear an image as is possible of all areas. GPR (Ground Penetrating Radar), proton magnetometer, electro resistivity are the most commonly used methods of survey of Viminacium's territory. Arial and satellite imagery were introduced at the same time, together with the development of the GIS and archaeological databases. The total area covered by the multidisciplinary surveys exceeds 600 hectares, of which 150 hectares were thoroughly scanned in high detail by different survey methods.

This was the solid foundation for the creation of the large scale model that combined the results of the long term surveys of the city and fortress and, unfortunately only partial, excavations. Since the remains of Viminacium are not visible on the surface any more this was important for the development of tourism and the future Archaeological Park. The visualisation of the archaeological remains and their presentation to the public became the spearhead project that finally resulted in the quicker development of the site.

The dimensions of the scale model are 3.5 x 7.5 m and, with the use of light materials (card board and plywood), its creation enabled us to make it the focal point of a small mobile exhibition that is part of a both permanent and more than twenty temporary exhibitions that were presented in Europe and North and South America.

During excavations, all buildings are documented via high quality 3D modelling. These are achieved using 3D laser scanning, photogrammetry and aerial drone imaging. All these methods were combined where it was possible to do so.

Fig. 1 Viminacium castrum reconstructed in 3D

Fig. 2 Viminacium castrum reconstructed in 3D, *principia*.

During creation of the 3D model[2], special attention was paid to accuracy and details in order to ensure a high level of realism. The technique used is the so-called "polygonal modelling", a technology that allows you to get closer to the true model and avoid the effects produced by the rendering where the edges do not "live" and where realism is guaranteed by the textures used with the limits provided by their two-dimensional nature. All materials were created from measurements of the visible architectural remains available or 3D laser scans in order to achieve maximum realism. Other sources were also used: any existing 3D models, floor plans, elevations related to the excavation areas, indications from scientific referees, graphic reconstructions related to other similar buildings. Analogies of known structures are widely used during scientific research and model creation.

The technique of lighting adopted is image-based lighting (HDRI), an innovative technology that allows designers to recreate, in a very realistic way, the light shown in photos taken at the related site. The technology is the same as that used in movie productions. The software used was Autodesk 3D Studio MAX. Thanks to this solution, it was possible to give not only realism but also emotional content to the audience. This was achieved with the use of different weather conditions and with adaptations of the presented architectural type (sunset, sunrise, night, storm, etc.).

A hi-poly 3D model of all the elements was reconstructed and, naturally, this formed the backbone of the project. The model had the same processing level used for the final production of the static images, of the animation and the future 3D virtual environment.

On the basis of the model, static renderings of virtual reconstructions were exported. The rendering, generated on the basis of a mathematical model of the 3D scene, was delivered as raster images in high resolution both in JPG and TIFF formats (Figures 1-9).

2 3D model je izradila kinematografska i televizijska produkcija DEDALUS ER, Beograd. Zoran Marković PR

Fig. 3 Viminacium castrum reconstructed in 3D, military baths (*thermae*)

On the basis of model that was produced, a 3D animation walk through video was created. The video represents a short virtual tour of the reconstructed environment through one or more 3D camera(s). This video is in FULL HD resolution and is available on the project web sites[3].

All 3D materials can be uploaded from the website to a tablet. The first version helps to familiarise the user with the remains that can be visited in the Archaeological Park, while the second version that is uploaded to a tablet can be used during guided tours and educational workshops.

FUTURE VISION OF PRESENTATION AND USE OF THE DIGITAL MODEL

There is a plan to create a real-time 3D optimised version together with Real Time software for exploration, which will allow free virtual navigation in both external and internal digitally created environments.

The level of detail of the digital models for 3D navigation will be well balanced in order to ensure an optimal level of visual rendering as well as a smooth flowing interaction.

PROJECT ARCHEST – THE ROAD TO VISUALISING THE PAST IN 3D

The ARCHEST Project - the education of visitors to archaeological sites along the Roman road Aquileia-Emona-Sirmium-Viminacium - is a continuation of the T-PAS project, co-financed by the CULTURE PROGRAM 2007-2013, which brought together institutions from Italy, Slovenia and Serbia. Besides the Aquileia Foundation (Fondazione Aquileia), the leading partner, museum and galleries of the City of Ljubljana, the Institute for the Protection of Cultural Monuments, Sremska Mitrovica and the Institute of Archaeolo-

3 Viminacium castrum 3D video available at https://vimeo.com/user73152746
Viminacium amphitheatre 3D video available at https://vimeo.com/239510667

Fig. 4 Viminacium castrum reconstructed in 3D, *porta praetoria,* front view.

gy in Belgrade were included in the project.

The ARCHEST project was co-financed by the European Union through the Creative Europe (2014-2020) Culture Sub-Programme Support for European Projects. As with the previous project, this one was also coordinated by the Fondazione Aquileia. It was expected to last 24 months, starting on 1st September 2015 and concluding on 31st August 2017. However, since it actually started in January, the project was prolonged until 31st December 2017.

The new project relied on the results of the earlier one with which were realised: research on the Roman route connecting sites that are taking part in the project, a socio-economic analysis, tourist promotion of the route in schools, didactic laboratories for primary schools, a photo contest for younger pupils and three conferences at each site organised together with a touring exhibition on the route. This inheritance provided the impetus for identifying activities to be implemented in the new project with the vision to extend the cooperation in the future with other sites of the same character in Romania, Greece, Bulgaria and Turkey.

Even the title of the project, ARCHEST, with the meaning Archaeology Est, as a mixture of a contemporary English word and the Latin word that means "it is", expresses the tendency to emphasise the application of modern technologies in the reconstruction of the past.

Included in the project T-PAS were three ancient cities: *Aquileia*, *Emona* and *Viminacium*,[4] and in ARCHEST a fourth city joined them - *Sirmium*, today's Sremska Mitrovica. The joining was inevitable considering *Sirmium* was the administrative centre of the province of *Pannonia Inferior*, later *Pannonia Secunda* and, during the period of the Tetrarchy, one of four tetrarchic capitals. Ancient writers describe it as one of the six most beautiful and richest cities in Illyricum. Founded in the territory of the Sirmian and Amantin tribes, it very quickly acquired the status of a

4 The development and the importance of these cities were described in N. Mrđić, S. Golubović, T-PAS – Project on tourist promotion of the archaeological sites along the route Aquileia, Emona, Viminacium. Arheologija i prirodne nauke 8 (2012), Beograd 2013, 101-112.

Fig. 5 Viminacium castrum reconstructed in 3D, *porta praetoria*, side view.

colony, probably during the reign of Domitian and became *Colonia Flavia Sirmium*. The city developed and flourished in the period from the 1st to the 6th century AD, thanks to, among other things, the efficient road network. The most important road was the one connecting these four cities. Sirmium was known as an important Christian centre and by its many martyrs who suffered for their religious beliefs (Popović 1993; Tiussi, C., 2013: 65). Representatives of this fourth site were introduced at the first meeting in Aquileia and quickly integrated into the existing team so that the partnership cooperation flowed smoothly and to the general satisfaction of all concerned.

The main objective of the project was the presentation of four exceptionally important archaeological sites from the Roman period through the creation of 3D reconstructions and the introduction of augmented reality technology which would bring visitors closer to the look of the settlement in ancient times. In other words, real-world information is combined with computer content and displayed on a computer, tablet, or mobile phone screen. The four sites are characterised by a lack of easily understandable remains. They are not like Pompei or Rome where is easier to understand how a Roman town, temple or theatre was built. So, in order to increase and develop the audience and to attract new visitors, an essential task was to work on 3D reconstructions because this was the only way to let people understand how Aquileia, Emona, Sirmium and Viminacium looked in Roman times. It was assumed that the 3D reconstruction, as the main tool among other activities, would be the method to change the public's preconception that archaeology in an elitist and boring subject, understood only by specifically knowledgeable people.

At the very beginning of the project the target groups were identified and divided into three categories:

- Already existing audiences: general public, young people, families, disabled people, cultural professionals like archaeologists,

conservators, historians, photographers, 3D designers and communicators of culture;
- Associations of professionals (connected to the project), government bodies at both a national and local level and international organisations;
- Non-audience: most important target group with the aim to be transformed into audience.

Additionally, the intention of the ARCHEST project was to support the archaeological sector and creative sectors related to archaeology to act at an international level and to advance the knowledge of common Roman history through a relationship with the most important archaeological sites so that visitors can experience a unique approach and modern technology that will lead potential visitors to become actual visitors and change the view of archaeology as a science to complicated for the general public to understand.

The first activity of the project was the photographic reportage, realised in each of the 5 sites involved (*Aquileia*, Ljubljana / *Emona*, Šćitarjevo / *Andautonia*, Sremska Mitrovica / *Sirmium* and Stari Kostolac / *Viminacium*). From that action, fifty pictures were selected and used for the calendar, the Joint Historic Research on the Roman Road Aquileia-Emona-Viminacium, conducted by a multidisciplinary team led by one archaeologist from each of the countries that participated in the project, and the web site. The aim of this activity was to create a photo story with a unique design and approach capable of telling the story of the five sites in an emotional and evocative style. All the shots were made available to the partners with unlimited rights of use over time. This task was assigned to a professional photographer, with years of proven experience in the communication, promotion and enhancement of archaeological and cultural heritage. The photo campaign was realised in April of 2016 by the lead partner, given that in spring there is better light and shadows than in the other seasons of the year. During the project, photo exhibitions were organised along the route from Aquileia to *Viminacium* and visits to archaeolog-

Fig. 6 Viminacium castrum reconstructed in 3D, legionary baracks.

ical sites covered by 3D reconstruction in accordance with the audience development strategy.

In addition to the experts from the institutions, the project involved a large number of researchers and experts on specific issues related to the project. The general public were also involved by actively participating in the project through their acquaintance with the cultural heritage of this part of Europe. At the same time, the visualisation results were used to promote the ARCHEST project during various planned and unplanned events. Fairs were planned - the first one was the Tourism fair in Belgrade in late February 2017, and then one unplanned but excellent opportunity was the celebration of the 70th anniversary of the Archaeological Institute, in June 2017. It was used to present the first results of the 3D visualisation of the archaeological sites and the presentation of the ARCHEST project to a wider audience in front of the Serbian Academy of Sciences and Arts (SANU), in the most visited part of the heart of old Belgrade, Knez Mihailova street.

Shortly before this big celebration, in May 2017, ARCHEOBUS was organised, an educational tour for journalists and archaeologists along the *Aquileia - Emona - Andautonia - Sirmium - Viminacium* route. Each partner sent five participants, archaeologists and journalists working for tourist and archaeological journals. It was an ideal opportunity for them to meet with colleagues from other countries (especially for the archaeologists) and to discuss the archaeology and tourist potential of the sites involved in the project. The six-day journey began in Aquileia, from where the participants travelled to Ljubljana / *Emona*, Šćitarjevo / *Andautonia*, Sremska Mitrovica / *Sirmium* and Kostolac and *Viminacium*. After the visit to Kostolac, the bus returned to *Aquileia* leaving the participants in their cities. In this way, the participants had more information and were able to easily present sites in order to attract visitors. The final goal, the growth of cultural tourism at the five sites, is expected in the next months after the very positive articles that appeared in several daily and

Fig. 7 Viminacium amphitheatre reconstructed in 3D.

Fig. 8 Viminacium city baths (*thermae*) reconstructed in 3D.

weekly newspapers and their online editions, and as short reportages on state TV channels.

One of the tasks of the project was the development of guided tours for audience development. The partners in the project were fully aware that archaeology has always been considered little bit difficult, boring and not easily accessible to a wide audience. The probable reason is because archaeologists and conservators often use technical terms with many rare words, Latin words and other uncommon words. This also happens in the communication and dissemination of culture e.g. the terminology used in museums for captions. So, the archaeologists together with the communication / audience development managers involved in ARCHEST decided to try to make archaeology more accessible to a wider audience. In order to attract new audiences, maintain existing audience and change the attitude that the general public has towards archaeology, guided tours were organised by the partners in their own territories. The main challenge was to transform the non audience (resistors and rejecters) into a new audience. The methodological tools were jointly developed by the partners and adapted according to specific contexts. Multidisciplinary teams composed of archaeologists, communication experts and guides were established in order to provide a holistic approach. Specific attention was paid to young people (children, students), to disabled people (e.g. blind people, mentally ill people) and to other disadvantaged groups. Tourist guides too often work using a standard style of language, but with ARCHEST we tried to adapt the message and the experience according to the target group involved by selecting the guides on the basis of the offer provided. The guides used modern technologies such as tablets onto which the 3D reconstructions had been uploaded. This allowed the audience to understand how the sites looked in Roman times and to have different emotions and experiences while visiting an archaeological site.

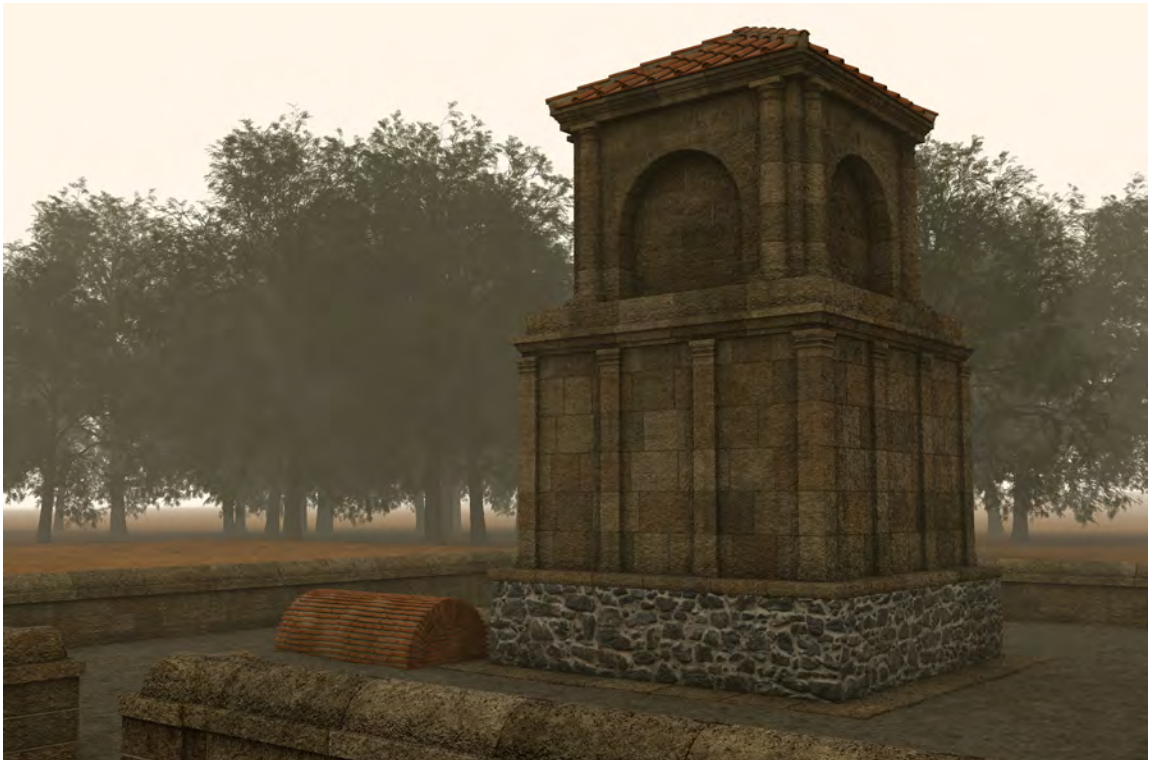

Fig. 9 Viminacium, 3rd century mausoleum complex at the east part of the cemetery reconstructed in 3D.

CONCLUSION

The rebuilding of Viminacium in 3D and its use in presentations, guided tours and public events has already proved to be of enormous value.

The specific intentions of ARCHEST and the 3D modelling were to promote knowledge and the use of information and communication technologies applied to cultural heritage; to instruct those who make decisions and have a political impact on the importance of information and communication technologies for the enrichment of cultural heritage; to promote the internationalisation of workers in culture who are active in archaeology (archaeologists, photographers, 3D designers, graphic designers, promoters of science); to promote visitor education by paying particular attention to young people and people with disabilities; to strengthen a network of archaeological sites linking Italy with the Black Sea through Slovenia, Croatia, Serbia and Romania, and, very importantly, to promote knowledge of archaeological sites that are involved in a tourism project. In that sense, it was extremely important to present the project through 3D reconstructions and virtual reality, first during the celebration of the 70th anniversary of the Institute of Archaeology, then at the Tourism Fair in Novi Sad where the presentation was accompanied by a dramatic musical performance, and finally at the Festival of Science in Belgrade where the presentation of Project Viminacium was the most visited.

The mutual activities of the partners included promotions at national fairs. For that purpose each partner had access to all the materials, including the 3D models, in order to promote the results at both national and international fairs. Fondazione Aquileia distributed them in the Borsa Mediterranea del Turismo Archeologico, held in Paestum from 26th to 29th of October 2017. The Institute of Archaeology in Belgrade participated with a stand at the International Fair of Tourism, held in Belgrade in February 2017, which proved to be a great opportunity to promote the ARCHEST proj-

ect's objectives and results by distributing flyers and merchandising material and informing visitors of the financed action's progress.

Also, the so-called archaeological days were organised with a series of lectures and educational and pedagogical workshops for pupils of higher classes of elementary and secondary schools, with the aim of bringing them closer to archaeology and history in an interesting way. Intensive work with journalists and the realisation of ARCHEOBUS resulted in real successes considering the publicity achieved and the ARCHEO OPEN DAYS in Sirmium, in August 2017 and in Viminacium, in December 2017.

After the finalisation of the work on the 3D reconstruction of the amphitheatre, legionary fortress and mausoleum from the eastern cemetery with developers and the static rendering and 3D video for tablets, we achieved 3D reconstructions based on the scientific results which allow us to help people understand and imagine how these sites looked 2,000 years ago.

We organised guided tours for different target groups (children, disabled people, an educational tour for journalists and archaeologist, and open days with schools and professionals) to involve new audiences, and also several workshops with high school students.

However, the greatest achievement is that, for the first time, the 3D reconstruction of four sites was made based on the results of scientific research obtained using cutting edge methods, excavations and geophysical surveys. Ultimately, the results have a huge appeal to ordinary audiences and support a better understanding and acceptance of Roman civilization through clear images which, at the same time, do not contradict the scientific concept but, rather, aim to support it.

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REZIME
RAĐANJE PROŠLOSTI – PODIZANJE VIMINACIJUMA U 3D I PREZENTACIJA KULTURNOG NASLEĐA

KLJUČNE REČI: 3D REKONSTRUKCIJE, VIRTUELNA REALNOST, VIMINACIUM, ARCHEST

Vizualizacija prošlosti je sigurno najsloženiji zadatak arheologije. Jedna je od najvažnijih naučnih zapovesti je da nešto nevidljivo, maglovito i tajanstveno, osvetli i učini vidljivim i bliskim. Arheolog proučava i istražuje drevne ostatke temeljno i sistematično kako bi mogao da razume i protumači mesta i događaje od pre nekoliko hiljada godina, ali ljudi koji posećuju arheološke lokalitete i muzeje nisu naučnici i nisu obrazovani da razumeju te ostatke. Otpatci ili smeće za neke, neprocenjivi su izvori saznanja za druge, a premošćivanje nauke i turizma ili arheologa i posetioca javlja se kao ozbiljan problem. Na imaginaciju posetilaca često utiču holivudski filmovi ili sopstvene bajkovite zamisli koje nisu zasnovane na dugotrajnim naučnim istraživanjima, tako da ustvari imaju prilično iskrivljenu sliku. Projekat ARCHEST je baš zbog

toga imao za cilj ispravljanje, ali i poboljšanje prezentacije arheoloških lokaliteta i privlačenje novih posetilaca korišćenjem savremene tehnologije.

Da bi se "obnovio" grad razrušen pre 16 vekova bilo je neophodno koristiti profesionalni pristup, odnosno naučna saznanja stečena nakon decenija istraživanja u kombinaciji sa elementima naučne imaginacije koja bi dovela do rezultata prihvatljivog i razumljivog prosečnom posetiocu.

Viminacijuma je bio jedan od prvih projekata koji je uveo geofizička istraživanja u. Od 2002. godine za sistematsko istraživanje legijskog utvrđenja, gradskih i prigradskih primenjene su višestruke metode kako bi se dobila jasna slika arheoloških ostataka. Prilikom istraživanja Viminacijuma korišćeni su georadar, protonski magnetometar, merena elektro-otpornost tla, avio i satelitski snimci, a uvedeni su istovremeno sa razvojem GIS-a i arheološke baze podataka. Ukupna površina obuhvaćena multidisciplinarnim istraživanjem prelazi 600 hektara, od čega je 150 hektara temeljito skenirano i detaljno razrađenim metodama istraživanja.

Ovo je bila čvrsta osnova za stvaranje modela grada koji je kombinovao rezultate dugoročnih istraživanja gradova i tvrđava i, nažalost, samo delimična iskopavanja. Pošto ostanak Viminacijuma više nije vidljiv na površini, ovo je bilo važno za razvoj turizma i budućeg arheološkog parka. Vizuelizacija arheoloških ostataka i njihova prezentacija javnosti postala je glavni projekat koji je konačno rezultirao brzim razvojem.

Nakon završetka rada na 3D rekonstrukciji amfiteatra, legijskog utvrđenja, mauzoleja i gradskih termi sa programerima i statičkim renderingom, sa 3D video zapisima za tablete, doščo smo do 3D rekonstrukcija zasnovanih na naučnim rezultatima kako bi ljudi razumeli i zamislili kako su ove građevine izgledale pre 2000 godina.

Projekat ARCHEST je uspeo da kroz izradu 3D rekonstrukcija i uz uvođenje tehnologija proširene stvarnosti (augmented reality) koje posetiocima mogu da dočaraju izgled naselja u antičko vreme, predstavi četiri izuzetno važna arheološka nalazišta iz rimskog perioda (Akvileja, Emona, Sirmijum i Viminacijum).

Svrha projekta „ARCHEST-a" je da podrži arheološki sektor i kreativne sektore povezane sa arheologijom da deluju na lokalnom i međunarodnom nivou i unaprede poznavanje zajedničke rimske istorije kroz upoznavanje sa najvažnijim arheološkim nalazištima. Posetioca je potrebno privući jedinstvenim pristupom i savremenom tehnologijom čime će potencijalno postati učesnici u rekonstruisanoj stvarnosti i promeniti pristup arheologiji kao nečemu što je dosadno ili previše „elitističko".

Najvećim dostignućem projekta smatra se to što su, po prvi put, 3D rekonstrukcije nastale analizom savremenih geofizičkih i arheoloških istraživanja. Krajnji rezultat je ispao toliko privlačan za prosećnu publiku da podstiče mnogo bolje razumevanje i prihvatanje znanja o rimskoj civilizaciji putem "živih" slika, a istovremeno nije u suprotnosti sa naučnim konceptom, već ga podržava.

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FEDERATED IDENTITY CONCEPT BETWEEN THE INSTITUTE OF ARCHAEOLOGY AND VIMINACIUM LOCALITIES

ABSTRACT

In this paper, the concept of a federated identity between the Institute of Archaeology and archaeological sites in Serbia is shown, based on the specific case Viminacium. In this manner, once the processing of a user's identification is performed by one of the identities, the need is eliminated to perform the same procedure for each site, since one can rely on the confidence that the primary subject is capable of providing a user's identity that can be trusted. As a result of such an approach, any user identified by the identity provider "Institute of Archaeology" shall automatically be recognised by service providers at any archaeological site in Serbia, in this particular case at the site Viminacium. In such a way, after a successful employee identification by the identity provider "Institute of Archaeology", all the Institute's employees would posses access to services (for example digital data bases) at the site of Viminacium.

KEYWORDS: FEDERATED IDENTITY, SECURE IDENTIFICATION, IDENTITY PROVIDER, SERVICE PROVIDER, SINGLE SIGN-ON.

The concept of a federated identity is based in law, in cases when there are business subjects establishing a legal relationship.[1] This is further upgraded with an informatics aspect, which gives extra security with the help of an informatics infrastructure. Once the process of user identification is conducted by one entity, there is no need for the second entity to perform the same procedure, since it can rely on the primary subject, being sure that it is capable of providing a user identity that can be trusted. Within such a relationship, two sides can be distinguished: the first one is the identity provider, while the other one is the service provider, offering a business service, but fully relying on the identity provider, since it rep-

1 The article is the result of the project: *Viminacium, Roman city and military camp – research of material and non- material culture of inhabitants by using the modern technologies of remote detection, geophysics, GIS, digitalization and 3D visualization (no 47018)*, funded by The Ministry of Education, Science and Technological Development of the Republic of Serbia.

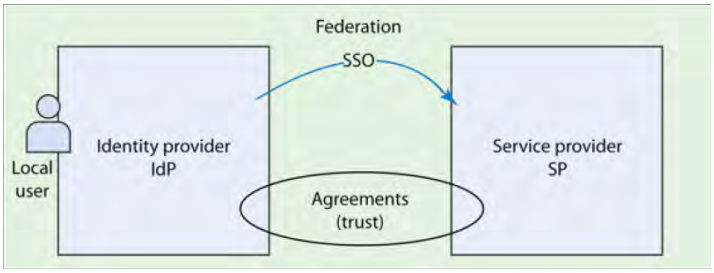


Fig. 1 The concept of federated identity
Source: https://www.ibm.com/developerworks/library/se-jitp/

resents the base for recognising a user's identity. In other words, IdP represents a business entity in charge of user registration and authentication that issues a certificate of established identity to other business entities. On the other hand, SP represents a business entity offering services to users (eg. access to business applications), but it does not establish their identity, since, as already mentioned, it relies on confirmations issued by IdP. ISAM 9[2] represents a concept of this kind that contains several functionalities. One of the functionalities of ISAM 9 is a single sign-on functionality (Fig. 1), intended to assist users that do not possess this benefit. Once they have been introduced to their basic information system of the business entity within which they operate, they are also capable of transparently accessing business system of the service provider without entering their user name or password. In other words, it is sufficient to know only the user name and password of their business system.

Besides the concept of "single sign-on", there is also the concept called "identity provisioning" that runs the life cycles of users' accounts on different systems (while employing, changing jobs etc…). It functions within the basic home organisation when, for example, dealing with employees: When new employees are registered in an organisation by making working contracts, they also need to receive user identities, actually accounts in different systems, either business applications, electronic mail system, data base access if it is an information environment, and so on. This is of special importance when users receive new positions within an organisation that require different access levels (Andronache and Nisipasiu 2011). This concept can be widened when there is a business identity one wants to cooperate with and, in such a case, it is referred to as federated identity provisioning. In such a case, the other business identity also needs to receive information about the user, enabling it to create user accounts for accessing its business applications. One here speaks about the provisioning of running user accounts to different systems, systems owned by a business partner, actually a service provider. Within the frames of standardised mechanisms, a situation can be recognised when such information is spread either via email or paper document or in more developed information structures, when users' identities are advertised to the service provider with ftp or some other mechanism. Provisioning can be more advanced, with IBM defined standards such as the so-called WS-Provisioning. Here, by entering a web service on a provider's page, one can securely create the user's identity, actually running such an account on its own page (Guruprasad and Rajesh 2012).

An even more upgraded mechanism is called "just-in-time provisioning". A user's account is here created by the SP at the moment of user's first access to this system (on the fly) (Ping Identity 2016). In other words, with this mechanism it is not necessary to transfer the entire user population from the identity provider to the environment of the service provider. The reason for this might be that not all of the users have a need to access such services placed on the service provider's page.

2 http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=an&subtype=ca&appname=gpateam&supplier=897&letternum=ENUS215-191

Provisioning access, actually creating the user accounts can occur only after the first time a user addresses such a service on the service provider's page. Information about the user's identity is then embedded and provisioned as such on the service provider's page and can be used in two different ways. The received information can be used either only for the needs of executing business transactions or it can be used to create a user's identity in a local service provider's repository, further to be used to work on applications on the service provider's page. The method of provisioning a user's attributes (name, surname, email address, personal number and tax number) from the Idp provider to the service provider represents SAML as a part of the "single sign-on" mechanism. The test environment itself is based in the application of such a standard, supported by Oracle, IBM and Microsoft.

Although it is an old standard, accepted in 2005, it was implemented in different producers of application servers. This standard offers a possibility for inter-communication with different environments. The SAML standard defines the format of a message for exchanging confirmations of users' identities, and these are XML messages. These XML messages represent a valid standard for information exchange between different systems. Besides, SAML also defines protocols in the sense of mechanisms for message exchange aimed at specific functionality. For example, it defines protocols for sending users' authentication demands, it defines requirements for users' "log-ins" on "single sign-on" or "log-offs" on several systems and defines information exchange according to their value or their reference. The greatest benefit and specificity of this standard is its bindings, a mechanism for message exchange according to which the messages are transferred from one system to the other. Three initial mechanisms are the most interesting (Novičić and Mitić 2015) (IBM ISAM9 2015**)**:

- HTTP redirect (Browser redirect – no direct communication between IdP and SP)
- HTTP POST (Browser POST)
- HTTP Artifact (Browser artifact – transfers references, while SOAP transfers the real message)
- SOAP (Simple Object Access Protocol – direct communication between IdP and SP)

Within the first three mechanisms, the browser represents a medium for communicating between business partners, identity providers and service providers. That means that there is no need for any communication net between the information systems of identity providers and service providers and it is enough that the browser, actually the user's client, possesses connectivity to the identity providers and service providers. Such a mechanism can also be applied in the Internet environment, if it is the method of accessing identity providers and service providers and can be applied in huge infrastructure intranets of an opened or closed type. These three mechanisms rely on standard http protocols.

The first mechanism, the so-called browser redirect (HTTP redirect) possesses no communication between the IdP and SP. There is a possibility to establish communication when, within the URL itself, actually in the URL arguments, XML zipped information is forwarded encoded from base64. The only limitation is that the URL itself is limited, so a rather small quantity of information can be transferred.

The second mechanism, the so-called HTTP POST (Browser POST) is applied for sending information through a screen form, actually an html form, that is usually hidden within the http response by the service provider. The identity provider requires the user's authentication for the needs of "single sign-on". Such information is hidden within the http format form, after which javascript is activated by the windowslogon trigger and the form is submitted on the identity provider's page. As a response, the identity provider uses the same mechanism to return the response. Those are the XML format documents, carrying information about an authenticated user identity or some of its attributes useful to the service provider.

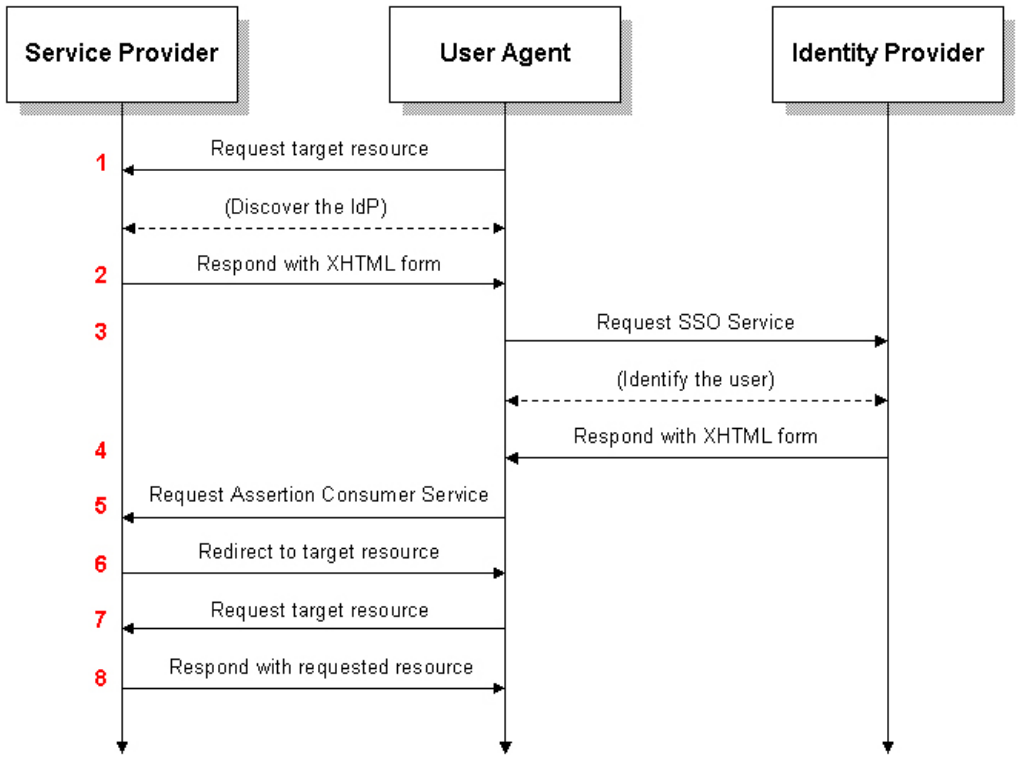


Fig. 2 Use of SAML in a web browser
Source: https://en.wikipedia.org/wiki/Security_Assertion_Markup_Language

The third mechanism, HTTP artifact information transfer, is done through references, while SOAP transfers the actual message. The artifact does not need to be entered into the http communication between browsers, identity providers and service providers in cases when there is no trust by the browser. In such cases, only the reference, actually an identifier of the service message, is transferred from one side to the other, while the systems communicate with each other via SOAP, basically communicating directly with the web services. The actual information is transferred through an alternative channel from one side to the other. It is a condition for the fourth mechanism to connect two systems through web services.

Within ISAM 9 there are profiles that include the most common applications of format standards, protocols and for binding (IBM ISAM9 2015**)**. Such application profiles in a tested environment are presented through a web browser with a web browser single sign-on implementation. In the backend, the ISAM9 infrastructure is performed. What does a standard profile look like and how do messages get exchanged? For example, when it is a web browser with a single sign-on profile and an http post mechanism, in our case, the user agent represents a browser attempting to address the service provider and demand access to a business application (see Fig.2).

This is the general case that is optional, since there can be several identity providers, so in that case it is necessary to decide which identity provider should receive the demand for user authentication. In a test environment, in which there is just a single service provider and a single identity provider, the system will respond with a hidden html form, not visible on the browser. Further on, it will be submitted and the XML formatted information, the authentication demand by the service provider, with the help of web browser user agent, will be forwarded as an http identity provider demand. There are two variants. Either the user has already been logged onto his system at his identity provider in his original environment, so there is

no need to perform authentication, or user authentication has not been performed yet and, in such a case, it would be necessary to make a screen form for the user's name and password in order to access a session. Only after this and based on the verified user's identity, a response confirming the identity will be issued to the browser in a XML formatted token, made using SAML 2 protocol. The web browser later forwards a response obtained in such a way (since it is now a communication medium between the identity provider and service provider) to the service provider's page and submission of this hidden form is automatically performed on the screen. If this XML is validated in the sense of a digital signature and in the sense of its structure and content, a session will be established on the service provider's system. The browser will be redirected to the application so that it can be used on the screen. Session sustainability is made through cookies.

There are three types of confirmations that can be presented within SAML 2 standards. The first one is when the user's authentication has been performed and in such a case, it is important that tokens contain the recognised user. When it comes to the method by which the user was authenticated, it should be noticed that certain systems can demand strong authentication forms, i.e. sometimes the user's name and password are not sufficient, but a smart card token or biometric authentication with fingerprint is also required. In other words, information is important as the method of authenticating users, but for some special purposes an extra step might be required in order to strengthen authentication in the sense of multi-factor authentication. The third, very important factor is the time at which authentication was performed, since it is necessary for these two systems to be chronologically synchronised, i.e. use the same time servers in order to keep the information about an authenticated user safe from misuse.

Apart from the information that the user has been authenticated, basically carrying information about the subject, actually the user's ID, it is also possible to provision the user's attributes, like name, surname or e-mail address, by placing them in the same SAML package and forwarding them to the service provider's page for the needs of performing applicative logic on another page. When it comes to working rights, if there are two or more applications on the service provider's page, it is possible to secure access to one, but not to all the applications for an individual user using the identity provider. Such an information exchange about whether the user is authorised to start an application can also be solved using the SAML protocol, after the identity provider and service provider have communicated with each other about issuing confirmation regarding permission (allowed, not allowed). The identity provider is the one that allows or does not allow the start o certain functions on the service provider's page for a specific user. This is usually not applied, since it belongs to specific applications in a business environment.

TOKEN PROCESSING OF SERVICE PROVIDER ISSUED BY IDENTITY PROVIDER

When, during to front end application access (the end user does not even have to know the exact link from the application to service provider, since it is rather complex), the user reaches the identity provider, it is obliged to issue confirmation of the user's identity. Confirmation in the form of a SAML response reaches the browser via XML and is then forwarded to the service provider (see Fig. 3) (IBM knowledge centre 2016).

As can be noticed in Fig. 3, within the infrastructure of the service provider there is a separated infrastructural part designed to perform the verification of digital signatures from XML, XML structures and to parse it. After it is verified, i.e. when the identity confirmation is adequate, the end result will be the formation of a session on the service provider's page. Such a session is usually

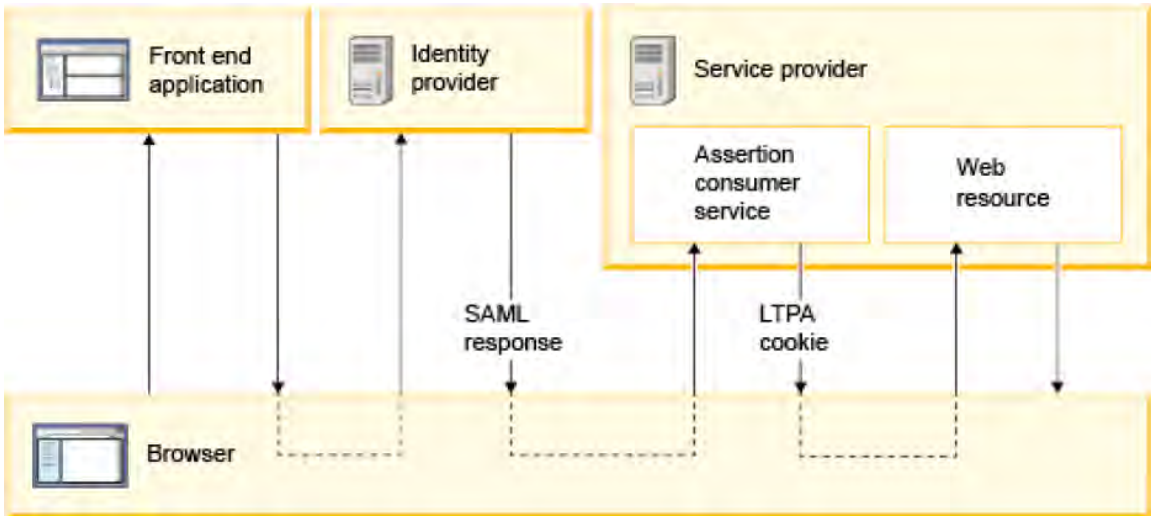


Fig. 3 Procedure of SAML SSO
Source:http://www.ibm.com/support/knowledgecenter/SSAW57_8.5.5/com.ibm.websphere.nd.doc/ae/cwbs_samlssosummary.html

implemented via cookies. In the IBM world, the LTPA (Lightweight Third-Party Authentication) cookie is a standard for maintaining sessions. The above mentioned infrastructure ensures that a user, once authenticated, can keep working with the web application on one (or possibly several) of the supported application servers owing to the fact that each of them trusts the LTPA cookie issued by the infrastructure on the service provider's page. It should also be mentioned that if a trust relationship is established between one or several applications on the service provider's page and the infrastructure, there is no need to change the applications themselves. Once a trust relationship is established within the infrastructure of the service provider, the applications follow the information about the authenticated user and his attributes and can keep working with him without the need to change anything in the application itself regarding login, authentication or authorisation. This represents the method of describing the content of this concept, the processing of a single sign-on message on the service provider's page.

JUST-IN-TIME PROVISIONING – PROCESSING SAML 2.0 TOKENS ON THE SERVICE PROVIDER'S PAGE

There are activities that need to be implemented either separately on each application server or delegated to the infrastructure in which one will be working for the needs of several backend applications on the service provider's page. These activities include: validation of a digital signature and the structure of SAML 2.0 tokens, parsing users' attributes, creation or alteration of local user accounts, establishing a local session and allowing access to a local business application according to the rules given to the user accounts.

An illustrated description of this procedure can be presented through the processes of the mentioned activities. In the first place there is a validation of a digital signature and the structure of the SAML 2.0 token, as well as parsing the user's attributes. When it comes to creating or changing a local user's account, these activities are performed to create a local session. Actually, if there is no user identity, it is possible to widen this process on the service provider's page by creating an identity within the user's register on the service provider's

page. This means that an operation of creating a user identity is performed and if it is recognised that the user's identity already exists, an update can be executed. In a life cycle, updating the user's identity must be foreseen, since users change their work places and gain more or less rights. This is why it is necessary to consider both the creation of the user's identity on the service provider's page and its changes within a life cycle. If this creation process is successful, the next activity is the establishment of a local session by the infrastructure, while the application itself can enable an undisturbed operation if the user possesses adequate membership to groups in the local register, the user's ascribed roles, which enable the starting of certain functions in this application on the service provider's page. It should also be mentioned that there are variations of the working procedure, depending on the individual corporation preferences.

ENABLING THE OPERATION OF THE SP APPLICATION ONLY ON FORWARDED USER IDENTITIES, WITHOUT SAVING THEM IN THE LOCAL REGISTER

In this case, for initiating an application on the service provider's page, it is not necessary to create the user's identity in a local repository on the service provider's page. In other words, according to the forwarded information containing the user's identity, name, surname, personal number and e-mail address, it is possible to make it a part of the token that reached the service provider from the identity provider. Based on this, all transactions can be performed in a business application. After the user has logged out, it is not necessary for all the information to remain within the register of the service provider's page. It is enough that in the transaction log of the business application details are contained that are related to the transaction and the user, which is traceable enough on the service provider's page. Connected to this, it is not necessary to retain the user's repository on the service provider's page in which the user's credentials would be noted, since it is sufficient to rely on what already exists within the infrastructure of the identity provider. This variation can help save privacy. This means that for performing a specific transaction, a SAML session must be established. Then, via SAML, provisioning of all the necessary user attributes is performed by the service provider for that specific transaction. After a user is logged out, all that was in the memory for this specific session object is deleted from the cache. The only trace that it was ever there remains in the transaction logs. This can be of importance for privacy protection on certain business systems.

TAKING OVER USER ATTRIBUTES FORWARDED THROUGH A SAML 2.0 TOKEN WITH AN INTERACTIVE SUPPLEMENT THROUGH A SCREEN FORM BEFORE REGISTERING A NEW USER

In cases when a business case requires the creation of a user's identity on the service provider's page, but where there is an insufficient number of attributes on the identity provider's page, it is possible for the existing attributes to be moved to the service provider's page and later on request to addition them through a screen form. For example, if there is no address on the identity provider's page, but on the provider's side there exists a service for sending email via an application, it is necessary to add this information for registering a user by e.g. adding the email address (all the information will be written in the user's registry on the service provider's page).

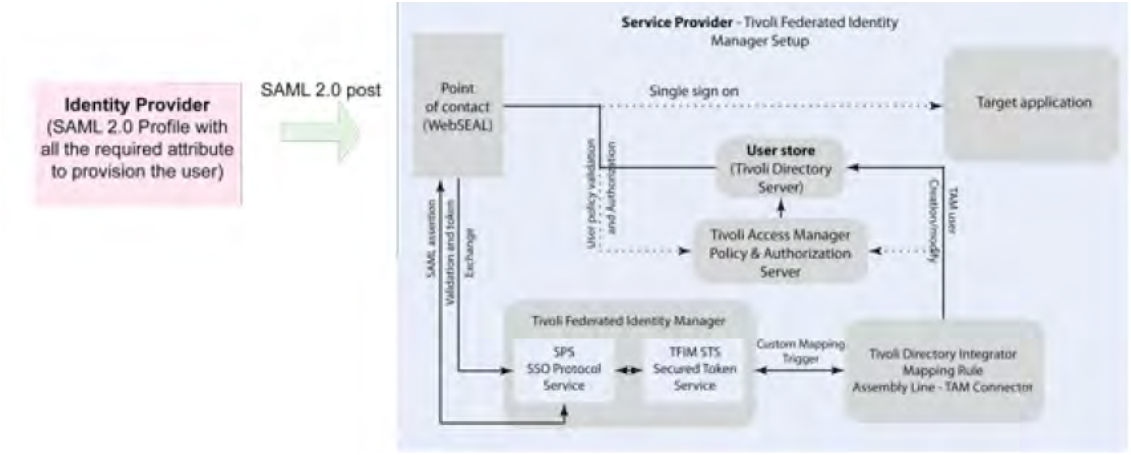


Fig. 4 Components of just-in time provisioning
Source: https://www.ibm.com/developerworks/library/se-jitp/

JUST-IN-TIME PROVISIONING SYSTEM AND ITS COMPONENTS ON THE SERVICE PROVIDER'S PAGE

It is necessary to parse the SAML token on the service provider's page, which carries the certificate of user's identity. Figure 4 shows that the target application can fully rely on the ISAM9 infrastructure regarding the validation of digital signatures, parsing, entering into local users' registry (LDAP or some other structure of users' database). The only thing users' applications need to do is trust the local ISAM9 infrastructure that the authenticated user is really the one that he claims to be over the token. The second way of provisioning attributes is to add attributes into the http demand, originally reaching the web browser, that were previously not there and then parse the SAML 2.0 token content. In such a way, the name, surname and other attributes are entered into the http heading and provisioned all the way to the application. If there is a need, it can be defined for the name and surname to appear in the page header, but it is also possible to use an e-mail address to perform automatic sending or to perform automatic SMS texting using a cell-phone number. Through an http request, such information can simply be entered into the http header, while with a simple code the application can extract it from the parser.

WEB SSO TESTING ENVIRONMENT

A presumption in the testing environment is that there are two fully independent entities: the Institute of Archaeology and the archaeological site Viminacium. Each entity possesses its own users' repository based on LDAP. Furthermore, each identity possesses its own security domain in which access permission is defined. Created users independently possess their passwords and are completely different in these two security domains, but they also possess different net domains. The presumed testing internet environment includes two domains, one of them being ai.ac.rs, while the other one is viminacium.rs. In order to allow the federated concept to be connected in both LDAPs, one must suppose that the same user named "User" is created, but with different attributes, not just according to their value, but also according to their description. For example, on one of the LDAPs, the mail attribute is created, while on the other LDAP, the telephone number attribute is created. Different rights are also defined, since different security domains are assumed. In one of them the user "User" will be a member of some groups, while on the other security domain, it will belong to other groups, since security domains are differently administrated on the identity provider and on the service provider. What is needed to be

shown in the testing environment is a web based single sign-on, on which the logged user from the identity provider's domain will transparently be logged onto the service provider's page without entering the password again, while another benefit can be seen in provisioning the missing attributes through the SAML2 token. Basically, in a different environment, the missing attributes will be provisioned and exposed in an application that is performed on the service provider's page. In other words, provisioning of the user's attributes is performed through a SAML 2.0 token from the identity provider's domain to the business application in a service provider's environment.

In order to secure this, the existence of business applications is also assumed in each environment that can show the user's data. For example:

Arheološki institut (http://miapp1.ai.ac.rs:8080/) application server

Viminacijum (http://sepapp1.viminacium.rs:8080/) application server

In this federated concept, applications are not approached directly, but over a reverse proxy (WebSEAL). The method of setting up the reverse proxy can be seen in the document *SafeNet Authentication Service: Integration Guide* (Gemalto 2016). This reverse proxy has the task to represent itself as the specific server that is used to perform the application. It receives an http request from the web browser and then initiates a new http request to the backend application. Basically, it tricks the backend application by representing itself as a direct client, while it also tricks the client by presenting itself as an application addressing the client. Owing to the fact that it now represents the interception point in the http communication between the client and the application, it can include additional functionalities, i.e. possibilities such as the user's authentication. That means that it alone will perform the user's authentication and not the backend application. It can also authorise users, for example a user can possess the right to access one, but not the other application. It is presumed that the firewall denies access to backend applications, so the reverse proxy represents the meeting point of the user and all the backend applications. This means that only through a firewall can one access the http request by the reverse proxy. Owing to this, it plays the role of both user authenticator and user authoriser. If one considers an Internet environment, it acts as a web application firewall. It takes over the protection of all of the backend applications in the event of malicious attacks. The advantage of this mechanism is that the backend applications do not need to possess implemented attack (threat) protection, since it is all delegated on a single web proxy that has integrated protection mechanisms. In the IBM infrastructure, it is a part of ISAM9 and this component is named WebSEAL. In this testing model, it is designed to initiate and end all the mentioned functions of verifying digital signatures, parsing etc. WebSEAL can parse a SAML 2 token and turn the information from it into the elements of an http heading. We will presume that we have created two applications, one on the identity provider's page in the *Institute of Archaeology (https://miapp1.ai.ac.rs:/app1)* and the other on the service provider's page at *Viminacium (https://sepseal.viminacium.rs/app2/).* Since each entity possesses configured access to the application through the reverse proxy (WebSEAL) that can read users' attributes from LDAP and a parsed SAML 2.0 token and forward them to the application through an HTTP heading, it means that the data received in the http heading is shown on screen. According to this, a processed SAML token entered into the http heading reaches the business application and will show it on screen. What should be mentioned is access via a WebSEAL request for the URL to be accessed will be targeted exactly as WebSEAL https://miapp1.ai.ac.rs:/app1 (in terminology, /app1 is called a junction). The WebSEAL junction represents a TCP/IP connection between the frontend WebSEAL server and backend server (IBM Tivoli Software 2016). The junction hides information about each http request that came to WebSEAL and is intend-

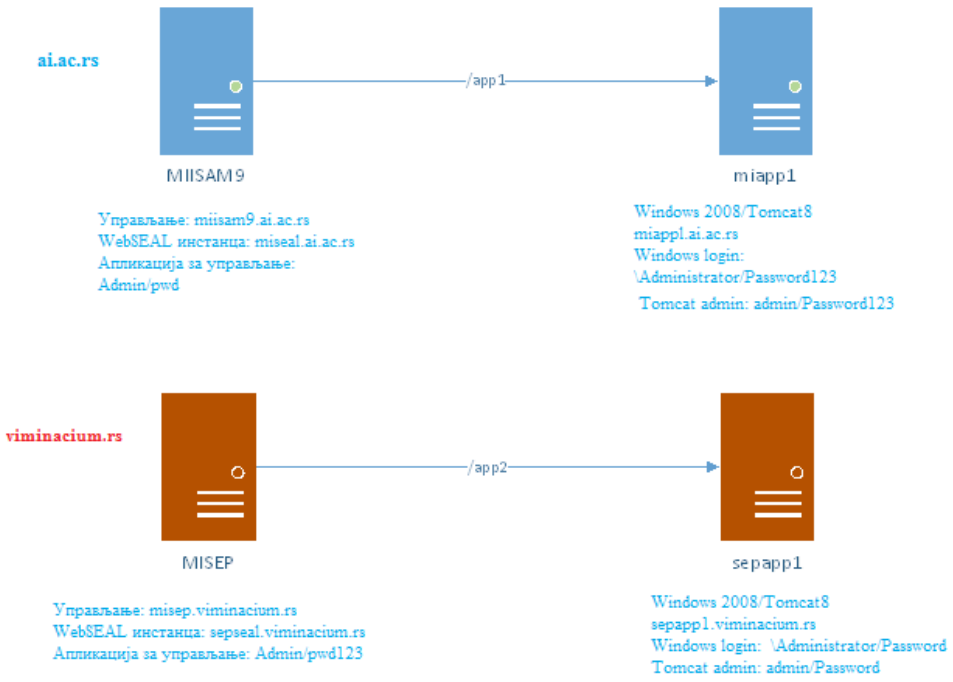


Fig. 5 Logical scheme of identity provider's and service provider's application servers

ed for the app1 application. Actually, it shall be initiated as URL, in this case targeting the appl application by WebSEAL. In another case, on the service provider's page, this junction, actually the logical name of the second application, app2, should internally indicate that each received http request will be turned into a new http request, targeting the backend server. Since WebSEAL is the "man-in-the-middle", it needs to receive information containing the name of the application server to which access is required and this is achieved with a junction, actually the logical name of the background server, e.g. /app1, /app2.

Figure 5[3] shows the logical scheme. Application servers of identity providers are shown in blue, while application servers of service providers are shown in orange (Novičić and Mitić 2015) :

As figure 5 indicates, there are no connections between these applications, actually this infrastructure, since all the communication between them goes over a web browser that can alternately access one server or the other, is the entry point of WebSEAL. This testing environment is made when, on the IdP page and on the service provider's page, adequate GUI ISAM9 wizards are initiated. They represent a series of screen forms in which specific configuration information needs to be entered. These steps define the partner relationship between the identity provider and the service provider. In addition, if attributes need to be provisioned, mapping of the user's attributes needs to be performed within the existing LDAP scheme of the identity provider to the SAML 2.0 attributes that represent the mechanism of their transfer to the service provider. In addition, digital trust is established by entering digital certificates on both sides, issued by the common CA bodies into trust root stores, in order to perform SAML 2 token digital signature validation that they exchanged. It should also be mentioned that the link connecting the identity provider with the service provider is rather complex, but it can be seen basically in the following scheme:

3 Dragan Novičić, Mita Mitić, IBM Security Access Manager 9.0 (ISAM9) - I*dentity Federation scenariji* MI SANU, presentation, SBS, December 2015.

https://miseal.ai.ac.rs/isam/sps/test/saml20/logininitial?RequestBinding=HTTPPost&NameIdFormat=Email&AllowCreate=true&PartnerId=https://sepseal.viminacium.rs/isam/sps/test/saml20&Target=https://sepseal.viminacium.rs/app2

In order to illustrate this, the scheme shows that within the link in a business environment of the identity provider, it targets the server on which ISAM9 is installed and where its WebSEAL component is. Then, ISAM represents a special functionality of a web reverse proxy that is able to generate SAML certificates and provision them to service provider's page. The service provider's address and its ISAM9 component can be seen, while functionality is hidden behind a false junction within the reverse proxy. Behind it there is an initiation of the functionality for creating SAML certificates, while on the service provider's page the validation functionality is hiding, parsing SAML2 certificates. When a request is received on the service provider's page, it needs to be told which backend application server we want to access. In our case that information is part of a complex link that shows in the text above: *Target=https://sepseal.viminacium.rs/app2*. There is actually a need to address the application on the service provider's page exactly through the app2 junction. In other words, with this link created on the IdP business application, the SP business application is accessed, while to the end user it will only represent a hyperlink to be clicked on.

DIFFERENCES OF LDAP ATTRIBUTES IN A TESTING ENVIRONMENT

Further on in this paper, the differences between a user's profile in LDAP on the identity provider's page and the service provider's page will be explained. Figure 6 shows the user's interface LDAP browser on the identity provider's page in which the defined user "User" can be seen, while within his user attributes there is also the email attribute, underlined in red. On the service provider's page in his LDAP, there is no attribute, but there is his cell-phone number as an attribute on his page. Figure 6[4] also shows that the repositories are not identical, but what they have in common is that there is the same user with the same user name on both sides. It should also be mentioned that within ISAM9 there is a LDAP that can be used as a user's repository, although this is not recommended in a production environment, since it is an OpenLdap. The existing user's repository of business environments will be used instead or another, more secure one, will be made. All this indicates that the same identity is created with different attributes in two different LDAPs.

DIFFERENCES OF LDAP ATTRIBUTS IN A TESTING ENVIRONMENT

Regarding authorisation, access rights are defined using memberships in groups. Figure 7[5] shows that within LDAP, a branch is defined with users' groups and that the identity "User" is a member of the group "group1" on the identity provider's page. We can assume that on the service provider's page there is a group called "group3" that, compared to the identity provider, contains completely differently regulated access to groups. Figure 7 shows that the identity "User" is a member of the group "group3". This illustration separates the user's attributes and group memberships, or operation rights in the different systems.

The result is as follows. The user will be applied to separate applications on the identity provider's page (Figure 8) and service provider's page (Figure 9) by using different passwords.

Since there is a link on the identity provider's

4 Dragan Novičić, Mita Mitić, IBM Security Access Manager 9.0 (ISAM9) - *Identity Federation scenariji* MI SANU, presentation, SBS, December 2015.

5 Dragan Novičić, Mita Mitić, IBM Security Access Manager 9.0 (ISAM9) - *Identity Federation scenariji* MI SANU, presentation, SBS, December 2015.

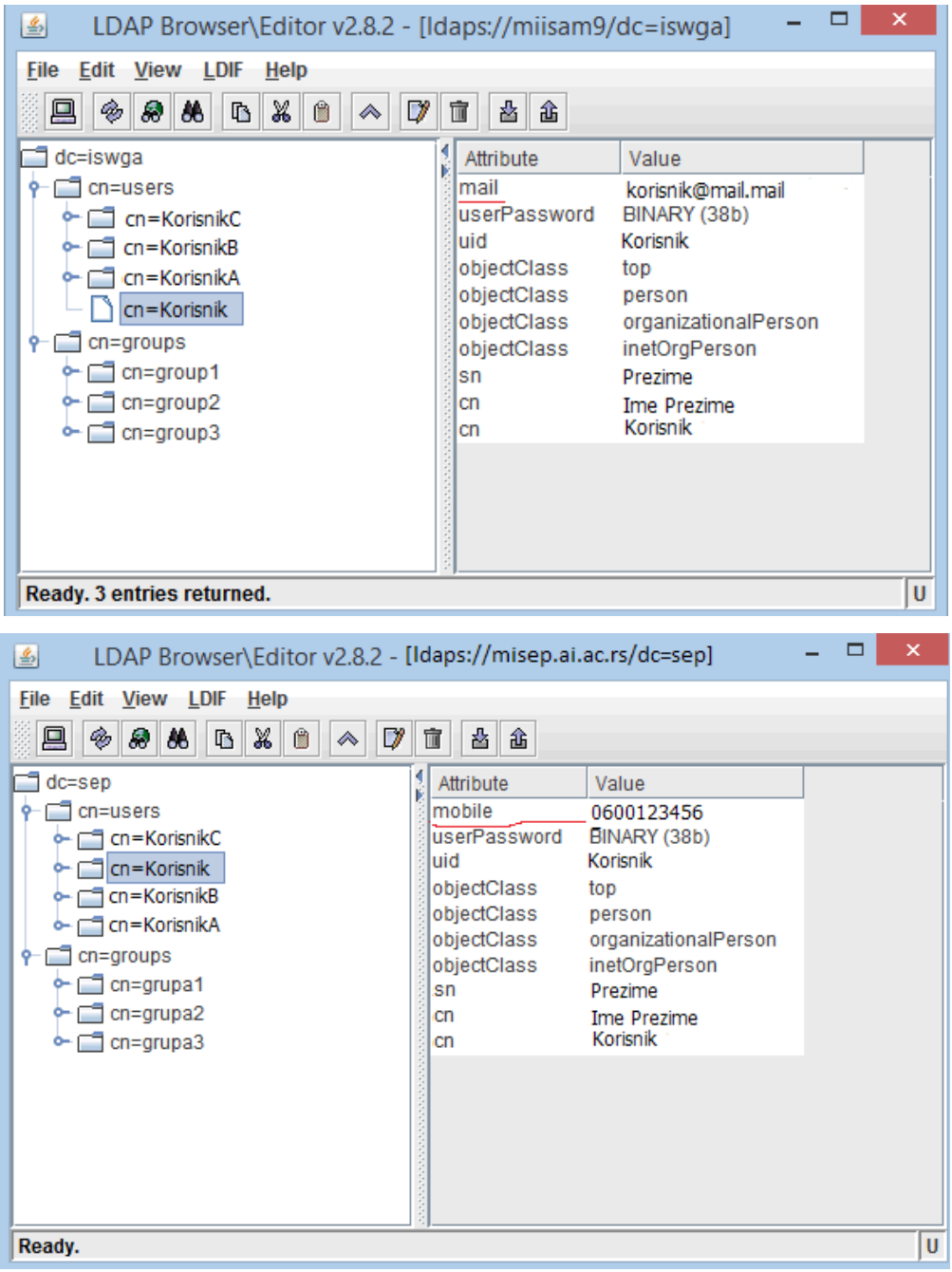


Fig. 6 User's interface LDAP browser on identity provider's page (left) and service provider's page (right)

page and when the user is logged onto the IdP application, by clicking on that link, he will automatically be transferred to the screen form on the service provider's page. The screen form in Figure 10 shows attributes that only exist on the identity provider's page (mail attribute, see Figure 10) will also be accessible on the service provider's page.

If the user is already logged into the identity provider's page and wants to access the service provider's page, the application will be transparent. However, if the user accessed an intranet web portal open to all users without the need for authentication and he then clicks on the link that can lead to the service provider's page in order to access their application, an authentication demand will pop up (since he has not yet been au-

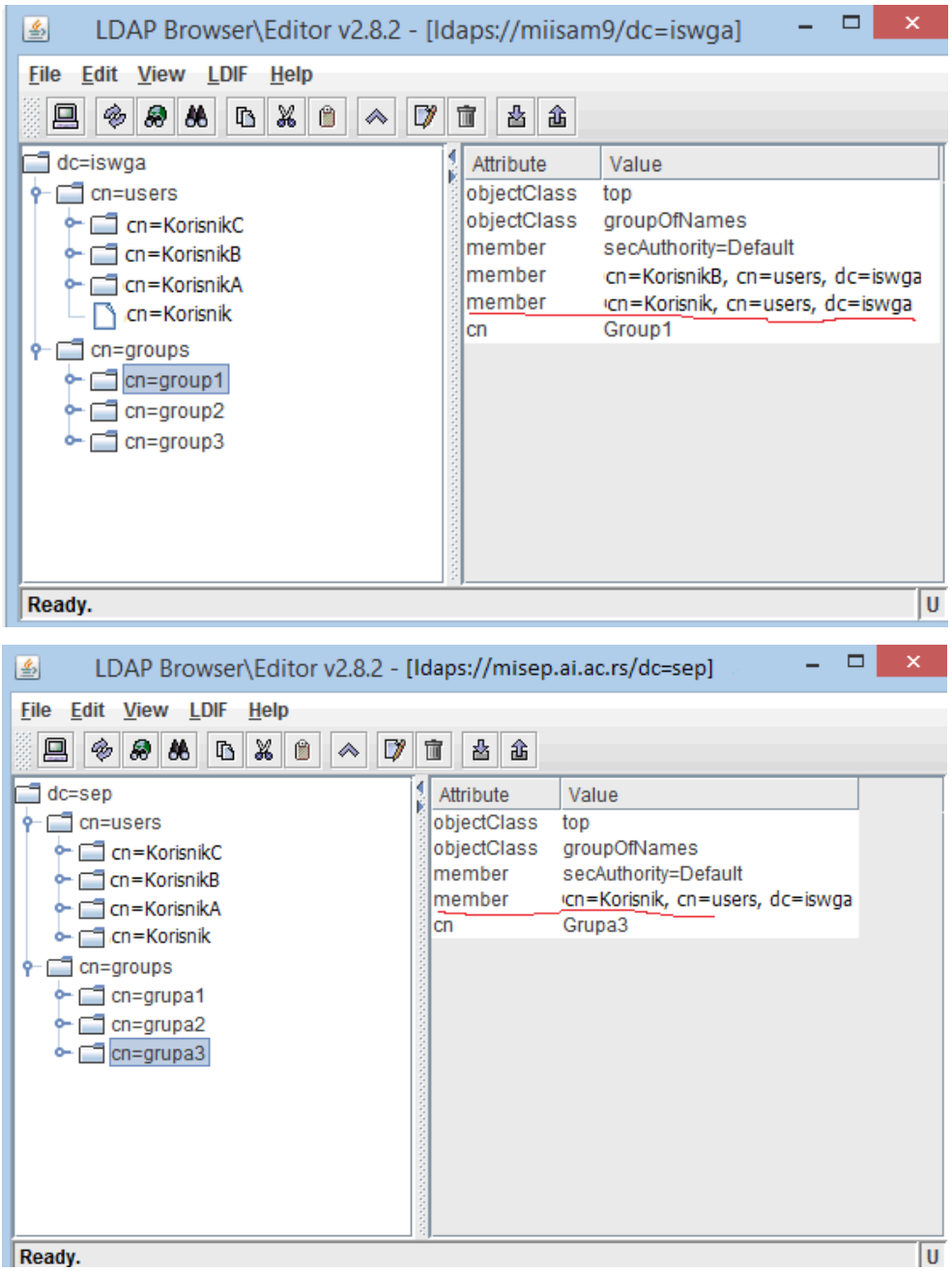
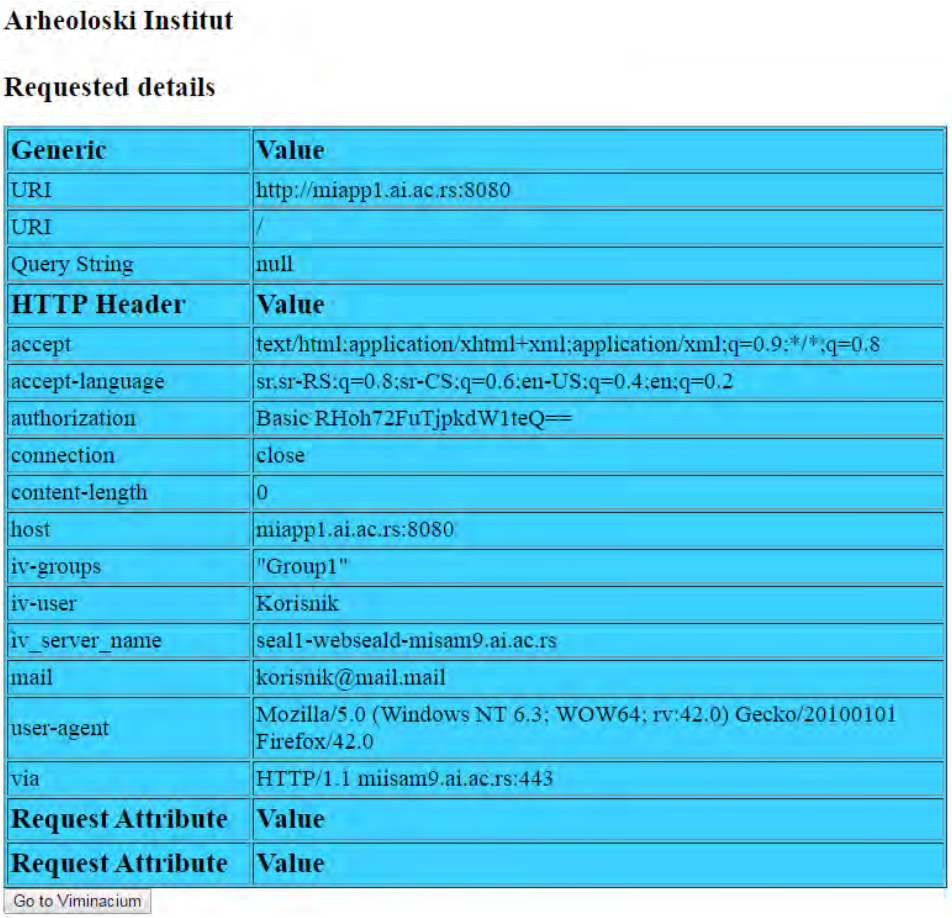


Fig. 7 Separating a user's attributes and group memberships

thenticated) on the identity provider's page (with the password for the identity provider). Only then will the application on the service provider's page be shown transparently.

In order to make this all function in a test environment, an IBM infrastructure has been created with two instalments of ISAM9 virtual appliance, one of them on the identity provider's page and the other on the service provider's page. ISAM9 is a modular appliance and it comes by default only with basic functionalities. In order to reach a federated environment, a licence is needed for a federation module, since it understands SAML 2 protocol. There is also an additional advanced access control module used for authentication with mobile web devices and for risk based authentication when access is performed over an insecure channel with a dynamic evaluation to determine



Arheoloski Institut

Requested details

Generic	Value
URI	http://miapp1.ai.ac.rs:8080
URI	/
Query String	null
HTTP Header	**Value**
accept	text/html;application/xhtml+xml;application/xml;q=0.9;*/*;q=0.8
accept-language	sr,sr-RS;q=0.8;sr-CS;q=0.6;en-US;q=0.4;en;q=0.2
authorization	Basic RHoh72FuTjpkdW1teQ==
connection	close
content-length	0
host	miapp1.ai.ac.rs:8080
iv-groups	"Group1"
iv-user	Korisnik
iv_server_name	seal1-webseald-misam9.ai.ac.rs
mail	korisnik@mail.mail
user-agent	Mozilla/5.0 (Windows NT 6.3; WOW64; rv:42.0) Gecko/20100101 Firefox/42.0
via	HTTP/1.1 miisam9.ai.ac.rs:443
Request Attribute	**Value**
Request Attribute	**Value**

Go to Viminacium

Fig. 8 User's application on identity provider's page.

whether it will allow access to a user or not (it is statically based on roles ascribed to it). In the production environment for the mentioned scenario, it is not necessary to put the ISAM9 appliance on the service provider's page, but in that case applications need to be made to the service provider side in the form of SAML 2 tokens, and also a change needs to be made in the configuration.

If there is a single-sign-on access through a web browser, communication is made to both systems via https. Then, they agree on which encryption will be applied, supported both by the web browser and by WebSEAL. This means that the browser can be re-configured in order to prevent connection to a weak https algorithm.

In addition, on the login page, it is possible to execute different methods of authentication. One is with the help of the user's name and password, while another is with the help of an external identification provider (EIP) that is able to define several types of authentication. This further implies that the already mentioned step-up authentication can be created, in which it is possible to define the provision of certain rights if the user accessed via a specific method. IBM within ISAM9 has a set of supported standards related to authentication mechanisms (double-factored, biometry and smart cards). Depending on the method of logging in, specific rights are provided. This represents a part of the WebSEAL configuration, since it receives the authentication demand and forwards it to the backend application.

Attribute mapping is performed within WebSEAL. There is a customising possibility when, instead of sending just the regular attributes, additional ones are sent, such as CN, SN and mail.

Viminacium

Requested details

Generic	Value
URI	http://sepapp1.viminacium.rs:8080
URI	/
Query String	null
HTTP Header	**Value**
accept	text/html;application/xhtml+xml;application/xml;q=0.9;*/*;q=0.8
accept-language	sr,sr-RS;q=0.8;sr-CS;q=0.6;en-US;q=0.4;en;q=0.2
cn	NOT_FOUND
connection	close
content-length	0
host	sepapp1.viminacium.rs:8080
iv-groups	"Groupa3"
iv-user	Korisnik
iv_server_name	seal1-webseald-misep.turorg.co.rs
mail	NOTFOUND
mobile	0600123456
user-agent	Mozilla/5.0 (Windows NT 6.3; WOW64; rv:42.0) Gecko/20100101 Firefox/42.0
via	HTTP/1.1 miisam9.ai.ac.rs:443
Request Attribute	**Value**
Request Attribute	**Value**

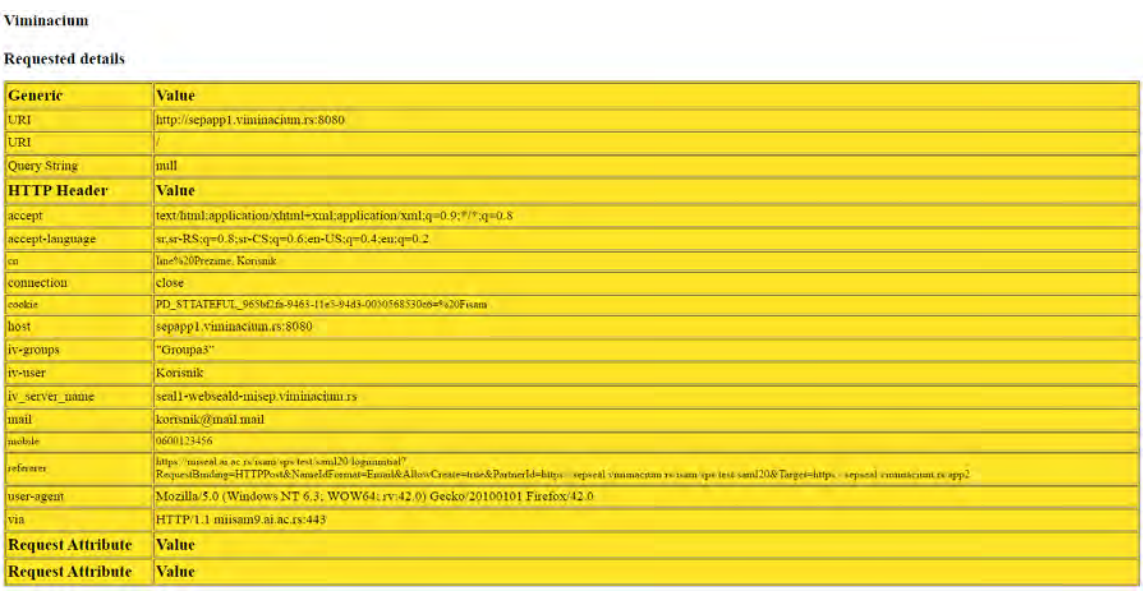
Figure 9. User's application on service provider's page.

These pieces of information are packed into SAML2 while on the other side what will be received is defined.

In addition, ISAM9 also contains a policy server in which polices can be made for certain applications set behind the mentioned junction.

The administration of the appliance itself is also possible, from the command line environment (with secure socket shell connection)

Securing the LDAP environment comes after configuring the runtime component of ISAM9. It is also possible to choose which type of LDAP will be used (external or embedded). After defining the LDAP type, ISAM9 makes its own specific suffix named **secAuthority=default**. It contains its specific attributes mapped to the users. After creating the new suffix or user, it maps them all onto its specific security LDAP for the needs of the access manager. These and the **secAuthority=default** could exist in their own local LDAP or in another LDAP, for example in an Active directory, Open Ldap or IBM directory server initiated on some other machine. The security suffix secAuthority can be set to be in the local LDAP and the ordinary suffix in some other directory. Regarding the administration of the local LDAP, there is a separate interface for the access manager that has a specific user who performs the administration



Viminacium

Requested details

Generic	Value
URI	http://sepapp1.viminacium.rs:8080
URI	/
Query String	null
HTTP Header	**Value**
accept	text/html;application/xhtml+xml;application/xml;q=0.9;*/*;q=0.8
accept-language	sr,sr-RS;q=0.8;sr-CS;q=0.6;en-US;q=0.4;en;q=0.2
cn	lane%20Prezime, Korisnik
connection	close
cookie	PD_STATEFUL_965bf2fa-9463-11e3-94d3-0030568530e8=%20Fusam
host	sepapp1.viminacium.rs:8080
iv-groups	"Groupa3"
iv-user	Korisnik
iv_server_name	seal1-webseald-misep.viminacium.rs
mail	korisnik@mail.mail
mobile	0600123456
referer	https://miseal.ai.ac.rs/isam/sps/test/saml20/logonmutual?RequestBinding=HTTPPost&NameIdFormat=Email&AllowCreate=true&PartnerId=https://sepseal.viminacium.rs/isam/sps/test-saml20&Target=https://sepseal.viminacium.rs/app2
user-agent	Mozilla/5.0 (Windows NT 6.3; WOW64; rv:42.0) Gecko/20100101 Firefox/42.0
via	HTTP/1.1 miisam9.ai.ac.rs:443
Request Attribute	**Value**
Request Attribute	**Value**

Figure 10. Screen form on the service provider's page

tasks. System users can only see each other in the secAuthority default**.**

The web space can additionally be protected using access control lists. For example, behind the reverse proxy there is the application app1. On the application app1, an ACL (access control list) can be added. The benefit gained is that all the authenticated users from ACL can have access to the app1 application, or it can also be set that access to the app1 application access is possible only from a specific ACL.

When it comes to protocols for creating federations, ISAM9 supports SAML2 and Openid, while TFIM has some more protocols for federation. If there is a need for some other federation, the ISAM9 licence includes a TFIM gateway. Such software actually represents an add-on that is installed onto the operating system, actually to the application server in order to broaden the ISAM9 functionality.

AUTHORISATION SETTING

WebSEAL itself secures the authorisation decision to be delegated by the application onto the reverse proxy server. As already mentioned, this proxy possesses in itself a definition of the protected web space. It is possible to define URL addresses that are subject to this protection. There is a root application that is placed on the specific URL address and then servlet calls and arguments are added onto the URL in order to start specific application functionality. If within such a defended space it is defined that according to a specific criterion (eg. joker signs or absolute routs etc...) something is allowed to pass through the web proxy, it will not be able to reach the application and be executed. By this alone, the decision is delegated from the application to the web proxy level as to whether the http request initiated by a client will reach the application, be initiated and return as a response, or if the proxy will return the response as "forbidden". Given the mentioned facts, it should be understood that the application is protected at the WebSEAL level and not within the application itself. As a security measure, it is also necessary to periodically perform vulnerability scanning and analysis of the server systems within an organisation in order to find and remove them in time. By detecting system vulnerability, recommendations are obtained for overcoming such security problems. (Korać, Prlja and Diligenski 2016).

CONCLUSION

The federated identity concept is most useful when there are business subjects with a legal relationship between each other. Onto this, an informatic aspect is imposed with the help of the informatic infrastructure. It secures that once the user's identification is performed on one of the identities, the same procedure is not repeated on another identity, since it can rely upon a trustworthy subject that can deliver the user's identity and that such an identity can be trusted. Regarding this, two sides can be distinguished, one of them being the identity provider, actually the one that secures the business procedure of establishing the user's identity, while the other is service provider, offering a business service, but fully relying upon the provider's identity as a base for recognising a user. In other words, the IdP represents the business entity in charge of user registration and authentication and issues confirmation of the established identity to other business entities. On the other hand, the SP represents the business entity that offers services to users (e.g. access to business applications), but it does not establish their identity, since it relies upon certificates issued by the IdP. Archaeological sites can be regarded as independent entities with their individual information systems. The services accessible to employees in the information systems and the services for end users that can be accessed from archaeological sites are wide ranging. Here, this refers to a digital database, virtual site visits, usage of video cameras for sightseeing, usage of cameras for video surveillance, streaming of events organised at some sites, and live transmission of concerts, operas and music events. Additionally, these services include observing archaeological excavations via video cameras, access to video conferences, souvenir sales related to a specific period (prehistory, Roman, Middle Ages, etc), a library database, exchange of library material, announcement of individual or group visits, ticket purchases and education programs. If the number of sites (Sirmium - Sremska Mitrovica, Singidunum - Beograd, Viminacium - Kostolac, Diana - Karataš, Felix Romuliana - Zaječar, Negotin - Šarkamen, Naissus - Niš, Iustiniana Prima - Caričin grad, Vinča, Lepenski Vir, Kale Krševica, Slatina near Paraćina) is added to these services, it becomes clear that the concept of federated identities would centralise and simplify identity exchange, at the same time offering secure access to servers after registration on the common identity provider, the Institute of Archaeology.

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REZIME

KONCEPT FEDERATIVNOG IDENTITETA IZMEĐU ARHEOLOŠKOG INSTITUTA I LOKALITETA U SRBIJI NA PRIMERU VIMINACIJUMA

KLJUČNE REČI: FEDERATIVNI IDENTITET, SIGURNA IDENTIFIKACIJA, PROVAJDER IDENTITETA, PROVAJDER USLUGA, SSO, ISAM9, TFIM, IDP, WEBSEAL.

U radu je prikazan koncept federativnog identiteta između Arheološkog instituta i arheoloških lokaliteta u Srbiji a na primeru Viminacijuma. Na taj način se obezbeđuje da, ukoliko je jednom sproveden postupak identifikacije korisnika od strane jednog identiteta, eliminiše se potreba da drugi identitet sprovodi tu istu proceduru za svaki lokalitet, već se oslanja na poverenje da prvi subjekt može da isporuči korisnički identitet kome se može verovati. Kao rezultat ovakvog pristupa identifikovani korisnik kod provajdera identiteta „Arheolški institut“ automatski će biti prepoznat kod provajdera usluga na bilo kom arheološkom lokalitetu u Srbiji, u konkretnom slučaju na primeru lokaliteta Viminacijum. Na taj način zaposleni u Arheološkom institutu bi imali omogućen pristup servisima (na primer bazi digitalne građe) na arheološkom lokalitetu Viminacijum nakon uspešne identifikacije zaposlenog od strane provajdera identiteta „Arheološki institut“.

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RESPONDING TO CYBER INCIDENTS WITHIN ORGANISATIONS BY APPLYING ADEQUATE POLICIES

ABSTRACT

The first cyber threats occurred in the 1970s [CW Jobs, 2016], in the form of rootkit, a hidden software which enabled continuous privileged access to computers, and also in the form of spam. The number and diversity of cyber threats has increased immeasurably up to today, and every such attack can cause serious damage. Since computers and the internet represent omnipresent and pervading technologies, the targets of these attacks are ever more often different organisations – those of the state, international companies, or parts of the local business sector. In order to respond to these threats in a quick and efficient manner, it is necessary to introduce certain policies at the entire organisation level, which would respond to cyber incidents. The purpose of the cyber incident response policies is to provide general instructions for the staff within an organisation, so they can perform, efficiently and precisely, those actions intended for establishing whether a cyber incident has occurred. If such an incident did occur, the staff would determine, on the basis of the given procedures, which actions should be taken so that the incident could be limited and the threat removed.

KEYWORDS: CYBER THREAT, CYBER INCIDENTS, TRAINING AND SECURITY AUDIT, INCIDENT RESPONSE TEAM.

CYBER THREATS

To recognise a cyber security incident, especially those behind which there are serious cyber attacks (which have become ever more common) and which are turning into a very persistent threat, has become a necessity for all organisations.[1] Cyber attacks cause serious damage to all organisations, those of the state, but also international institutions and local business sector companies. The correct manner to fight a cyber attack is to have a swift and efficient response to it. In order to achieve that, it

1 The article is the result of the project: *Viminacium, Roman city and military camp – research of material and non- material culture of inhabitants by using the modern technologies of remote detection, geophysics, GIS, digitalization and 3D visualization (no 47018)*, funded by The Ministry of Education, Science and Technological Development of the Republic of Serbia.

is necessary to have active preventive mechanisms and ready responses to cyber attacks that have been prepared at the highest possible level within organisations themselves and the institutions of the state. Cyber attacks are usually not a local occurrence and, hence, sometimes it is even necessary to establish international cooperation.

With common distributed-denial-of-service attacks (DDOS), sites being brought down or cracked, their contents deleted or changed, and also network infiltrations, ransomware threats and other types of attacks, all of which are claiming ever more space on public information media, it is obvious that cyber attacks are a reality of today. As such, they cannot be subdued without the exceptional cooperation of the international community at the highest levels.

CYBER SECURITY INCIDENTS – CSI

There is no universal point of view which would determine what can be called a cyber security incident, because there is such a wide range of variations and interpretations. Without having an agreed upon definition, and considering the fact that most organisations apply different views and practices for CSI, it is difficult for organisations to define types of CSI, and even more so to plan and secure resources or support level for preventive actions or responses to CSI.

The media has contributed to having CSI traditionally listed as Security IT incidents up until the point when the national infrastructure or security network becomes threatened, and in that case a CSI would be declared, because it would have the properties of cyber terrorism.

Even though good practice in CSI responses certainly exists and is constantly being improved, organisations still avoid information exchange, precisely because of the already mentioned fact – the lack of a general understanding and limited capacities and resources regarding CSI, which puts them into the context of limited, i.e. a low level of response to CSI.

Types of CSI

In practice, types of CSI are differentiated according to whether they are viewed according to the source of the indecent – minor crimes/organised crimes, or according to the manner in which the incident was executed (e.g. cracking, malware or social engineering). Thus, we have the basic CSI on one hand – minor offences, local interruption and theft, while on the other, on the extreme side of CSI, we have organised crime, national or worldwide interruptions and critical damage to national or international infrastructure. The nature of the attack can be public (e.g. compromising the reputation of a company) or concealed (e.g. profit).

FACTORS THAT AFFECT CSI AND HOW TO PREPARE A RESPONSE

CSI are usually linked to information, technology, processes and employees. Hence, the goal of the attack is always linked to the availability/unavailability, i.e. the theft of information. In order to enable a CSI attack, from within or outside, certain technology is required, from network devices up to computers or devices containing information. The exception, of course, are papers containing information; however, theft from within is still possible here by taking photos (CSI), and stealing papers containing information, while not CSI, is still a Security Incident. When it comes to processes (services), process interruption also leads to unavailability of information. Additionally, employees can cause CSI, and it is estimated that ca 70% of security breaches are performed wth the help of insiders [M. Reardon, 2005].

Preparation of an incident response

Regarding the already mentioned, one must know what to save and protect, and, therefore, how to respond as well.

Information – It is necessary to have a Central Registry for Information (CRI) and a list of people with access privileges and the Information Owner. It is necessary to comprehend the use of the Information, as well as to comprehend the exchange of information between employees, users, support and the ISP in order to ensure a correct response.

Consequently, it is necessary to make a record, for every incident, of details relative to the time of the incident: how and when it was noticed, what happened and what was affected by the incident.

Technology – It is necessary to have a Central Registry for Technology, which usually exists in the list of Basic Assets, but is often lacking certain information, which should be added to it. It is of paramount importance to know the data and network topology, especially where access points and the firewall are, where the incoming internet network is (or several of them) and where (backup) logs are stored. Also, it is very important to know who configures network devices and has access to or works on a computer (which is also a network device).

Processes (Services) – Knowing what, and in what manner, the processes do, recognising if a process is active or missing is solved by defining a Central Registry for Processes. It comprehends the description, verification and installation (should the entire process be re-established from the start) of every process. To make it clearer, let us give the example of software (a basic asset) or, more specifically, a database or a webpage used by all employees. Knowledge on the process is necessary in order to limit and remove CSI, to restore critical systems, data, networks and work processes.

Employees and other human resources – Every organisation has a Central Registry for Employees, with their work description (contract), behaviour code, policy of acceptable usage or standard security policy and, if it has specified registries, it is known precisely who does what, and what their function, job description, contact (work phone number) and access to network devices are.

According to what has already been said, it is clear that there should be a Central Registry for Resources / Information Assets, which needs to contain all the necessary data and specified details on the Information, list of network devices and software (also a basic asset).

An additional registry which should exist is a centralised list of suppliers, which would significantly shorten the response time.

It is clear that someone should always respond in cases of SI and CSI, hence, it is also necessary to create a list of members of the Incident Response Team, with a list of replacement members, and to make it known to the employees.

Backup – the regular creation of a backup and periodical verifications have to be established.

Training – An annual or biennial lecture, which can be performed internally by a security officer, for all employees, with a test of some 10 to 20 questions, is necessary in order to maintain a perception of the importance of security. This small investment of money offers significant returns. An annual CSI simulation is desirable and represents the best possible training, especially when a complete restoration of processes is included.

Security Audit – An Annual Internal Security Audit represents the verification of documents, IT policies and procedures, knowledge of the IT personnel, including IT Security, and provides management with a clear image of the situation in IT/Sec within organisations and, most importantly, it highlights deficiencies and bad practices.

It is very important to note that Security audits provide an indication of the places where management must invest resources: hardware/software/human resources, training, external partners or support in order to bring the situation to an acceptable level.

RECOGNISING A COMPUTER OR CYBER INCIDENT

After an occurrence happens which raises concerns of a possible incident, it is essential to determine whether the events, data and facts gathered can be qualified as a cyber incident. Those pieces of information can be obtained through different sources, including events examined by computer administrators, through IT security, legal and corporative risks, privacy risks, process owners or business owners and higher management levels, and even employees and end users.

Finally, it is necessary to examine the gathered information in order to determine if they fulfil the conditions needed to pronounce that it was in fact a computer or cyber incident. A breach or the imminent danger of a breach of computer security policies, acceptable usage policies or standard security policies has a significant chance of leading to:

- negative influence on the reputation of an organisation;
- loss of intellectual properties or assets;
- unauthorised access to confidential (classified) data and personal (user) data.

If the data gathered does not fulfil the correct definition of a cyber incident, it is not accepted categorically as a computer or a cyber incident, but merely represents, instead, a sequence of computer events (any notable occurrence in a system or a network) which should be dealt with in an operational manner.

If an individual or a team determines that there is sufficient evidence to declare an incident, they have to forward that information to the person authorised to declare a cyber incident. That person can be the Chief Operating Officer, Chief Financial Officer, Chief Human Resources Officer, General Counsel or an officer in charge of privacy, IT or security. If there is a security officer, then they, according to the procedure, notify the General Counsel, and in case there is no such officer, the General Counsel takes over this role and declares the incident. In practice, the first person to be informed is always the manager /officer (CISO/ISO[2]) in charge of security, and then he or she notifies the CEO of the organisation.

Establishing an Incident Response Team

The Incident Response Team is a team in charge of examining and resolving discovered computer security problems, as well as finding suitable solutions through data gathering, information examining, risk measuring and implementing solutions in a suitable manner.

When the existence of an incident is declared, the Incident Response Team must be notified and activated. Generally, the following professionals are considered part of the Team in order to provide coverage for every individual segment of the incident:

- General Counsel – should be legally informed as soon as possible;
- Head of information security and/or Head of IT;
- Technical leaders – such as heads of security, network or infrastructure;
- Risk management / insurance;
- specialised experts (external forensic attorney);
- Human resources – except in cases when it is necessary to prevent physical access to an employee because of a breach of work discipline;
- Public relations / marketing;
- Security organs / HTC services.

Additionally, it is necessary to name the Incident Manager, who will be in charge of the incident. He can be the information or process owner, depending on the nature of the incident. The Incident Manager serves as the main organiser in cyber incident resolution.

The Project Manager can also be of use in organising notes and goals. It is very important to

2 Chief Information Security Officer / Information Security Officer

carefully select the members of the Incident Response Team, because the perpetrator of the incident could be one of the employees.

Once the incident is declared, it is important to establish the communication route to and from the Incident Response Team. The Team must establish whether it is safe to use the electronic mail of the institution. The Team must seek advice (from the General Counsel) on what would be appropriate for oral communication, and what should be communicated via electronic mail. If necessary, a communication room can be established.

Limiting the incident (if convenient)

The Incident Manager will determine (with the help of the Incident Response Team) whether the adverse computer events demand quarantine. Adverse events comprise computer events with negative consequences, such as system failures, package overload, unauthorised use of system privileges, unauthorised access to sensitive data and setting up of malware that destroys data.

If deemed convenient, actions could be taken which would isolate systems, block access or prevent suspicious activities. It is necessary to carefully evaluate quarantine risks versus the ability to thoroughly investigate the problem, while taking into account business management risks. It is also important to note that any actions taken can show the attacker that he has been exposed.

Extent of the incident

The Incident Response Team has to instruct the system administrator to make a preliminary list of endangered information assets, including servers, systems and/or data affected by the event. This should include timeframes, people known to be involved in imminent actions, during and after the event, as well as all information such as network data or warnings, alarms or other information obtained during the investigation. It is important that the administrators report all relevant facts which can be directly or indirectly brought into connection with the incident which occurred. It is essential that managers of work organisations also provide reports if the processes came to a complete or partial halt because of the CSI.

Information analysis by the Incident Response Team

The Incident Response Team has to take into consideration all the information gathered and to document the following:

- suspicious activities, such as unwanted visitors or suspicious network traffic;
- access to information by the attacker, e.g. capability of physical transfer of devices or data confiscation through network;
- data that was accessed, along with witness statements and computer logs;
- duration of danger, with time marked when the data could have been, or was, endangered;
- method of attack, such as malevolent visitors or network intruders who used the hacked assets;
- data accessed without authorisation, or which is under suspicion of being accessed from external systems;
- loss estimation comes down to data loss estimation, time estimation in relation to the actual loss of data. Aside from material, loss can also be non-material, e.g. the compromising of the organisation's reputation.

Recovery or recuperation of the environment and verification of the environment

The Incident Recovery Team should work together with the system administrator in order to restore information assets into the regular working state. This may include:

- Implementation of information security controls which resolve vacancies in policies,

processes or procedures.

- Implementation of technical controls, such as stronger passwords, limited access or obligatory multi-factor authentication.
- Implementation of administrative controls, such as logging, processes for obtaining or removing accessibility or strict access time.
- Implementation of physical controls, such as locks, barriers and protection of information assets.
- After restoring work status, it is necessary to verify that all the processes have been re-established, which is the task of the managers of the organisational units and employees who have the testing scenarios (Central Process Registry). Alongside them, the Information Owners also perform the verification.
- If it is necessary to restore some of the information which was entered just before the CSI and which does not exist in the BACKUP, but which are available in another form, a team is established for entering and verifying that data

Work on communications

The organisation can have the duty of revealing certain information concerning a possible or actual incident. The Incident Response Team has to establish whether and which communication can be shared internally, within the management, within the entire business or with external parties, such as newspaper agencies, social networks and/or government institutions.

Additionally, the Incident Response Team might be obliged to inform other stakeholders as well (e.g. sponsors) according to legal contracts which define the time period in which the endangering of the data has, or may have occurred. Communications must be performed according to guidelines given by the General Counsel.

Discussions after taking actions

The General Counsel will determine if there is need to conduct a series of discussions on the incident after taking actions. If they are deemed necessary, these discussions will ensure that the incident process was well responded to – including all public relations, internal communication with the staff and/or technical changes concerning the incident, as well as vacancies relative to the incident. On the basis of these discussions, if necessary, it may be deemed opportune to revise procedures and polices after the CSI, and, again, if necessary, change the topology of the network or processes in order to avoid a further CSI. The creation of a policy is approved by the General Counsel, and is recorded in a table, where revisions can be monitored with descriptions, dates and signatures of all the people who wrote the policy and signatures of persons responsible for accepting the policy.

FINAL CONSIDERATIONS

To recognise a cyber security incident, especially one behind which there are serious cyber attacks, has become a necessity in all organisations. A response to these incidents comes from the existence of active mechanisms and ready responses which are defined through a policy for cyber incidents responses. It is necessary to know all the factors which can be influenced by a cyber security incident, and what is to be preserved as well, but it is also necessary to be aware of a suitable way to react. An organisation must have a Central Registry for Information, Central Registry for Technologies, Central Registry for Processes, Central Registry for Employees and Central Registry for resources/information assets, which, together, enable a more efficient way to recognise an incident, its influence and possible source. The determination of the manner and intervals of making backup copies of data represents a basic step in limiting the damage that a cyber incident can cause.

When an incident occurs, it is essential to gather as much data as possible, on the basis of which it can be determined what type of incident it was, and to notify the person in charge in cases of such an incident. Additionally, it is necessary to have an Incident Response Team, whose responsibility it is to investigate and resolve discovered incidents, which must be notified and activated when an incident occurs. It is essential to establish the scope of the incident, i.e. which part of the information system was affected by the incident, which occurrences happened immediately before and after the incident, as well as other important information for the Incident Response Team to investigate. After that, the team, along with system administrators, has to work on activities concerning the restoration of the system to its regular state. After a response to a cyber incident, discussions can be held, which would determine if the reaction was suitable. On the basis of those discussions, it is possible to revise procedures, policies or various systems for the future avoidance of incidents, if deemed necessary.

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REZIME
ODGOVOR NA SAJBER INCIDENTE U OKVIRU ORGANIZACIJE KROZ PRIMENU ADEKVATNE POLISE

KLJUČNE REČI: SAJBER PRETNJA, SAJBER INCIDENTI, TRENING I SECURITY AUDIT, TIM ZA ODGOVOR NA INCIDENTE.

Broj i raznovrsnost sajber pretnji se do danas neuporedivo povećao, a svaki od napada može naneti ogromnu štetu. Kako su računari i internet danas sveprisutne i sveprožimajuće tehnologije, mete napada su sve češće različite organizacije koje mogu biti državne, međunarodne ili deo biznis sektora. Kako bi se na ove pretnje brzo i efikasno reagovalo, neophodno je uvođenje određene polise na nivou cele organizacije za odgovor na sajber incidente. Odgovor na ove incidente podrazumeva postojanje aktivnih mehanizama i spremnih odgovora koji se definišu polisom za odgovor na sajber incidente. Neophodno je znati na šta sve može uticati sajber bezbednosni incident, kao i to šta je potrebno čuvati, ali je potrebno primeniti i odgovarajuću reakciju. Svrha polise za odgovor na sajber incidente je da pruži opšta uputstva osoblju u okviru organizacije, kako bi se efikasno i uredno sprovele akcije koje služe za utvrđivanje postojanja sajber incidenta. Ako incident postoji, osoblje na osnovu procedure određuje koji je postupak neophodno sprovesti kako bi se incident ograničio i otklonio. Na osnovu razmatranja je moguće revidirati procedure, polise ili različite sisteme radi budućeg izbegavanja incidenta, ukoliko je to neophodno.

PRIKAZI - REVIEWS

GRÜLL TIBOR, A RÓMAI BIRODALOM GAZDASÁGA, BUDAPEST 2017.
Knjiga sadrži 339 strana, 45 fotografija, crteža i grafikona i 11 karata.

Grull Tibor je univerzitetski profesor antičke istorije i arheologije iz Pečuja. Najnovije delo u njegovom širokom opusu je knjiga Ekonomija rimskog carstva. Knjiga je izašla pod pokroviteljstvom mađarske Akademije nauka, izdata je na mađarskom jeziku, u Budimpešti 2017 godine. Rad je podeljen na devet glavnih poglavlja od kojih svako ima još po nekoliko potpoglavlja. Na kraju svakog potpoglavlja nalazi se spisak korišćene literature.

Knjiga je namenjena svima koji se bave proučavanjem ekonomije rimskog Carstva, jer detaljno se pozabavila svakim segmentom privrede. Mogu je koristiti i studenti istorije, ali i arheolozi, jer se autor u svakom poglavlju u problematici koju razmatra poziva i na istorijske izvore i na savremene autore sa navedenom literaturom koji su se tom tematikom bavili. Na jednom mestu je prikupljen i jasno sažet ceo Mediteranski svet, predstavljen sa svim svojim manama i vrlinama.

Sam naziv dela odlično oslikava njegov sadržaj. Teme su dobro razdeljene po oblastime i time će raznim istraživačima olakšati potragu i rešiti nedoumice po pitanju ekonomskog funkcionisanja Rimskog carstva. Autor je primenio potpuno odgovarajuće naučne metode, tekst prate dobro izabrane ilustracije i odgovarajući prilozi. Dobro je odmerena količina fotografija, crteža i mapa koje pomažu razumevanju pojedinih potpoglavlja. Veličina poglavlja nije identična, ali to i nije bilo moguće izvesti jer različite teme zahtevaju da im se pruži i drugačija količina prostora. Kompozicija rada potpuno odgovara sadržaju i temi i podela na devet poglavlja sa više manjih potpoglavlja je dobro izabran strukturalni metod.

U svoje nas delo uvodi Salustijevim komentarom o Jogurti koji smatra da je u Rimu sve na prodaju ako se nađe kupac i time oslikava stanje u tadašnjoj Republici. Nastavlja se na Avgustovo delo *Res gestae divi Augusti* ne tretirajući ga kao pouzdan istorijski izvor, niti pak kao čistu propagandu, nego jednostavno kao podatak o tome koliko je car u toku svoje vladavine podelio novca stanovništu i kako je to uticalo na celokupnu ekonomiju (jer je stanovništvu distribuirano 2700 tona srebra). Upoznaje nas sa rimskom ekonomijom tj. sa sistemom snabdevanja u rimskom carstvu, gde prikazuje kako je bilo omogućeno da se konzumiraju sveže ostrige u Alpima, britanski limun ili afrička slonovača, beotsko vino u graničnom prostoru Akvinkuma, što je potvrđeno ostacima amfora.

U prvom poglavlju, o razvoju rimske ekonomije, daje iscrpan pregled istraživača koji su se ovom temom do sada bavili. U drugom poglavlju osvrće se na istorijske izvore koji govore o rimskoj ekonomiji i skreće pažnju čitaocima da je potrebno biti obazriv u korišćenju izvora ne samo zbog činjenice da su ti tekstovi prepisivani i prilagođavani, već i da su sami autori ono o čemu su pisali razmatrali sa neke manje ili veće vremenske distance. Razvrstava ih hronološki i po temama kojima su se najviše bavili, bila to poljoprivreda (*Cato, Varro,*

Vergilius, Columella, Palladius...), zoologija (*Aelianus*), geografija (*Strabon, Pomponius Mel, Ptolomaus, Pausanias*), ili istorija (*Plinius*). Skreće pažnju čitaocima na vrednost *Corpusa Inscriptionuma* bez kojih bi rimsku ekonomiju i društvo jednostavno bilo nemoguće proučavati.

Značaj epigrafskih natpisa ogleda se i u tome što bi u slučaju njihovog izostanka bili uskraćeni za razne nazive profesija, čiji su članovi bili grupisani u kolegijume, cehove, a kojima je pripadala trećina muškaraca. Na sreću istraživača, Rimljani su pisali po svim materijalima koji su im bili dostupni, tako da se ostaci natpisa nalaze i na zidovima, na malteru, kostima, metalu, drvetu. Ti su podaci iako fragmentovani, vrlo bitni za proučavanje ekonomije. Sa voštanih tablica dobijaju se informacije o knjigovodstvu i kakve su se usluge pružale te čime su se zalozi plaćali. Ostaci papirusa koji broje preko milion primera odlični su za proučavanje ekonomskog života, jer donose razne ugovore, popise, ekonomske teme, uputstva te su sa istorijskog istraživanja takve arhive najvrednije.

Autor je kao bitno prepoznao i dao mesta u svom radu i trgovinskim i ekonomskim odnosima u distribuciji posuda od *terra sigillate.* Iako ima više naziva za nju, njene radionice su dobro istražene i prepozatljive, pečati majstora publikovani i njihove hronološke granice dobro utvrđene. Još i danas se korisi Dragendorfova tipologija posuda. Sledeći materijal na kojem su utvrđeni natpisi jesu opeke sa pečatima preko kojih možemo da pratimo kretanje vojske kao i širenje radionice. Još je jedan materijal sa kojim se autor pozabavio, a koji na sebi često nosi ime majstora i time olakšava praćenje trgovine i njegove distribucije. U pitanju su žižci, koji su najčešće izrađivani od keramike. Jedan od vrlo često zastupljenih, a zapostavljenih nalaza jesu žrvnjevi za mlevenje žita. Analiza kamena od kojih su načinjeni služi tome da da i informaciju kako su bili rasprostranjeni. Tu autor navodi antičke izvore, u prvom redu radove Strabona koji opisuje koji je kamen najpodesniji za upotrebu.

U odeljku o ekološkoj arheologiji autor pravi osvrt na to kako neke prirodne promene poput erupcije vulkana, zemljotresa ili tektonskih poremećaja mogu da utiču na životnu sredinu. Isto tako i ljudi imaju uticaj na preoblikovanje pejzaža u kome žive, izgradnjom kanalizacije, rudarskom industrijom i sličnim aktivnostima. Upućuje nas na autore koji se bave ovom temom, jer se posebna grana arheologije poslednjih decenija bavi studijom o istoriji pejzaža. Za proučavanje ekonomije svakako su bitni podaci o tome kako su tekli svakodnevni dani, a kako se „luksuzno“ živelo te su podaci koje pruža zooarhelogija bitni za utvrđivanje prehrambenih navika, a time i izvlačenja zaključaka o praksi stočarstva, religioznih kultova pogrebnim navikama i dr. Tako su u ostacima vila u Švajcarskoj pronađene kosti divljih riba, žaba kao i ostaci stotine šunki, zečeva i pilećih kostiju. I arheobotanički ostaci daju prikaz ekonomije, jer pružaju sliku o distribuciji raznih vrsta biljaka, kako voća tako i začina. Istraživanjem vojnih naselja može se pratiti širenje upotrebe pojedinih posuda i među običnim stanovništvom. To ukazuje na činjenicu i da su vojnici i oficiri bili dobro snabdeveni i luksuznom hranom. Antropolozi svojim istraživanjima doprinose proučavanje ekonomije tako što na ljudskim ostacima otkrivaju tragove neuhranjenosti, a izotopskim pregledom zuba utvrđuju poreklo, preko čega se dobija važna informacija za istraživanje migracija.

U trećem poglavlju autor nas upoznaje ekološkim stanjem u carstvu i kako i u kojoj meri klimatske promene prirode utiču na ekonomiju. U prvom redu zemljotresi i vulkani ostavljaju velike tragove na ekonomske odnose, dok odmah za njima slede cunamiji i poplave. Reke nanose blato, zatrpavaju prilaze lukama, dok se zbog močvarnih delova roje komarci i stanovništvo mora da napušta određene regione. Tu navodi radove Plinija i Strabona koji ostavljaju zabeleške o problemima koje su imali stanovnici zbog nepravilno izvedenih građevinskih radova u luci, ili pak o naredbi da se brodovi natovare peskom i istovare u luci.

Uticaj antorpogenih efekata na imperiju ogledaju se prvenstveno u tome da su usled prekomernog korišćenja izumrle pojedine biljne i životinj-

ske vrste, dok se uvode neke nove stvari, grade se objekti velikih dimenzija, rudarstvo i proizvodnja značajno utiču na okruženje. Porast dinamike privrede omogućava rast populacije usled bolje ishrane i snabdevanja vodom te popravljenih higijenskih uslova stanovanja. Krčenje šuma koje antički izvori predstavljaju kao katastrofalne na svu sreću, ipak nisu doveli do takvih erozija zemljišta kakve su predvideli.

Da je erozija tla bila vrlo prisutna, može se videti iz priloženih tekstova koji govore o tome da su pojedini vlasnici nekada močvarnih zemljišta razvitkom irigacionih sistema uspeli da dobiju plodno tlo, a da su bili u obavezi da u znak sećanja na ta dešavanja priređuju godišnji festival. Naravno ne postoje za sve prostore epigrafski nalazi, ali arheološki ostaci omogućavaju da se rekonstruiše uticaj koji je rimska okupacija izvršila na određenu sredinu i koje su bile indukovane promene. Naravno sa korišćenjem ovih resursa dolazilo je do zagađivanja i vode i vazduha, pa autor tu navodi interesantan podatak koji iznosi Seneka u svom delu gde skreće pažnju, da čim je izašao iz grada i ostavio razne loše mirise za sobom može lakše da diše. Posle zemljotresa ili vulkana, a i zbog zagađenosti dolazilo je do više epidemija za koje se zna iz radova Plinija,Tacita i Svetonija. Epigrafski natpisi ukazuju na finansijske krize u carstvu zbog zatvaranja rudnika usled nedostatka radne snage pogođene raznim epidemijama.

Poglavlje četiri se odnosi na multinacionalno stanovništvo carstva i njegov uticaj na ekonomiju. U okviru rimskog carstva, a naročito u Rimu i njegovoj glavnoj luci Ostiji postojale su etničke eklave posebno istočnih etničkih grupa. Ovo je bitno jer kontakti koji su ostvarivani sa matičnim prostorima gradili su ustvari mrežu trgovine na daljinu i povezivali međusobno provincije. Autor se pozabavio i temom uticaja bogatih pojedinaca na celokupnu ekonomiju. Naime, ako je jedna porodica, carska kuća, držala ogromna zemljišta, rudnike, šume i ostalo i u slučaju nedostatka gotovine mogla je da se prevaziđe kriza učešćem pojedinca, da se recimo da gotovina (kao Tiberije) da obezbede isporuku žita (kao Klaudije) da izuzme čitav jedan deo stanovništva iz poreza (kao Neron) ili da pokrene novi poreski budžet (kao Vespazijan) ili da zabrani korišćenje vinove loze (kao Domicijan). Plinijeva prepiska donosi podatke kako uz carev pristanak udaljena pokrajina Bitinije može da reši probleme vodovoda, kanalizacije ili postavljanje vatrogasne brigade. Na ekonomiju carstva bitan je uticaj ne samo vladarske kuće, nego i raznih senatora koji su svojim odobrenjima dozvoljavali razne trgovinske aktivnosti, dok se broj rimske zemljoposedničke aristokratije čiji su finansijeri bili iz redova bankara ili trgovaca robovima, stalno povećavao. Rimljani su imali dobro razgranatu prilično složenu mrežu administrativnih sistema koji su se rasprostirali na sve oblasti koje su osvojili sa centrom u Rimu. Provincije imaju posebnu važnost jer su iz njih koristili prednosti ljudskih i prirodnih resursa za sve aktivnosti koje su želeli. Shodno tome svaka provincija je imala određeni status i bila u obavezi da dostavlja tražene dažbine. Autor se tu detaljno osvrće na obaveze svake provincije. To pokreće i pitanje urbanizacije jer je svako naseljeno mesto svojim razvitkom poprimalo i nove obaveze i dobijalo razne beneficije. U Rimskom carstvu najviše su putovali vojnici dok su delovi nekih pomoćnih trupa i jedinica stalno i bili na putu. Petronije dobro ilustruje mobilnost vojnika koji svake tri godine menja mesto službovanja. Što se tiče ishrane stanovništva, autor predstavlja istraživanja koja pokazuju da je prosečni stanovnik antičkog perioda imao kvalitetniju ishranu od evropskog srednjevekovnog seljaka. Jedan od parametara koji se uzima u obzir je i prosečna visina stanovništva, a u izvorima se nalaze podaci koliko je morao biti visok vojnik da bi mogao ići u rimsku konjicu. Isti je slučaj i po pitanju smrtnosti dece, gde se više vodilo računa u antici o pristupu čistoj vodi za piće i kanalizaciji te da se recimo uvođenjem vodovoda rešio problem kolere u gradu. Autor navodi Juvenalove satire kao tekstove u kojima opisuje teškoće rimskog života i Vitruvijeve o kažnjavanju onih koji oštete ili zagade vodovod. Pronalazak sapuna u više kuća u

Pompejima samo oslikava da je higijeni kao jednom ekonomskom pitanju davano posebno mesto.

U petom odeljku autor se pozabavio pitanjem prirodnih resursa i njihovom eksploatacijom. Po pitanju vrsta zemljišta i njihovom kultivizacijom navodi Collumeline savete kako za popravljanje kvaliteta pojedinih tipova zemljišta tako i za uzgoj raznih biljaka. U upotrebi mineralnih sirovina antičko stavnovništvo nije prevagu davalo onome što je danas najtraženije, nego su se bazirali na sedimentne stene i minerale, te materijale za građevinu. Mineralni resursi imali su veoma važnu ulogu za funkcionisanje ekonomije u celini. Može se reći čak da je cela ekonomija počivala na rudarstvu metala i to od zlata i srebra preko bakra, gvožđa, kalaja i olova. Navodi potom koji su najbogatiji rudnici i koji je sistem vađenja rude. Potom slede opisi nabavke dragog kamenja i začina. Obaveštava nas kako Plinije u svom radu puno mesta daje postupku dobijanja raznih vrsta soli i koliko je to značajno za ekonomiju te koja su mesta najbolja za eksploataciju. Sledeći izvor sirovina su bile šume i tu se prikazuje koliko je zemljišta bilo prekriveno šumama i koliko su one devastirane. U posebnom odeljku autor se pozabavio i izračunavanjem koliko je bilo potrebno po stanovniku proizvesti energije.

U šestoj celini svog dela autor se pozabavio poljoprivredom i stočarstvom te raspodelom zemljišta. Isto tako iz čega su se sastojale vile rustike i urbane vile, a dao je i karte sa rasporedom potvrđenih vila na prostoru Laciuma. Potom se bavi žitaricama, maslinama i grožđem, uzgojem životinja, lovom i ribolovom. Za sve delove se poziva na istorijske izvore kojima dopunjuje izlaganja.

Sedmi odeljak počinje sa proizvodnjom hrane pre svega obradom i skladištenjem žitarica kao i njihovim mlevenjem bilo upotrebom ljudske ili životinjske snage. U ovom poglavlju bavi se i pekarima gde detaljno daje prikaz kako se proizvodilo brašno i pekao hleb u pekarama. Slede odeljci posvećeni preradi maslina, maslinovom ulju i vinu, te pronađenim formama amfora u celoj Galiji. Prerada mesa i dostupnost mesnih prerađevina bila je različita u zavisnosti od položaja provincije i njenih klimatskih uslova. Iako se mislilo da su konzumirali manje mesa nego danas, najnovija istraživanja ukazuju da su jeli više vrsta mesa, a da su govedina i svinjetina bile jednako zastupljene. Zanatstvo sa izradom tekstila i obradom metala (bakra, bronze i olova) bilo je vrlo razvijeno. Izrada opeka dostiglo je takvu standardizaciju da su mogle da se izvoze svugde i budu ugrađene gde god je potrebno. Korišćene su i za izradu lukova. Proizvodnja stakla bila je široko rasprostranjena, a uz pomoć savremenih analiza može se utvrditi i njegovo poreklo. Drvo je imalo vrlo visoko mesto u životu i ekonomiji rimskog carstva, kako Plinije navodi bez drveta nema života jer se koristi u svakoj sferi života. Proizvodnja i trgovina parfemima bio je unosan posao. Plinije ostavlja podatke o cenama nekih koji se uvoze sa istoka, kao i to da se prave i jeftinije kopije. Autor je izabrao i epigrafske natpise sa imenima oslobođenika koji su se bavili spravljanjem parfema.

Razvoj tržišta prati i snabdevanje istog. Da bi ta trgovina funkcionisala i da bi se postigla efikasnost u distribuciji proizvedene robe bili su u celom carstvu dobro osigurani putevi. Iako je transport u unutrašnjem saobraćaju bio skup, on je bio i dobro organizovan. Uz put se nalaze stanice za menjanje konja, taverne, bunari, vojni kampovi, skladišta, a naravno i putokazi. Tu je autor dao posebno naglasak na napoznatije putne pravce i njihovo održavanje. Ne manje pažnje posvećeno je i rečnom transportu i održavanju rečnih obala. Potom se osvrće na morske rute i cenovnik takvog transporta. Daje pregled vozila za vodeni prevoz i njihove karakteristike. Sva ta roba koja je stizala sa raznih strana morala je nekako doći i do krajnjih potrošača. Najveća mesta za njihov plasman su razne vrste pijaca, a mnoge su bile specijalizovane (*forum holitorium, piscarium, pistorum, vinarium*). Gradske pijace mogu se arheološki potvrditi dok seoske ne. Postoje i sajmovi, vašari koji se uglavnom vezuju za neke svetkovine.

Poslednji odeljak odnosi se na monetarnu politiku i finansije. Iako su se vršile velike transakcije

autor se zapitao koliki je deo bio utvrđen u gotovini, a koliko se isplaćivalo na drugačiji način. Antičko društvo jeste bilo monetarizovano, ali su koristili različiti novac. Još jedno pitanje koje je autor postavio odnosi se i na to da ako je mnogo novca i zamena novca u opticaju kako to nije izazvalo stvaranje banaka? Otkriveni dokumenti pokazuju da je bilo pozajmljivanja i zaduživanja na svim nivoima rimskog društva, čak su se davali zajmovi provincijama što je dovodilo i do ustanaka. Pojedini autori (M. Crawford) smatraju da su samo gradovi monetizovani, da je novčani tok u pokretu, ali da je to karakteristično samo u gradovima. Ovakve tvrdnje autor sučeljava sa novim istraživanjima (von Reden) da su za monetarizaciju bila zadužena tri motora, vojska, urbanizacija i poljoprivreda. Vojska je svoje potrebe isplaćivala u novcu, a to nije bilo malo. Sve to dovodi do poslednjeg odeljka, poreza. U osnovi postoje dva oblika rimskog oporezivanja direktan (*tributum*) i indirektan (*vectigal*). Osim poreza carina (*portoria*) je takođe glavni izvor prihoda države. Rimljani su Carstvo podelili na pet glavnih carinskih oblasti. Svi ti prihodi čuvani su u trezorima koji su se mogli otvoriti samo uz ovlašćenje senata u slučaju ugrožavanja riznice. Puno je istraživača koji su se bavili problematikom prihoda rimskog carstva i te procene godišnjeg prihoda vrlo variraju u različito doba carstva. Uzimanja države su različita, kao i podele određenim grupama stanovništva. Merna jedinica oko koje su se saglasili istraživači jeste potrošnja žita po osobi godišnje i došli su do cifre od 250 kg po osobi.

Simbolično ili ne, autor je svoje delo završio porezima i tako kompletirao ekonomiju jedne epohe. Knjiga pokazuje ne samo piščevu naučnu zrelost po pitanju odabira literature već i po stalnom osvrtu na radove drugih savremenih istraživača. Na jednom mestu je prikupio veliku količinu novih podataka i time ovu knjigu učinio vrlo korisnom, ne samo za svoje kolege istoričare, nego i za druge grupe istraživača.

Angelina RAIČKOVIĆ SAVIĆ

TOMASZ GRALAK, ARCHITECTURE, STYLE AND STRUCTURE IN THE EARLY IRON AGE IN CENTRAL EUROPE, IZDANJE UNIWERSYTET WROCŁAWSKI -INSTYTUT ARCHEOLOGII, WROCLAW 2017.

Knjiga sadrži 240 stranica teksta, 44 stranice bibliografije i 110 ilustracija.

Autor, Tomas Gralak, na originalan i intuitivan način predstavlja razvoj arhitekture i društva na području Centralne Evrope, od metalnih doba do epohe Seobe naroda. Koristeći veliki broj analogija različite vrste, autor nas upoznaje sa modulima gradnje i metrologijom primenjenom prilikom izgradnje drevnih građevina i inspiracijama za njihov nastanak. Pitanja vezana za analizu načina gradnje se redovno pojavljuju u arheološkoj literaturi, ali se analiza metrologija javlja izuzetno retko, što ovu publikaciju čini posebno značajnom. Autor nas upoznaje i sa modalitetima razmišljanja ljudi tokom dugog perioda, od halštata do Seobe naroda, načinima na koje je funkcionisalo društvo u tim razdobljima, uz konstataciju da arhitektura, kao i sve druge oblasti stvaralaštva, odslikava simboliku, način razmišljanja i celokupan društveni poredak u datom trenutku.

Teritorijalno, opseg rada bavi se područjem Centralne Evrope, između Rajne i Visle, odnosno Baltičkog mora i Dunava. Kako je autorovom opusu rada najbliži prostor Poljske, posebno Donje Šleske, arheološkim lokalitetima sa ovih teritorija posvećena je posebna pažnja.

U hronološkom pogledu, analiza obuhvata period halštata i latena, preko rimskog doba sve do epohe Seobe naroda. Prema autorovom navodu, u Centralnoj Evropi, svi navedeni periodi mogu se obuhvatiti pojmom rano gvozdeno doba, pa se ovaj termin nalazi i u naslovu publikacije.

Halštatska kultura, tokom VII i VI veka pre nove ere, razvijala se na širokim prostranstvima Zapadne i Centralne Evrope. Nastala je na osnovu kulture polja sa urnama, ali su uticaji pristigli iz različitih pravaca uticali na njen razvoj. U tom periodu, kada gvožđe počinje da se značajno koristi, nastaju velika utvrđena naselja, dok nekropole ukazuju na proces socijalne diferencijacije. Tada postaju uočljive veze sa mediteranskim kulturnim krugom, primetne kako u materijalnoj kulturi, tako i u ideologiji.

Na početku svog dela, autor predočava metrološke analize otkrivenih građevinskih struktura, gde je bilo moguće utvrditi oblik njihove osnove. Rezultati su upoređeni sa ornamentikom zastupljenom na istovremenim keramičkim posudama.

Kao prvi primer, navedeno je naselje lužičke kulture otkriveno u Vojkovicima, okolina Vroclava. Utvrđeno je da se građevine javljaju u oblicima koji se ponavaljaju, tako da je bilo moguće utvrditi postojanje građevinskog modula, čija je dužina, procenjena na 0,785 metara, primenjivana prilikom izrade planova svih građevina. Za ove potrebe verovatno je korišćena neka vrsta konopca odgovarajuće dužine. Modul odgovara uobičajenim merama ljudskog tela, što je pojava zabeležena širom sveta. Određne razlike koje se javljaju u merama objašnjavaju se različitim mernim tehnikama i fizičkim razlikama među populacijama. Korišćeni modul može se poistovetiti sa polovinom dužine hvata (oko 152 cm), odnosno dužinom koraka, čija se dužina od 76 cm i danas javlja kao narodna merna jedinica na prostorima Rusije. Modul dalje može da se podeli na lakat (38 cm) i pedalj (19 cm).

Osnovna kategorija utvrđena prilikom analize gradnje objekata u Vojkovicama predstavlja pravilan red pravougaonih građevina različite dužine. Sve su bile podignute primenom dva paralelna reda markera postavljenih na podjednakoj udaljenosti, u skladu sa modulom. Različitost dužina zavisila je od broja markera korišćenih prilikom

određivanja plana građevine. Potvrdu ovog principa autor je pronašao u analogijama na brojnim lokalitetima u Poljskoj i Nemačkoj. Ova pojava postala je karakteristična za „narodno graditeljstvo“ lokalnih zajednica.

Potvrdu svoje teorije autor je potražio u ornamentima konstatovanim na pokretnim arheološkim nalazima, među kojima očekivano dominira keramika bogate ornamentike, koja u sebi izvesno nosi karakterističnu simboliku. Tokom Halštat C perioda, na teritoriji Šleske i Velikopoljske, javlja se slikana keramika, najčešće otkrivana u grobovima. Keramika je dekorisana geometrijskim ornamentima, najčešće izvedenim u skladu sa modularnim sistemom. Sličan sistem dekorisanja uočljiv je i na predmetima izrađenim od metala (vaze, kopče, igle...).

Primetno je da, između građevina, keramike i metalnih rukotvorina postoji strukturalna povezanost, koja se prvenstveno ogleda u upotrebi modularnog sistema, kao osnove za izradu plana građevina, načina dekoracije i izrade predmeta za svakodnevnu upotrebu. U svim naznačenim slučajevima, uočljiv je značaj trougla kao najčešćeg dekorativnog motiva na posudama, ali i izradama građevinskih planova, pri čemu je model pravougaonog trougla korišćen pri određivanju pravih uglova u okviru pravougaonog modula. Razumljivo, ovaj oblik predstavljao je jedan od principa prostorne organizacije u novopodignutim građevinama.

Preovlađujući dekorativni stil u Šleskoj, tokom halštata, pristigao je preko kulturnih talasa formiranih na Srednjem Istoku, postavši zajednički, *koine,* na širokom prostoru koji je obuhvatao Luristan, Kavkaz, Frigiju, Mikensku Grčku, vilanova kulturu i Centralnu Evropu, dok se njegovi odblesci javljaju i u Maloj Aziji, Centralnom Balkanu i Bavarskoj. Ovaj kulturni talas sa sobom je nosio, između ostalog, proizvodnju gvožđa, antropomorfne predstave, modularnu geometrijsku dekoraciju i, vrlo verovatno, neku vrstu inicijalne ideologije koja je sve elemente povezivala u jedinstvenu celinu.

Autor smatra da su dekorativni motivi karaketristični za geometrijski stil u halštatu korišćeni i u drvodeljstvu. Takođe, ovaj stil mogao je imati svoje odbleske i u drugim tipovima umetnosti, nekim relativno bliskim, poput tkanja, ili, na prvi pogled različitim, kao što je muzika. Sve nas dovodi do veza koje je Centralna Evropa morala imati sa grčkim kulturama tokom „mračnog doba“ (geometrijskog perioda). Ovaj period opevan je u Homerovim delima, čije su klice sigurno nastale u tom razdoblju, što se ogleda i u njihovoj strukturi.

Veliki Homerovi epovi pisani su u heksametru, za razliku od klasičnog perioda, kada je korišćeno više pesničkih metara. Sagledavamo da su i veliki grčki epovi, u svojoj osnovi, imali modularnu strukturu, kombinovanu sa čestim ponavljanjem motiva, što je za zajednice u vremenu pre upotrebe pisma predstavljalo mogućnost za lakše memorisanje, neophodnu osnovu za očuvanje kulture. Homerovi, kao i epovi drugih njemu savremenih poeta, izvođeni su u formi ritmičkih recitacija praćenih muzikom, najčešće izvođenoj na liri, koje je mogao pratiti i ples, čiji ritam je odgovarao pesničkim „koracima“ u heksametru. U klasičnoj Grčkoj bio je usvojen princip jedinstva izražaja tela, glasa i instrumentalne muzike (muzike, plesa i poezije), poznat pod nazivom *choreia.* Utemeljenost ovog principa u kolektivnoj svesti potvrđuje i podatak da su i pravne norme, kao i vladarski dekreti, bili donošeni u formi pesničkog metra, što potvrđuje i starogrčka reč *Νόμοι,* koja označava i pesmu i zakon.

Umetnički izražaji geometrijskog perioda u Grčkoj mogu biti tumačeni kao vizuelizacija shvatanja sveta i čoveka, kakvi su predstavljeni u Homerovim epovima. Keramika je bila ukrašena modelima izvedenim od često ponavljanih elemenata. Oni se sastoje od trougaonih i četvorougaonih motiva raspoređenih u horizontalne trake. Ljudske figure, kao i pojedini delovi tela, imaju izrazito geometrijsku formu. Torzo je često prikazan neproporcionalno velik, što možda ima veze sa verovanjima da se centar svih osećanja nalazi u plućima i srcu. Treba napomenuti da su i predstave životinja prikazivane na sličan način. Ukrasni elementi koji se ponavljaju česti su i na predmetima za svakodnevnu upotrebu (igle, kopče itd.).

Modularna percepcija sveta inspirisala je i filozofe klasičnog perioda. Među nima posebno se ističu Leukip i posebno njegov učenik Demokrit, koji su razvili teoriju da se celokupna priroda sastoji od nedeljivih čestica, atoma. Ovu ideju dalje su razvijali i brojni drugi grčki filozofi, uključujući i Aristotela i Platona.

Na ovaj način bio je koncipiran i razvoj arhitekture, uključujući i sakralnu. Pravila konstrukcije, zasnovana na modularnom principu i pravilima ponavljanja motiva, opisana su u Vitruvijevim delima, koji naglašava da proporcije građevine slede linije tela skladno razvijenog čoveka.

Autor dalje naglašava da su iste ideje i pristupi imali odlučuju ulogu i u stvaranju osnova za razvoj grčke organizacije društva, pri čemu je ustanovljeni vid komunikacije imao suštinski uticaj u razvoju društva i ustanovljenju njegove strukture. U svakom slučaju, može se zaključiti da su Grci bili svesni uticaja koja su metrološka iskustva imala u oblikovanju njihove percepcije i razumevanja sveta.

Naravno, postavlja se pitanje na koji su način i zašto ideje o modularnoj strukturi dosegle do severnih predela, gde su ih prihvatile zajednice koje su formirale halštatsku kulturu. Izvesno je da su veze severnih predela sa Mediteranom imale dugu tradiciju, koja je otpočela u periodu ranog bronzanog doba. Mitološki odblesak ove tradicije pronalazimo u poznatom mitu o boravku Apolona u zemlji Hiperborejaca, o kome svedoče i arheološki nalazi kočija sa upregnutim labudovima, otkrivani na prostorima Centralne i Južne Evrope.

Dekorativni motivi i drugi elementi tipični za halštatsku kulturu su relativno retki na prostorima Južnog Balkana. Češće se javljaju u Podunavlju, kao i u okvirima Vilanova i Este kulture. Sa druge strane, na prostoru halštatske kulture česti su nalazi različitih vrsta importa iz mediteranskog sveta, što svedoči o postojanju direktnog kontakta i komunikacije između ovih kultura.

Elitni slojevi u halštatskoj kulturi gradili su svoj prestiž koristeći i trgujući luksuznim predmetima dobavljenim sa juga. Prisustvo luksuzno dekorisane halštatske keramike najčešće je povezano sa bogatim grobnicama, u okviru čijih priloga se nalazilo i oružje. Zajedno sa novim načinom dekoracije, na halštatske prostore lagano pristiže i nova ideologija, koja je uključivala i religiju, pravni sistem, običaje, a proširivana, u formi pesama, najviše uz pomoć glumaca i poeta. O ovoj pojavi svedoči i veliki broj predstava muzičara sa lirama, poznatih iz halštatskog kulturnog kruga. Navedeno potvrđuju i pisani izvori koji opisuju latenski period, kao i podatak da su srednjovekovni irski zakoni imali poetsku formu kako bi bili lakše zapamćeni.

Kao zaključak priče o halštatu, treba napomenuti da je razvoj novog konstrukcionog stila u arhitekturi tekao paralelno sa sve širom upotrebom gvožđa, kao materijala koji omogućava mnogo lakšu obradu drveta, a time i olakšava primenu novih obrazaca sa strane, poput pravougaonih i modularnih. Ovaj podatak postaje značajniji kada se podsetimo da je drvena građa predstavljala osnovni materijal u izvornoj grčkoj arhitetekturi, koga su zapravo samo oponašale buduće prepoznatljive građevine od kamena, ne samo u osnovi, nego i u detaljima. Međutim, halštatski kulturni krug nije prihvatao samo navedene uticaje u korišćenju građevinskog materijala nego, kao što potvrđuje naselje u Hojneburgu na Dunavu (jug Nemačke), za igradnju čijih odbrambenih zidova su korišćene opeke, materijal do tada nepoznat severno od Alpa. Utvrđeno je da dimenzije opeka odgovaraju istovrsnom materijalu upotrebljavanom u grčkim gradovima Geli i Apoloniji.

Svet geometrijske *koine* kulture bio je organizovan. Svaka jedinica imala je svoje mesto u strukturi, kojoj je ona predstavljala samo jedan deo. Homerov rečnik pokazuje da je, tokom mračnog doba, bilo jako malo reči kojima je pojedinac mogao opisati lična iskustva. Čitava kultura bila je zasnovana na podsećanju svih pojedinaca na njihove obaveze prema celokupnoj zajednici, iz čega proizilazi da je društvena hijerarhija bila utemeljena i nije bila podložna naglim promenama. Iz tih razloga ovaj period karakteriše velika društvena diferencijacija, koju potvrđuju arheo-

loški nalazi bogatih grobnica pripadnika elite halštatskog društva.

Uvideli smo uticaje koje je, prema mišljenju autora, halštatski kulturni krug primio sa mediteranskog područja. Naredna epoha, laten, otvoriće novo poglavlje ove priče.

Latenska kultura nastala je, na temeljima halštatske kulture, na prostorima dnašnje Jugozapadne Nemačke i Istočne Francuske. Usvajanje novih tipova materijalne kulture teklo je paralelno sa napuštanjem utvrđenih naselja i promenama u pogrebnim običajima i društvenoj strukturi. Populacija postaje mnogo mobilnija, sa jačim vojničkim karakterom i većom društvenom jednakošću.

U suštini, latenska kultura se poistovećuje sa keltskim plemenima, mada treba naglasiti da je i među njima bilo onih koji nisu prihvatili ovaj kulturni model. Primere za ovaj stav, autor pronalazi na Iberijskom poluostrvu, Cisalpinskoj Galiji i Britanskim ostrvima.

Sa druge strane, latenska kultura se gotovo u startu pojavila u razvijenoj formi, čiji su uzori traženi među Etrurcima i na prostorima Grčke. U osnovi je imala tzv. orijentalistički ili animalistički stil, čiji su se elementi pojavili u periodu halštata. Javljali su se najčešće na nakitu, najčešće importovanom, što ukazuje na pojavu društvenog raslojavanja. Na ovu pojavu imao je veliki uticaj i kontak sa prostorima koje je zahvatala basarabi kultura, čiji uticaj na latensku kulturu je mogao da se ogleda ne samo u prisvajanju određenih dekorativnih motiva, nego i elemenata ideologije.

U ranom latenu dolazi do napuštanja modularnog sistama i prestaju da se koriste pravougaoni i trougaoni motivi. Krugovi i sfere postaju dominantni dekorativni motivi. Ljudske i životinjske predstave su komponovane korošćenjem diskova, krugova i elipsi, što autor upoređuje sa „diznijevskim“ stilom u XX veku. Treba naglasiti i da su, na antropomorfnim predstavama, dominantne predstave glave, sa često dodatno naglašenim očima.

Značajnu osobinu latenske umetnosti predstavlja i izbor materijala, odnosno različitost u načinu dekoracije u zavisnosti od vrste predmeta. Keramika više nije bogato dekorisana, sa delimičnim izuzetkom nalaza otkrivenih u Severnoj Galiji. Predmeti od metala postaju cenjeniji i raskošno ornamentisani, što se posebno odnosi na ukrasne predmete (narukvice, torkvese itd.) najčešće izrađene od bronze, ali i od srebra i zlata. Za ove potrebe retko je korišćeno gvožđe, mada treba naglasiti da i oružje postaje značajan činilac u izražavanju simbolike.

Antički autori, na prvom mestu Diodor i Cezar, pružaju određene podatke o keltskoj religiji, u čijoj osnovi je ležala vera u besmrtnu dušu, koja predstavlja vrhovni princip koji vlada svetom, što je ostavilo trag na čitavu kulturu. Ovo verovanje izvesno je pristiglo sa Mediterana, najverovatnije preko Grčke, gde je duša najčešće predstavljena kao sfera u kružnom kretanju.Na ovo verovanje nadovezuje se i pretpostavka da kretanje nebeskih tela reflektuje kružni put duše, što potvrđuju Cezarovi zapisi o astronomskom znanju druida.

U skladu sa ovim verovanjima, u latenskoj umetnosti dolazi do novog načina percepcije ljudskog tela, u kome se sada naročita pažnja posvećuje glavi, kao mestu gde obitava besmrtna duša. Na ovom mestu, autor nas podseća na mit o Orfeju, čija glava je, iako odvojena od tela, nastavila da peva i propoveda. Kod Kelta je postojao specifičan kult, oličen u lovcima na glave, koji beleže brojni antički pisci. U Južnoj Galiji otkriveni su ostaci hramova poznatih kao „kapele lobanja“. Na čitavom prostoru koji je pokrivala latenska kultura pronađene su brojne ostave ljudskih glava, kao i amuleti izrađeni od kostiju lobanje. U latenskoj umetnosti glava i oči se često predstavljaju u vidu krugova i elipsi različitih po veličini, što odražava simboličnu predstavu kružnog kretanja duše.

Novi model kulture usvojen u latenu bio je povezan i sa promenama u ponašanju. Tipičan zajednički element za keltsku populaciju toga doba predstavljale su sve vrste migracija, što se odnosilo kako na celokupna plemena, tako i na pojedince, poput misionara. Sa promenama mesta nastanjivanja bio je povezan ceo proces edukacije. Mladići su slati da bi bili vaspitavani kod suseda

ili rođaka, dok su druidi prelazili velika prostranstva kako bi širili svoja znanja. Po svemu sudeći, inspiracija za ovaj model ponašanja pristigla je sa grčkih prostora.

Opisani model ponašanja nastao je na osnovu verovanja o duši kao suštinskom principu koji upravlja čitavim univerzumom. Kretanje duše i njena potraga za odgovarajućim ritmom i mestom u ljudskom telu predstavljala je prototip za ponašanje pojedinaca i čitave zajednice, što se odražavalo, između ostalog, kroz brojna putovanja. Dolazi i do promena u socijalnoj strukturi, koja se ogleda u tome što nestaju grobne humke pređašnjeg višeg staleža, a sve više se javljaju grobovi ratnika, koji postaju dominantna klasa, što posvedočuju i Cezarovi zapisi. Ipak, evidentno je da drustvena struktura postaje ujednačenija nego u prethodnom periodu.

Pokreti i promene postaju obrazac koji formira socijalnu strukturu. Može se konstatovati postojanje potlača, odnosno uništavanja ili povlačenja iz opticaja materijalnih dobara, koji postaje važan deo keltske kulture. Ovaj običaj je karakterističan za grupe sa promenljivom socijalnom strukturom, što preduzimljivi pojedinci pokušavaju da iskoriste. On na taj način podstiče ratničke vođe da preduzimaju vojne pohode sa ciljem sticanja novih dobara. Ovaj običaj posvedočuju brojna otkrića ostava.

Pošetak latena karakteriše napuštanje halštatskih uporišta u brojnim područjima (Rajnska oblast, Ardeni, Šampanja...), što prati depopulacija izazvana migracijama. Tek tokom Latena C dolazi do razvoja naselja, uključujući i utvrđene opidume. Metrološka analiza naselja otkrivenog u Manhingu (Bavarska) pokazuje da je korišćena merna jedinica iznosila oko 31 cm, koju otkrivene analogije, poput opiduma u Bibraktu (Burgundija), potvrđuju kao korišćenu na velikom delu latenske teritorije. Ova merna jedinica verovatno vodi poreklo sa Mediterana i približna je tzv. Ptolomejovoj stopi.

Na pomenutom lokalitetu u Manhingu utvrđeno je da su, prilikom planiranja građevina, korišćene utvrđene proporcije, kod pravougaonih u odnosu 3:4 i 4:7, dok je kod kvadratnih iznosio 3:3 merne jedinice. Prvougaoni i kvadratni oblici smanjivali su se i uvećavali u zavisnosti od vrsta građevina, ali su proporcije uvek ostajale iste. Izvesno je da, u ovom slučaju, imamo primer da su moduli iz halštata nastavili da se koriste i u novom periodu, mada su u novom sistemu planiranja građevine korišćeni i kružni moduli izvedeni konopcem ili nekom vrstom vrpce ili strune.

Na osnovu iznetih argumenata, autor zaklju;uje da je izvorište nove kulture i umetnosti nastalo na osnovu transformacija pređašnjih paradigmi. Sada može da se postavi pitanje o osnovama za nastanak ovih promena, čiji su nosioci bili pripadnici posebne klase koja se bavila religijom i umetnošću. Konkretno, druidi, koje pominje ukupno sedamnaest grčkih i rimskih pisaca.Antički izvori svedoče da su druidi podučavali „plemenite ljude“ dugo vremena (dvadeset godina) na skrovitim mestima, poput pećina. Ove zapise potvrđuju arheološki nalazi.

Često se navodi i da su druidi osnivali bratstva slična pitagorejcima i da su usvojili nešto od njihove doktrine. Izvori takođe opisuju svešteničke zajednice u okviru tračko-dačke populacije. Učenja ovih grupacija inspirisala su orfizmom, u čijoj suštini se nalazi vera u besmrtnu dušu. Legenda govori da je Zalmoksis, utemeljivač dačke religije, ranije bio Pitagorin rob. U svakom slučaju, izbvesno je da su ideje, ponikle u Grčkoj, imale veliki uticaj na nastanak druida i njihovog pogleda na svet. Treba napomenuti da su, pod ovim uticajem, nastale promene i na prostorima koje je obuhvatala basarabi kultura.

Nova doktrina imala je i druge načine za propagiranje svojih ideja. Izgleda da glumci i pevači, kao ni pesnički metar, više nisu imali prvorazredan značaj u širenju novih ideja. Sa druge strane, zanatlije su imale značajnu ulogu u širenju promena u kulturi. Stiče se utisak da su bili, na neki način, podsticani da proizvode rukotvorine u novom stilu.

U grčkom svetu, kraj geometrijskog perioda i nastanak orijentalizirajućeg stila, bio je povezan sa velikim promenama u pitanju percepcije čitavog sveta. Modularni sistem prestaje da bude

ubedljivo tumačenje za razumevanje stvarnosti. Shvatanja sveta prestala su da budu statična i čvrsto utemeljena. U geometrijskom shvatanju sveta sve i svako imalo je svoje precizno utvrđeno mesto. Svi su bili u obavezi da ispune svoje dužnosti prema bogovima i drugim ljudima. Svako ljudsko biće predstavljalo je modul u okviru šire strukture, poput geometrijskog ornamenta. Harmonija je zavisila od održavanja reda. Prihvatanje ovih pravila i prikladno ponašanje obezbeđivali su uspeh pojedinaca i čitave zajednice.

Početkom klasičnog perioda, ovo pravilo počinje da se dovodi u sumnju, najviše iz razloga njegovog nepotvrđivanja u praksi. Ovaj fenomen odlično opisuju grčke tragedije, recimo Sofoklova Antigona, koje pokazuje da čovek, iako postupa striktno po pravilima, ne može izbeći propast. Slični motivi poznati su i u semitskim kulturama, poput biblijske Knjige o Jovu, ali i delima vavilonske i egipatske književnosti. Kao odgovor na ova razmišljanja, javljaju se pregnuća za promenu ustaljenog reda. Odličan primer novog pogleda na stvari predstavlja Antenorova skulpturalna kompozicija Tiranoubica, koji su predstavljeni nagi, poput heroja. Oko 500. godine nove ere započinje talas demokratizacije koji započinje u Atini i Grčkoj, potom u Rimu i, finalno, zahvata područja halštatske kulture. Svet prestaje da bude modularan, statičan i sa modelima koji se neprestano ponavljaju. Sad se smatra pokretnim i podložnim neprestanim promenama.

Ostaje otvoreno pitanje procesa rasprostiranja latenske kulture, koji je predstavljao prihvatanje dostignuća keltske civilizacije od strane različitih varvarskih naroda. Ovaj proces nikada nije obuhvatio sve elemente latenske kulture, pa su nekeltski narodi prihvatali samo neke od njenih elemenata. Autor dalje daje brojne primere rasprostiranja keltske kulture u oblastima oko Baltičkog i Crnog mora.

Pojava ranog rimskog stila u Barbarikumu povezana je sa dramatičnim političkim promenama koje su zahvatile Centralnu Evropu na kraju stare i početkom nove ere. Tada dolazi do naglog opadanja latenske kulture. Keltska područja osvajaju Rimljani, pri čemu, naravno, najznačajniju ulogu imaju Cezarovi pohodi. Posle toga, Avgust pomera rimsku granicu do Rajne i Dunava, a Kelte dodatno ugrožavaju i Dačani sa istoka i Germani sa severa. Na razmeđu hronoloških era, između Rajne i Labe osniva se rimska provincija Germanija. Njeno postajanje bilo je grubo prekinuto ishodom bitke u Teotuburškoj šumi, 9. godine nove ere, što dovodi i do promena u germanskoj kulturi.

Rani rimski stil u Barbarikumu javlja se tokom Laten C i Laten D perioda. Tokom Latena C dolazi do promene životnog stila koji postaje više sedelački. Karakteristiku ovog perioda predstavljaju opidumi. Njihova lokacija ponavlja mesta nekadašnjih hajštatskih uporišta. Tokom Latena D, naselja dobijaju karakteristike „vierckschanzen“ tipa, odnosno četvorougaonog naselja opasanog rovovima i zemljanim bedemima, kakvi su najčešći u Južnoj Nemačkoj, Češkoj i Francuskoj.

Tokom Latena C2 i Latena D dolazi do povratka geometrijskoj dekoraciji, zasnovanoj na modularnom sistemu. Ova pojava se prvo javlja na slikanoj keramici, a potom i na predmetima izrađenim od drugih materijala. Vremenski se gotovo poklapa sa promenom hronoloških era. Smatra se da je pleme Markomana imalo veliku ulogu u ovom procesu. Pod vođstvom Marobuda, Markomani stvaraju državnu organizaciju, šire se na račun susednih plemena, poput Sveva i Luga, da bi zauzeli ceo sliv reke Labe i prostor pševorske kulture. Stvaranje države Markomana istovremeno označava početak intenzivnih odnosa između varvara i Rima.

Stilska analiza arhitekture na makromanskom području može se pratititi na lokalitetima Polvica 4 i 5 i Skripnik 8 u blizini Olave (Donja Šleska, Jugozapadna Poljska). Na sva tri lokaliteta pronađeni su ostaci naselja pševorske kulture, sa građevinama iz ranog rimskog perioda zidanih po sistemu „šest tačaka“, karakterističnom za južni deo sliva Labe, uglavnom za Moravsku i Slovačku, a nešto manje i za Češku.

Metrološka analiza građevina pokazala je da su građevine zidane u sistemu dimenzija koje se po-

navljaju. Utvrđeno je da osnovna jedinica dužine iznosi 71,5 cm, što je približno duzini od polovine hvata. Ovi principi utvrđeni su kod svih građevina iz ranog rimskog perioda. Princip „šest tačaka" zasnovan je na ideji neravnomernog raspoređivanja šest markera u planiranom prostoru građevine. Oko svakog markera izvođeni su krugovi, konopcem približne dužine od dvanaest mernih jedinica, čime je dobijan plan građevine. Modul je tako dobijao oblik trougla proporcija 3 x 4 x 5 (ukupno 12). U suštini, ovaj plan zasnovan je na proporcijama sličnim pitagorejskom trouglu, uz korišćenje jedinstvene merne jedinice i organizacije prostora. Može se reći da građevine iz ranog rimskog perioda predstavljaju kombinaciju halštatskih (pravougaonih) i latenskih (krivolinijskih) tradicija.

Modularni sistem (kompozicija sačinjena od segmenata koji se ponavljaju) predstavljala je osnovu pševorske keramike u prerimskom periodu, uz korišćenje četvorougaonih motiva. Modularni sistem dekoracije nastavljen je i na keramici u narednom perioda, samo što sada dominiraju motivi svastikje i meandra.

U poljuprivrednim društvima, pristup organizaciji prostora bio je od suštinskog značaja za opstanak zajednice. On omogućava pristup osnovnim mestima proizvodnje, odnosno prostoru izdvojenom za zemljoradnju. Tacit u svojoj *Germaniji* beleži da su zemljoradnička polja takođe imala modularnu strukturu, odnosno da su bili sličnog oblika i veličine. Arheološki nalazi potvrđuju ove zapise, posebno na tzv. „keltskim poljima" u severnom delu Barbarikuma. Treba naglasiti da su, kao što navode i Cezar i Tacit, naseljeni prostori razdvojeni nenaseljenim prostranstvima, šumovitim i/ili planinskim, što predstavlja karakteristiku čitavog evropskog Barbarikuma.

Na narednim stranama, uz pomoć velikog broja primera i analogija, autor navodi suštinske razlike izmešu pševorske i, susedne, vielbarske kulture (predmeti za svakodnevnu upotrebu, „sveti gajevi", pogrebni običaji, grobovi sa oružjem, ritualni prostori...). Priču o ranom rimskom periodu, autor zaključuje sa očuvanim tradicijama iz perioda halštata (građevine organizovane oko centralnog prostora, pojedini običaji, nastanak ritualnog prostora, figuralne predstave...).

Tokom III veka Rimsko carstvo zahvata velika ekonomska kriza. Ona rezultuje ideološkom krizom, koja se manifestuje prvo progonom hrišćana, ali i njihovim trijumfom u narednom veku. U III veku filozof Plotin preispitao je klasične ideje o lepoti zasnovane na simetriji, proporciji i harmoniji. On je smatrao da lepota ne proizilazi samo iz uređenja pojedinačnih elemenata, nego i od njihovog kvaliteta. Na osnovu ovog mišljenja, koje favorizuje unutrašnju lepotu i njene duhovne vrednosti zasnovana je ranohrišćanska i vizantijska umetnost, mada se neki elementi ovog pristupa javljaju još od I veka.

Deluje da je transformacija kulture u Evropskom Barbarikumu bila povezana sa dešavanjima u Rimskom carstvu. Nove ideje, nastale u Carstvu, stizale su do teritorija nastanjenih varvarima. Pored promena u materijalnoj kulturi, prvorazredan primer predstavlja prihvatanje hrišćanstva od strane Gota i drugih germanskih naroda, naravno, u arijanskom obliku. Treba imati u vidu da je populacija iz perifernih oblasti prihvatala novopridošle ideje selektivno i često im davala sopstvena tumačenja, tako da kultura Barbarikuma ne predstavlja jednostavnu kopiju rimskih uzora. Drugi važan činilac za događanja u Barbarikumu predstavljaju prodori stepskih naroda, prvenstveno Huna.

Autor posebno naglašava da je Evropski Barbarikum bio, takođe, zahvaćen ekonomskom krizom, čije posledice su pojačavali dodatni faktori ogledani u značajnom zahlađenju klime, što je imalo katastrofalne posledice po poljoprivredu. Na prostorima pševorske kulture u Poljskoj, od početka III veka, javlja se znatno manje arheoloških nalaza, što je povezano sa progresivnim opadanjem populacije. Posledicu svega predstavljaju migracije što dovodi do napuštanja nekadašnjih teritorija i nestanka kultura koje su se razvijale na tim prostorima. Tada dolazi i do formiranja novih zajednica sa, do tog trenutka nezabeleženim imenima, poput Saksonaca, Franaka, Alemana, Tirinžana...

U tom periodu i varvari usvajaju novi pogled na svet, po kome duša predstavlja osnovni element koji svemu daje smisao i lepotu. Ovo shvatanje predstavlja suštinu koja određuje strukturu sveta u celini, ali i pojedinačnih objekata i ljudskih tela. Duša postaje osnovna paradigma za razumevanje i opisivanje stvarnosti. Sada se postavlja pitanje na koji način duša može biti predstavljena. Autor sada ponovo podseća na razmišljanja grčkih filozofa klasičnog perioda koji su kretanje duše predstavljali u vidu kružnog toka.

Takva ideja o duši predstavljala je razlog za korišćenje dekorativnih motiva u vidu krugova i, još zastupljenije, spirala koji postaju veoma popularni tokom epohe Seobe naroda. Oni se javljaju na predmetima za svakodnevnu upotrebu, poput fibula i pređica. Na njih se nadovezuje i tzv. motiv čvora, čest na metalnim predmetima, ali i keramici.

Tokom Seobe naroda, u znatno većem broju nego u prethodnim razdobljima, javljaju se predmeti od zlata i dragog kamenja, što je dovelo i do sve veće upotrebe polihromije u dekoraciji rukotvorina, što je takođe povezano sa promenama u ideologiji, gde se naglašava da lepota boja simbolizuje pobedu nad tamom. Krajem rimskog perioda javlja se dekorisanje metalnih predmeta pečatnim motivima sa raznim vrstama dekoracije (motiv ranije korišćen pri dekoraciji keramike), što ukazuje na značaj tehnike obrade metala i verovatno simbolizuje odnos duše i tela.

Autor napominje da su izrađivači nakita od metala morali, pored zanatlijske veštine, da poseduju i značajna znanja iz religije, što potvrđuju i srednjovekovni pisani izvori. Njihove rukotvorine prvenstveno su bile namenjene eliti, koja je kreirala novi stil i imala mehanizme da svoje viđenje sveta nametne ostalim pripadnicima zajednice.

Pojava Huna, 375. godine, označava početak Seobe naroda u Evropi. Huni napadaju plemena koja su se nalazila na njihovom putu, dok napadnut narod kreće na svog prvog suseda i tako redom, što je jednostavno opisao Sveti Ambrozije: „Huni su napali Alane, Alani Gote, Goti Tajfale i Sarmate“. Krajem IV i u V veku, Huni uglavnom deluju u dunavskom basenu i, pod vođstvom Atile, stvaraju državnu organizaciju koja je kontrolisala velike delove Centralne i Istočne Evrope. Njihova hegemonija okončava se nakon smrti vladara i bike kod reke Nedao, 454. godine. Direktna posledica ovih događaja je veoma jaka orijentalizacija kulture Evropskog Barbarikuma.

Tokom Seobe naroda postaju veoma česte dekorativne predstave ljudi i životinja, inače retke u rimskom periodu, što se objašnjava kao uticaj ideja centralnoazijskog šamanizma. Predstave su rađene veoma stilizovano, tako da su ponekad gotovo neprepoznatljive. Istovremeno se javlja i običaj davanja ličnih imena po životinjama, čiji značaj najbolje posvedočava primer Beovulfa. U isto vreme počinju da se koriste i maske sa predstavama ljudskih lica, koje su verovatno olakšavale komunikaciju sa svetom duhova i mitoloških bića. Tipični su i ornitološki motivi u dekoraciji, najčešće orlovi i sokolovi. Kao posebno značajni predmeti kod Huna javljaju se ogledala, često otkrivana kao grobni prilozi u Centralnoj Evropi. Poznato je da su ogledala imala bitnu ulogu u šamanskim obredima.

Karakteristiku predstavlja pojava sahrana konja, konstatovana na prostorima između Rajne, Labe i Dunava. Često se javljaju na grobljima, zajedno sa grobovima ratnika sahranjenih sa konjima. Za ovaj običaj česte su analogije na azijskim područjima.

Pod uticajem stepskih naroda dolazi do promena u pogrebnim običajima. U skeletnim grobovima primetna je pojava disartikulacije tela i ponovnog otvaranja grobnih mesta, što su elementi karakteristični za inicijacije šamana, sa ciljem oživljavanja i preuzimanja novog identiteta.

Pored pogrebnih običaja, dolazi i do promena u percepciji samog ljudskog bića, o čemu svedoče običaji deformisanja tela, prvenstveno glava dece. Ovaj običaj, od evropskih naroda, najviše su prihvatili Germani, što ukazuje da je njihova zajednica psihološki bila spremna da ga prihvati. Kod Huna zabeleženo je i unakaživanje lica i tetoviranje. Osakaćivanje tela ukazuje predstavlja još jedan dokaz verovanja da duša predstavlja suštinu

čoveka. Po tom pitanju, šamanizam korespondira sa hrišćanstvom. Deluje da je religijski sistem Barbarikuma ljudsko telo doživljavao samo kao neku vrstu nosioca mnogo bitnijih vrednosti od njega samog. U skladu sa tim razmišljanjem, postaje razumljivije antropomorfne predstave u svedenom ili deformisanom obliku.

Verovanja u suštinsku važnost stvari poput duhovne lepote i plemenitih dela, uslovila su promenu u obrascima prihvatljivog ponašanja. Vreme Seobe naroda je period u kome se izuzetni pojedinci pojavljuju u varvarskim zajednicama. Oni predstavljaju vođe koje svoj narod, na primer, vode sa jednog na drugi kraj poznatog sveta. Njihova pojava predstavlja posledicu ekstremno nestabilne političke situacije i upečatljivi individualci bili su u prilici da iskažu svoje vojne ili organizacione sposobnosti. Sa druge strane, i zajednice su prihvatale i, verovatno, iščekivale pojavu ljudi obdarenih posebnom harizmom. Na neki način, to je predstavljalo neku vrstu odraza „duhovne lepote“. Naravno, to ne znači da se, u prethodnim periodima, nisu pojavljivali izuzetni pojedinci, ali je Seoba naroda pružala daleko najveće mogućnosti za ljude od akcije.

Najistaknutiji primer među izuzetnim pojedincima svakako je Atila. Autor posebno skreće pažnju da je, ova izuzetna ličnost, imala drastično drugačije ponašanje od njegovog neposrednog okruženja. Prema Priskovim zapisima, Atila je jeo iz drvenih posuda, oblačio se skromno, koristio nedekorisano oružje i veoma jednostavnu konjsku opremu. On se jasno razlikovao od njegovih dvorjana, koji su se raskošno odevali i koristili zlatne posude. Opisano jasno odslikava da je poseban status zasluživan individualnim sposobnostima, a ne materijalnim objektima.

Može se zaključiti da je, tokom Seobe naroda, period viđenja prostora sačinjenog od delova u potpunosti nestao. Svet postaje uniforman i više se ne posmatra kao struktura sastavljena od modula. Sa druge strane, pojavljuje se mišljenje da je sve podložno slobodnim promenama i oblikovanju. Ovo shvatanje primenjivalo se i na druge komponente kulture, uključujući i samo ljudsko telo.

U zaključku, preciznije epilogu, autor naglašava da je Seoba naroda period kada nestaju uzajamni odnosi, označeni kao korelacija između centra i periferije, između Rimskog carstva i Centralnoevropskog Barbarikuma. Rimsko carstvo postepeno gubi snagu i prostranstva, lagano klizeći u propast. Oblastima, koje su ranije nastanjivali Germani i Sarmati, počinju da dominiraju Sloveni. Prema autorovom mišljenju, Sloveni su se u rimskom periodu nalazili na marginama Evropskog Barbarikuma i nisu uzimali učešća u pomenutom odnosu centra i periferije. Zbog toga, u vreme propasti ovih korelacija, nisu osetili posledice krize što je predstavljalo razlog uspeha njihovog kulturnog sistema.

Germani, Sarmati i, potom, Sloveni u velikom broju se pojavljuju na prostorima bivših rimskih provincija. Svet, u formi u kojoj je postojao pre 375. godine, se raspao. Međutim, očito je da su ljudi tražili odgovore na pitanja na koji način da stvore nove životne uslove za sebe. Seoba naroda predstavlja vreme potrage za novim poretkom. Nova religija, hrišćanstvo, brzo osvaja široka prostranstva. Autor smatra da su, tokom Seobe naroda i ranog srednjeg veka, stvoreni uslovi da Evropa, iako nije bila homogena, postane zajednica.

Knjiga Tomasa Gralaka predstavlja originalno i inspirativno delo, neophodno svim istraživačima Evropskog Barbarikuma, ali i svima koji budu proučavali prostore sa kojima je Barbarikum imao komunikaciju tokom gotovo dva milenijuma, koliko iznosi hronološki opseg pokriven ovom značajnom publikacijom.

Ljubiša VASILJEVIĆ

BOJANA ILIJIĆ, TIMACUM MINUS − DVA SVETA,
IZDANJE ZAVIČAJNI MUZEJ KNJAŽEVAC, KNJAŽEVAC 2015.
Publikacija sadrži 88 stranica, 89 kataloških jedinica, 115 fotografija.

Publikacija Bojane Ilijić, *Timacum Minus − dva sveta*, urađena je u formi kataloga, mada svojim značajem prevazilazi taj format jer pruža sabrane informacije i nepublikovane podatke o izuzetno značajnom lokalitetu. Autorka je, za potrebe izložbe i publikacije, uključila u aktivnost stručnu ekipu, koju su činili, između ostalih, urednik Sofija Petković i recenzent Gordana Jeremić, kao i brojni saradnici za polja dizajna, grafike, fotografije, konzervacije, lekture i prevoda na engleski jezik (naglasićemo izuzetno uspela dizajnerska i grafička rešenja).

Tekstualni deo započinje kratkim *Predgovorom,* u kome se autorka osvrće na, sada već davnu 1975. godinu, kada je započeto novo poglavlje u istraživanju lokaliteta Kulina u Ravni, identifikovanim sa antičkim Timacum Minus-om (izložba i katalog priređeni su na četrdesetogodišnjicu od započinjanja sistematskih istraživanja).

U *Uvodu*, posvećenom položaju i prirodnim karakteristikama lokaliteta, skreće se pažnja na geografski položaj, reljef, klimu, hidrografiju, zemljište i geološke resurse Timočke krajine i knjaževačkog kraja. Potom su predstavljene antičke komunikacije registrovane u oblasti Timoka, gde je svakako najznačajniji put Lissus – Naissus – Ratiaria. Drugi važan put, koji je uključivao dolinu Timoka je Naissus – Serdica. Kod Knjaževca su se račvali putevi koji su povezivali sever Timočke oblasti, kod ušća reke u Dunav i jug, od ušća Svrljiškog u Trgovački potok. Putevi su se dalje granali u pravcu juga i jugoistoka (Niš i Pirot), severa (dolina Crnog Timoka), zapadu (dolina Morave) i istoku (Arčar). Ostaci puta ka Nišu evidentirani su u selu Nišavac, što potvrđuje postojanje trase puta preko Svrljiških planina i kod lokaliteta Ploče u Orešcu. Krak puta ka severu je evidentiran na lokacijama Lug (Štipina), Ravani potok (Ravna) i Mali drum (Debelica). Jedan deo ovog puta se odvaja u pravcu severa i, dolinom Koritske reke, vodi ka Arčaru. Na ovoj deonici registrovani su ostaci rimskih utvrđenja. Put ka jugu, u pravcu Turres-a, omeđen je utvrđenjima lociranim duž Trgoviškog potoka. Dolinom Papratske reke odvaja se jedan manji krak puta, dok se drugi krak, od utvrđenja kod Kalne, usmerava dolinom Crnovrške reke. Trasa puta koja je vodila ka Pomoravlju, registrovana je na lokalitetu Gradište u Videvcu. Sa ove tačke račvaju se dva kraka puta, ka dolini Crnog Timoka kroz selo Lepena i ka Sokobanji preko lokacije Stari drum, severozapadno od Banjskog Orešca. Navedeno je i postojanje komunikacije od tvrđave u selu Bučje, preko Koželja (utvrđenje) i sela Drenovac do doline Belog Timoka i Koritske reke. Sledom pozicija kasnoantičkih utvrđenja evidentiran je putni pravac od Baranice, preko sela Gradište ka Crvenom gradu na Staroj planini. Kod Gradišta odvaja se krak ka rudarskim oknima u selu Dejanovac. Ovaj pregled jasno pokazuje komunikacijski i strategijski značaj knjaževačkog kraja u antičkom periodu.

Istorijat istraživanja nam govori o svim etapama od prvog pomena lokaliteta do savremenih iskopavanja, što predstavlja period od sto pedeset godina. Prve podatke o nalazištu zabeležio je lekar Stevan Mačaj 1866. godine, u svom radu *Građa za topografiju okruga knjaževačkog,* gde navodi ostatke starog grada na levoj obali Timoka i povezuje ga sa Rimljanima. Dr Mačaj je na svoje otkriće uputio i nezaobilaznog putopisca Feliksa Kanica, koji zaključuje da je reč o rimskom kastrumu i zapažanja publikuje 1892. godine u delu *Römische Studien in Serbien.* Lokalitet je zainteresovao i Alfreda Domaševskog, koji je posetio Knjaževac 1866. godine

i prvootkrivene natpise objavio u CIL-u.

Krajem XIX veka, general Antonije Bogićević poslao je Mihajlu Valtroviću plan ravanske tvrđave. Na žalost, plan nikada nije objavljen. Drugi general, Jovan Mišković, u svom radu publikovanom u *Glasniku srpskog učenog društva XIX* iz 1881. godine, pruža detaljnije podatke o kastrumu. Početkom XX veka, lokalitet je privukao pažnju i lingviste i antropogeografa Marinka Stojakovića, koji je u svojoj knjizi *Timok* predstavio lokalitet, zajedno sa drugim antičkim spomenicima knjaževačkog kraja.

Ključni momenat za istraživanje Timacum Minus-a predstavlja saradnja između Artura fon Premerštajna iz Austrijskog arheološkog instituta i Nikole Vulića, profesora Beogradskog univerziteta. U periodu između 1889 i 1902. godine započeta su prva arheološka istraživanja ravanskog utvrđenja, koja su izvođena sve do početka Drugog svetskog rata, pod rukovodstvom Nikole Vulića. Pokretni arheološki materijal sa ovih istraživanja čuva se u niškom muzeju.

Posle višedecenijske pauze, 1975. godine, započeta su nova istraživanja, u saradnji Arheološkog instituta iz Beograda i Zavičajnog muzeja Knjaževac. Sistematska istraživanja lokaliteta nastavljena su, sa povremenim prekidima, do današnjih dana. Radovima su rukovodili Petar Petrović i Miloje Vasić, a danas projekat vodi Sofija Petković.

Prve godine istraživanja akcenat je stavljen na iskopavanja severoistočne i severozapadne kule utvrđenja, a istraživan je i kružni objekat u unutrašnjosti fortifikacije. U narednim kampanjama nastavljena su istraživanja kula, severne kapije i bedema, ali i prostora *extra muros*, gde su registrovani rimski grobovi inhumiranih pokojnika i terme. Paralelno sa arheološkim istraživanjima, Zavod za zaštitu spomenika kulture iz Niša realizovao je konzervatorske radove otkrivenih objekata.

Krajem sedamdesetih godina XX veka, započeta su iskopavanja građevine sa hipokaustom, izvan bedema, kao i centralnog objekta u unutrašnjosti utvrđenja, gde je registrovano i postojanje srednjovekovne nekropole. U temeljima obližnje crkve Sv. Trojice otkriveni su ostaci antičkog hrama. Tokom osamdesetih godina XX veka istraživanja su fokusirana na prostor zapadnog i južnog bedema, zapadne kapije i jugozapadne kule utvrđenja. U centru sela Ravna, na lokalitetu Crkvište–Sveta Petka, evidentirane su jame i skeletni grobovi.

Početkom poslednje decenije trećeg milenijuma, Odeljenje za arheologiju Filozofskog fakulteta u Ljubljani, Arheološki institut iz Beograda i Zavičajni muzej Knjaževac izveli su geomagnetska snimanja lokaliteta, čime započinje novo poglavlje istraživanja. Godine 1991. realizovana su istraživanja u okviru projekta međunarodne saradnje sa američkim Univerzitetima iz Mičigena i Olbenija, fokusirana na sektor centralne građevine u unutrašnjosti utvrđenja. U periodu od 1994–1996. godine, na bregu Slog, otkrivene su poznorimska i srednjovekovna nekropola, kao i biritualna nekropola na desnoj obali Ropinskog potoka (III–IV vek), kao i nekropola (verovatno srednjovekovna) na lokaciji Tursko groblje. Paralelno sa istraživanjima nekropole, odvijala su se iskopavanja južne kapije utvrđenja.

Nakon više od dve decenije pauze, 2008. godine, sprovedena su zaštitna iskopavanja na lokaciji Podina, gde su otkriveni delovi kamene strukture i skeletni grobovi. Naredne godine, u okviru uređenja Arheo-etno parka u Ravni, nastavljeno je istraživanje nekropole na Turskom groblju.

U 2010. godini započet je rad na obradi pokretnog arheološkog materijala, čije rezultate nestrpljivo očekujemo. Iste godine, u saradnji Arheološkog instituta iz Beograda, zavičajnog muzeja Knjaževac i Rimsko-germanske komisije Nemačkog arheološkog instituta iz Frankfurta na Majni urađena je geofizička prospekcija lokaliteta. Tokom 2013. i 2014. godine nastavljena su zaštitna arheološka iskopavanja nekropole Slog, koja su dala značajne rezultate. Plan za naredna istraživanja obuhvata definisanje granica prostiranja nekropole Slog, kao i istraživanje unutrašnjosti utvrđenja i civilnog naselja.

Poglavlje *Stratigrafija kulturnih slojeva arheološkog nalazišta Timacum Minus* posvećeno je nepokretnim nalazima otkrivenim na lokalitetu i nji-

hovoj interpretaciji. Rezultati istraživanja pružila su važne informacije o prošlosti Istočne Srbije u praistorijskom, antičkom i srednjovekovnom periodu.

Najstariji nalazi opredeljuju se u starije i srednje gvozdeno doba (gvozdeno doba Ib i gvozdeno doba IIc, faza Lanište II−Basarabi). Fragmenti keramike sa prostora Termi I opredeljuju se u mlađe gvozdeno doba.

Izgradnja prvog zemljanog utvrđenja određuje se u period od sredine do kraja I veka. Bilo je izgrađeno od zemlje i palisada, okruženo odbrambenim rovom. Podigli su ga pripadnici jedinice *Cohors I Thracum Syriaca*. Prvo kameno utvrđenje sagrađeno je početkom II veka. Utvrđenje je pravougaonog oblika, dimenzija 144 x 112 m, sa zaobljenim uglovima i četvorougaonim kulama sagrađenim sa unutrašnje strane bedema. Vezuje se za graditeljsku delatnost cara Trajana. U njemu je posvedočen boravak kohorte *II Aurelia Dardanorum*. Faza III izgradnje utvrđenja vezuje se za obnovu fortifikacija izazvanih gotskim upadima, za vreme vladavine Trajana Decija (249-251. godine). Novoizgrađene defanzivne kule (16 do 20) izbačene su sa spoljne strane bedema. Poslednja obnova izvedena je krajem IV veka, verovatno za vreme Valentinijana i Valensa (364–375. godine). Kapije utvrđenja su zatvorene uz pomoć novoizgrađenih velikih kula. Novi bedem, širine dva metra, postavljen je uz postojeći kameni bedem. Utvrđenje je verovatno stradalo u hunskoj najezdi 441. godine. Nije registrovana obnova nakon ovog razaranja. Pretpostavlja se da je, u vreme cara Justinijana, podignuto novo utvrđenje na nekoj obližnjoj lokaciji, možda na brdima Sveta Trojica i/ili Podina, zapadno od Timacum Minus-a. Najmlađi horizont nalazišta u Ravni je srednjovekovno naselje, verovatno iz X veka, koje je, po svemu sudeći, bilo obnovljeno tokom XII i XIII veka.

Dosadašnjim sistematskim arheološkim istraživanjima, izuzev bedema i kula, istraženo je i nekoliko građevinskih objekata. U samoj unutrašnjosti utvrđenja istraženi su građevina u centralnom delu (mogući *horreum*) i kružni arheometalurški objekat. Van bedema ispitana su dva građevinska objekta, severoistočno od utvrđenja − Terme I (u upotrebi od II−IV veka) i jugozapadno − građevina sa hipokaustom (verovatno Terme II, II−III vek). Delimično je istražena i građevina, smeštena jugozapadno od fortifikacije, datovana u prvu polovinu IV veka.

Tragovi najstarije nekropole, iz perioda I−III veka, otkriveni su zapadno od utvrđenja, na lokaciji Slog. Na ovom lokalitetu istražen je i deo kasnoantičke nekropole iz druge polovine IV i početka V veka. Na ovom lokalitetu registrovana je i slovenska nekropola iz IX−X veka. Pretpostavljena lokacija nekropole stanovnika Timacum Minus-a iz II−III veka je na potesu Širina, zapadno od utvrđenja. Ova nekropola spaljenih pokojnika nije istražena, ali su sačuvani njeni kameni nadgrobni spomenici, koji su, sredinom III veka, uzidani u bedeme tvrđave. Na desnoj obali Ropinskog potoka, severozapadno od utvrđenja, istražen je manji deo biritualne nekropole sa kraja II i početka IV veka.

Autorka u poglavlju *Timacum Minus−dva sveta* predstavlja rezultate istraživanja antičkih i srednjovekovne nekropole na lokalitetu Slog, sa posebnim osvrtom na pogrebni ritual i kult mrtvih, uz davanje interpretacija vezanih za pojedine rituale, kako iz antičkog, tako i iz srednjovekovnog perioda (grobni prilozi (posude, toaletni pribor, novčići, jabuke, jaja, zmija), ritualno lomljenje posuda, pogrebne gozbe, obredne vatre, ograđivanje pokojnika kamenom, polaganje prstenja za odrasle u dečije grobove).

Kataloški deo publikacije podeljen je u dva dela. Svaki deo ima svoj podnaslov, što nije tako često u literaturi, pa odajemo priznanje autorki na inventivnosti. Prvi deo nosi naziv *Mundu Mortalis / Svet prolazni* i posvećen je pokretnim nalazima iz antičkog perioda. Predstavljeni su nalazi zlatnog prstena, fibula, kopči, pojasne opreme, katanca, ključa, žižaka, olovnog ogledala, ukrasne igle, koštane pikside, koštanog češlja, raznih predmeta vezanih za kult božanstava (Amor, Venera, Merkur, Dionis i Jupiter) i keramike (amfora, lončići, zdelice, cediljke, lonci, krčazi i pehari).

Naziv drugog dela kataloga glasi *Mundus Aeternus / Svet neprolazni* i posvećen je pokretnim nalazima otkrivenim na nekropolama. Iz antičkog perioda poznati su nalazi srebrnih i bronzanih fibula, srebrnog prstena sa umetkom od staklene paste, ogrlica sa perlama od raznih materijala, naušnica od zlata, stakla, bronze i bisera, bronzanih narukvica, kozmetičke spatule, bronzanog novca Konstancija II i Konstansa, strelice, kopči za obuću, staklenih i keramičkih posuda. Od grobnih priloga sa srednjovekovne nekropole sačuvane su ogrlice sa perlama od stakla, bronze, kosti i pozlate, bronzano prstenje, srebrne i bronzane naušnice i keramika (krčazi, zdele, lončići).

Finalno, kratko poglavlje, *Reč autora,* objašnjava motivaciju za nastanak publikacije i autorkine izraze zahvalnosti nekadašnjim istraživačima i sadašnjim saradnicima. Imajući u vidu da neki elementi ovog obraćanja imaju lični karakter, prepustićemo da se sa njima upoznaju čitaoci same publikacije.

Publikacija je štampana na srpskom jeziku (ćirilica), kataloške jedinice urađene su dvojezično, na srpskom i engleskom jeziku, rezime je na engleskom jeziku.

Delo Bojane Ilijić, *Timacum Minus−dva sveta,* sve do publikovanja sveobuhvatne monografije posvećene ovom izuzetno značajnom lokalitetu, za koju verujem da će autorka, zajedno sa čitavim projektnim timom, da nam u dogledno vreme prezentuje, predstavljeće nezaobilaznu literaturu za sve istraživače antičke prošlosti na ovim prostorima.

Ljubiša VASILJEVIĆ

GUIDELINES FOR SUBMITTING MANUSCRIPTS FOR THE PERIODICAL ARHEOLOGIJA I PRIRODNE NAUKE (ARCHAEOLOGY AND SCIENCE)

Editorial staff of the periodical *ARHEOLOGIJA I PRIRODNE NAUKE* decided to apply *Akta o uređivanju naučnih časopisa*[1] (Acta about editing scientific periodicals) proposed by the Ministry of Science and technological development of the Republic of Serbia. By applying these acta, complete editing of scientific periodicals is determined, quality of periodicals is promoted and their integration into the international system of exchanging academic information shall become more complete.

Papers submitted to the editorial staff of the periodical *ARHEOLOGIJA I PRIRODNE NAUKE* must be formed in a standard way. Each paper submitted has to contain: title; author's name; name of the institution (affiliation); abstract; key words; main text; resume; illustrations with captions; bibliography; contact address.

1. Titles need to be short and clear, describing content in the best possible way. Words used in titles should be apropriate for indexing and web-searching. If there are no such words withing titles, it is advised to add a subtitle. Titles are to be written in the fifth or sixth line, under the top margin, bold and with font size 14 (pts).

2. Author(s) should give their full name(s), including first name, surname and middle initial.

3. Autor(s) need to state official names and addresses of their employees, including names and addresses of employees which conducted research that lead to the results published. With complex institutions, complete title is to be named (ex.: Belgrade University, Faculty of Philisophy, Archaeological Department, Belgrade).

4. Abstract, consisting of 100-250 words, describes shortly content of the paper. Within abstracts, it is advised to use terms convenient for indexing and web-searching. Abstracts should offer data about aims, methods, results and conclusions of the research. Abstracts should be bilingual (in Serbian, English or some other foreign language). Abstracts in foreign languages need to be adequatly lectured, i.e. posses correct grammar and spelling.

5. Key words need to be terms which describe paper's content in a best way, suitable for indexing and web-searching. They should be named according to a widely accepted international source (lists, indexes, dictionary, thesaurus), like list of key-words Web of Science. The number of keywords should not exceed ten words.

6. The lenght of papers should not exceed 32 pages, DIN A4, including footnotes and illustrations. The main text should be written in Times New Roman or Arial (12 pts), MS Office Word 97 or later, line-spacing 1,5 and with margins 2,54 cm. Main text should not contain illustrations. They are to be submitted as separate files.

7. Apart from Serbian, manuscripts can be submitted in one of worldwide languages (English, German, French). Names of translators, if any, should be stated. Papers submitted should have an abstract and a resume written in some other language. If a paper is submitted in a language other than Serbian, there should be an abstract and a resume written in Serbian language. Words, quotations and titles written in some other language should be written in their original form.

Footnotes can be incorporated within the main text. They should contain less important data or apropriate explanations. They are not to be replaced with quoted literature. (An appendix to

1 Acta about editing scientific periodicals, proposed by the Ministry of Science and technological development of the Republic of Serbia, can be found at the following web-site: http://www.nauka.gov.rs/cir/images/stories/vesti/09-07-17/akt_o_uredjivanju-casopisa.pdf

these Instructions explains the way of quoting to be applied).

8. Abstracts should have the same content as resumes, only in an extended form, whose length is not exceeding 10% of the main text. It is very much desired to submit a resume in a structural form.

9. Illustrations (photographs, tables, drawings, graphs etc.) should be submitted in a proposed manner. Scanned illustrations should be submitted in a 600 dpi resolution, while photographs are to be submitted in a resolution of at least 300 dpi, in formats TIFF, PSD or JPG. Illustrations are to be submitted as separate files and should not be incorporated into the main text. Captions should be submitted bilingually (using the language in which the manuscript was written and in English or some other of the proposed languages).

10. Quoted literature should include bibliographic sources (articles, books etc.) and it should be submitted as a separate part of the manuscript, as a list of references. It is a part of every scientific article, with precisely named bibliographic references which were quoted. Bibliography should be written in a proposed manner, depending on standards precisely described in this instruction. Bibliography should be written using the language and alphabet in which it was originally published.

11. Bibliography's structural elements (author's name, title of work, source etc.) should be written according to standard forms of quoting. Editorial staff of the periodical *ARHEOLOGIJA I PRIRODNE NAUKE* accepted the reccomendation of the Ministry of science and technological development and decided that authors should precisely follow quotation rules named below.

The following examples describe the most frequently quoted kinds of references:

I BOOKS (MONOGRAPHS)

1. Author's books

a. single author

within main text: (Popović 2006)

in bibliography:

Surname, name's initial. Year of publishing *Title of book* (*italic),* Place: Editor.

Popović, I. 2006

Roma aeterna inter Savum et Danubium, Works of Roman Art from the Petrović-Vasić Collection, Belgrade: Archaeological Institute.

- Series' name and number is also needed:

Mirković, M. 1968

Rimski gradovi na Dunavu u Gornjoj Meziji, Dissertationes 6, Beograd: Arheološko društvo Jugoslavije.

Papazoglu, F.1969

Srednjobalkanska plemena u predrimsko doba (Tribali, Autarijati, Dardanci, Skordisci i Mezi), Djela 30, Centar za balkanološka ispitivanja 1, Sarajevo: Akademija nauka i umjetnosti Bosne i Hercegovine.

b. two or three authors

Between the names of the first and the second author, or the second and the third author,

"and" should be written, no matter what the main language of the publication.

within main text: (Popović i Borić-Brešković 1994)

in bibliography:

Popović, I. i Borić-Brešković B. 1994

Ostava iz Bele Reke, Arheološke monografije 7, Beograd: Narodni muzej.

Ivanišević, V., Kazanski, M. and Mastykova, A. 2006
Les necropoles de Viminacium a l'Epoque des Grandes Migrations, Monographies 22, Paris: Association des Amis du Centre d'Histoire et Civilisation de Byzance.

c. four or more authors

Books written by four or more authors, within the main text and in Serbian cyrillic, only the first name is written and **i dr.** is added. Books printed in Lati alphabet, the abbrevation ***et al.*** is applied. The abbrevation ***etc.*** is used in cases when there are more than three editors or places of editing.

2. Author's books with added name of the editor

within main text: (Jeremić 2009: 40)
in bibliography:
Jeremić, G. 2009
Saldum, Roman and Early Byzantine Fortification, S. Perić (ed.), Cahiers des Portes de Fer, Monographies 6, Belgrade: Institute of Archaeology.

3. Edited books (instead of the author – editor, translator) - (ed., eds.), (trans.).

within main text: (Поповић 1994)
in bibliography:
Поповић, И. (ур.) 1994
Античко сребро у Србији, Београд: Народни музеј.
within main text: (Morris 2002)
in bibliography:
Morris, I. (ed.) 2002
C*lassical Greece-Ancient Histories and Modern Archaeologies*, Cambridge: Cambridge University Press.
within main text: (Hurst and Owen 2005)
in bibliography:
Hurst, H. and Owen. S.(eds) 2005
Ancient Colonizations-Analogy, Similarity and Difference, London: Duckworth.
within main text: (Радојчић 1960)
in bibliography:
Радојчић, Н. (prev.) 1960
Законик цара Стефана Душана 1349. и 1354., Београд: Српска академија наука и уметности.

4.Way of quoting books without author's name

within main text: (Anon. 1985)
in bibliography:
Anon. 1985
Anonymi Peri strategias, The Anonymous Byzantine Treatise on Strategy, *Three Byzantine Military Treatise* (trans. G.T. Dennis), Washington DC.

5. Simultaneous quoting of several books of the same author

a. written in different alphabets

within main text: (Поповић 2002, Popović 2006)
in bibliography:
Поповић, И. 2002
Накит са Јухора, остава или сакрални тезаурус, Археолошке монографије 14, Посебна издања 36, Београд: Народни музеј и Археолошки институт.
Popović, I. 2006
Roma Aeterna inter Savum et Danubium, Works of Roman Art from the Petrović-Vasić Collection, Belgrade: Archaeological Institute.

b. written in the same year

within main text: (Dawkins 1996a, Dawkins 1996b)
in bibliography:
Dawkins, R. 1996a
Climbing Mount Improbale, London: Viking.
Dawkins, R. 1996b
River out of Eden, London: Pfoenix.

6. Quoting chapters in books (acta)

within main text: (Петровић 1997: 87-90)
in bibliography:
Петровић, Б. 1997
Накит, у: *Античка бронза Сингидунума,* С. Крунић (ур.), Београд: Музеј града, 85-117.

within main text: (Samson 1970: 44-68)

in bibliography:
Samson, C. 1970
Problems of information studies in history, in: *Humanities information research*, S. Stone, (ed.), Sheffield: CRUS, 44-68.

7. Translated books
in bibliography:
Bajron, DŽ. G. 2005 (1812)
Čajld Harold, Z. Paunović (predgovor), N. Tučev (prevod), Beograd: Zavod za udžbenike i nastavna sredstva.

8. Books and articles published in electronic form
within main text: (Fishman 2005: 11)
in bibliography:
Fishman, R. 2005
The rise and fall of suburbia, [e-book], Chester: Casle Press. Available through Anglia Ruskin University Library. http://libweb.anglia.ac.uk>[pristupljeno 5 juna 2005].

II PAPERS PUBLISHED IN PERIODICALS, CONGRESS ACTA AND SIMILAR

within main text: (Vasić 2008: 69, fig.3)
in bibliography:
Surname, name's initial. Year
Title, *Title of the acta (italic)*, Name's initial. Surname, (ed.), Place of editing: Editor, page numbers.

Vasić, M. 2006. Stibadium in Romuliana and Mediana. *Felix Romvliana 50 years of archaeological excavations.* M**.** Vasić (ed.). October, 27-29 2003, Zaječar, Serbia. Belgrade: Institut of Arhcaeology, Committee on Archaeology of Serbian Academy of Sciences and Arts, and Zaječar: National Museum, 69-75.

Series' data are also needed:

Петровић, П. 1997
Римљани на Тимоку, у: *Археологија источне Србије* (Научни скуп Археологија источне Србије, Београд-Доњи Милановац, децембар 1995*)*, М. Лазић (ур.), Центар за археолошка истраживања 18, Београд: Филозофски факултет, 115-131.

III PERIODICALS

within main text: (Бајаловић-Хаџи-Пешић, 2001: 108)

Surname, Name's initial. Year
Title, *Name of the periodical (italic*) number of the periodical: page number.

Бајаловић-Хаџи-Пешић, М. 2001, Налази хабанске и постхабанске керамике у Србији, *Годишњак града Београда* 47-48 (2000-2001): 107–121.
- For periodicals with similar titles, behind the name of the periodical, place of publishing should be stated in brackets:
Анђелковић, Б. 1988
Праисторијски налази са локалитета Јелица-Градина, *Зборник радова Народног музеја* (Чачак) 18: 81–85.
Анђелковић, Б. 1994
Први резултати анализе мумије из Народног музеја у Београду, *Зборник Народног музеја* (Београд) 15-1: 153–159.

- Depending on the year of publishing *Старинар* is named in its full title:
years 1884-1895 *Старинар Српског археолошког друштва*
years 1906-1914 [novog reda] *Старинар* (н.р.)
years 1922-1942 [treća serija] *Старинар* (т.с.)
years 1950-2010 [nova serija] *Старинар* (н.с.)

- If there is a difference between the year of actual printing and the year of publishing, the second is stated in brackets:
Жеравица, З., и Жеравица, Л. 1979, Средњовековно насеље у Поповици код Неготина, *Старинар* (н.с.) XXVIII-XXIX, (1977-1978): 201–211.

IV PAPER IN PRINT / FORTHCOMING

- (in print), within papers written in English (in print)
- (forthcoming), within papers written in English (forthcoming).

within main text: (Јовановић, in print)
in bibliography:
Јовановић, А. (in print)
Бор и околина у античком периоду, у: *Бор и околина у праисторији, антици и средњем веку*, ур. М. Лазић, Бор и Београд: Музеј рударства и металургије и Филозофски факултет.

Papers overtaken from the internet, from electronic periodicals, are quoted in the same way as printed papers, only there is a full web-address written at the end with http://...

V DOCTORAL AND MASTER THESES

Instead of place of editing and editor, the full name of faculty/university is given, where the thesis was conducted.
within main text: (Ilić, 2005)
in bibliography:
Ilić, O. 2005
Ranohrišćanski pokretni nalazi na području dijeceze Dakije od IV do početka VII veka, Magistarska teza, Filozofski fakultet, Univerzitet u Beogradu.

within main text: (Patch, 1991)
in bibliography:
Patch, D. C. 1991
The Origin and Early Development of Urbanism in Ancient Egypt: A regional Study, Ph.D thesis, University of Pennsylvania.

VI ARTICLES FROM NEWSPAPERS

within main text: (Кашанин, 1929)
in bibliography:
Кашанин, М. 1929, Музеј савремене уметности, *Политика, 23. јул, 7-8.*

MAIN TEXT

Quoting bibliography in the main text according to the pattern (author's surname and year: page number, footnote, figure, table):
(Papazoglu 1969: 52, sl. 4/1, T. 18-4-6)
(Babović 1984: 68; Moritz 1978: 68, figs. 40-41; Tasić 1997: 84, sl. 21)
- Additional data within brackets can be written after a dash:
(Swoboda-Milanović 1958: 55, Taf. 18/24 – olovne pločice).
- The same work of the same author in the next quotation can be quoted abbrevated *ibidem* (*ibid.*: page number).
- The second work of the same author in the next quoting, if there are no quotations in between, is quoted as (*idem* year: page number): (Faltings 1998a: 367; *idem* 1998b: 31–32).
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- If the author, work and page number are the same as in the previous quotation, they are quoted as *loc. cit.* (lat. *loco citato)* – quoted place.
- Abbrevation *cf.* (lat. *confer*) - compare
- Abbrevation *e.g.* (lat. *exempli gratia*) - for ex-

ample
- Abbrevation *i.e*. (lat. *id est*) - actually.

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