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Jurjevac-Stara Vodenica – nalazište lasinjske kulture

Jurjevac-Stara Vodenica – a site of the Lasinja Culture

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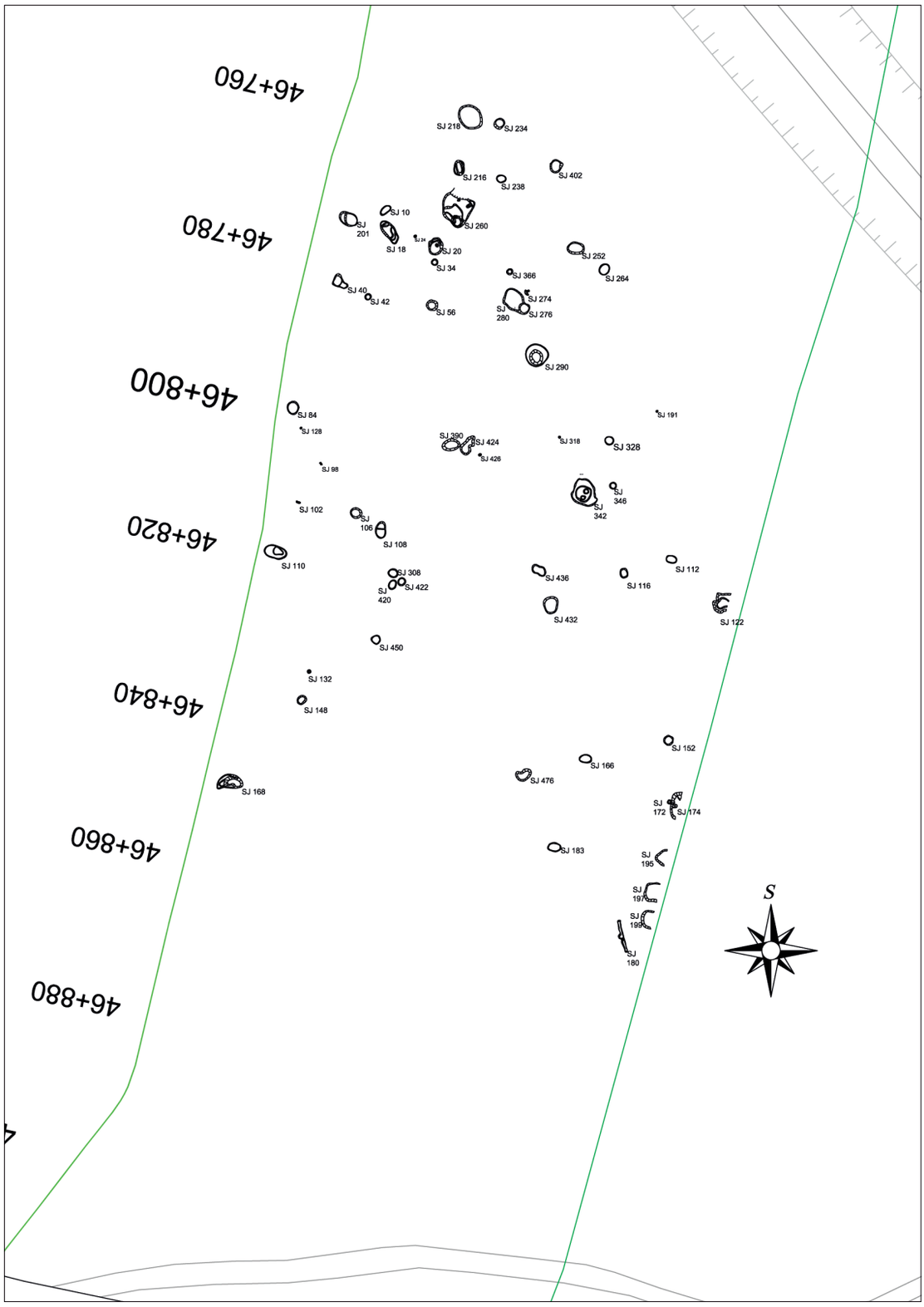
Rad donosi 14^C datume i rezultate analize nalaza s lokaliteta Jurjevac-Stara Vodenica. Na osnovu pokretnoga arheološkog materijala, kao i apsolutnih datuma, možemo zaključiti da su na lokalitetu istraženi dijelovi eneolitičkog naselja koji pripadaju lasinjskoj kulturi.

Ključne riječi: *Jurjevac-Stara Vodenica, Đakovština, eneolitik, lasinjska kultura, keramografija, kamene izrađevine, arheobotanika*

The paper brings 14^C dates and the results of find analysis from the site of Jurjevac-Stara Vodenica. Based on the movable archaeological material, as well as the absolute dates, we can conclude that the site yielded a part of an Eneolithic settlement ascribed to the Lasinja culture.

Key words: *Jurjevac-Stara Vodenica, Đakovo region, Eneolithic, the Lasinja culture, pottery production, stone artifacts, archaeobotany*



Slika / Figure 1. Plan lokaliteta s označenim lasinjskim objektima (izradila Ana Solter) / Layout of the site with marked structures ascribed to the Lasinja culture (made by Ana Solter).

Arheološki lokalitet Stara Vodenica nalazi se sjeveroistočno od sela Jurjevac Punitovački u Osječko-baranjskoj županiji. Riječ je o povišenom položaju na desnoj obali rijeke Vuke koji na jugu graniči sa šumom Saonički lug i koji je smješten uz cestu koja vodi prema selu Beketinci. Lokalitet se, dakle, nalazi na prostoru Đakovštine koja obuhvaća istočne ogranke Dilja i Krndije, glavninu Đakovačkog prapornoga ravnjaka i uske pojaseve susjednih nizina, na sjeveru domeđašnje Vuke, a na jugu do Biđa-Bosuta.[1]

Arheološki muzej u Zagrebu proveo je zaštitna arheološka istraživanja na nalazištu u razdoblju od 25. ožujka do 15. svibnja 2008. godine, u okviru iskopavanja na trasi autoceste Beli Manastir – Osijek – Svilaj. Lokalitet se proteže između stacionaža 46+700 i 46+900, a ukupna istražena površina iznosila je 16.000 m^2.[2]

Na temelju zaštitnih arheoloških istraživanja i obrade pokretnoga arheološkog materijala s lokaliteta Jurjevac – Stara Vodenica, može se govoriti o postojanju dvaju manjih pretpovijesnih naselja, kao i o naselju iz srednjovjekovnog razdoblja.[3]

Starije pretpovijesno naselje prema analizi pokretne građe, a i na osnovi apsolutnih datuma, atribuirano je srednjoeneolitičkoj lasinjskoj kulturi (l. 1, Tab. 1).[4]

Gotovo većina istraženih objekata, koje sa sigurnošću možemo pripisati lasinjskoj kulturi, ima svjetlijesmeđu zapunu, punu komadića lijepa i mjestimice gara i ugljena. Uglavnom se radi o plitkim jamama, a tek se njih nekoliko ističe po dimenzijama i/ili po broju nalaza pronađenih u njihovim zapunama: SJ 200-201, 217-218, 259-260, 275-276, 289-290, 327-328, 341-342, 401-402. Ni jedan objekt očito nije imao funkciju stambenog, već je uglavnom riječ o spremištima, otpadnim jamama ili o radnim

[1] Sić 1975, 162.

[2] Balen 2009, 56-58.

[3] Balen 2009, 56-58; Bunčić 2012; Bunčić 2016.

[4] Balen 2008, 20, sl. 3.

The archaeological site of Stara Vodenica is situated northeast of the Jurjevac Punitovački village in the Osijek-Baranja County. It is on an elevated position on the right bank of the Vuka River, bordering the Saonički lug forest in the south, and placed along the road leading towards the Beketinci village. The site is, therefore, situated in the Đakovo region, which includes the eastern slopes of the Dilj and Krndija mountains, the greater part of the Đakovo loess plain, and narrow strips of neighboring valleys, reaching northwards to the Vuka River and southwards to the Biđ-Bosut.[1]

The Archaeological Museum in Zagreb conducted rescue excavations at the site in the period between March 25, and May 15, 2008, as part of the excavations on the Beli Manastir-Osijek-Svilaj motorway. The site is situated between chainages 6+700 and 46+900, and the total excavated area was 16,000 m^2.[2]

Based on the rescue archaeological excavations and analyzing the movable archaeological material from the site, we can say that the site of Jurjevac-Stara Vodenica included two smaller prehistoric settlements, as well as a settlement dated to the Middle Ages.[3]

The older prehistoric settlement, based on movable find analysis and 14C dates, has been ascribed to the Middle Eneolithic Lasinja culture (Fig. 1, Tab.1).[4]

Most excavated structures definitively ascribed to the Lasinja culture have a lighter brown fill, which is full of daub fragments and sporadic concentrations of ash and charcoal. The structures are mostly shallow pits, and only a few of them stand out based on their dimensions and/or number of finds in their fills: SU 200-201, 217-218, 259-260, 275-276, 289-290, 327-328, 341-342, 401-402. None of these structures had a residential function, but they were obviously used as storage space, waste pits, or working areas. Specific evidence supporting the existence

[1] Sić 1975, 162.

[2] Balen 2009, 56-58.

[3] Balen 2009, 56-58; Bunčić 2012; Bunčić 2016.

[4] Balen 2008, 20, fig. 3.

Oznaka laboratorija / Lab number	Stratigrafska jedinica, uzorak / Stratigraphic unit, sample	Radiokarbonska starost / Radiocarbon age	13C/12C	Jednostruka standardna devijacija (vjerojatnost 68%) / One sigma range (probability 68%)	Dvostruka standardna devijacija (vjerojatnost 95%) / Two sigma range (probability 95%)
Beta 246768	uzorak 146 (ugljen), SJ 121 / sample 146 (charcoal), SU 121	5200+/-40	-25.5	4040-3970 cal BC	4050-3960 cal BC
Beta 246771	uzorak 14 (ugljen), SJ 200 / sample 14 (charcoal), SU 200	5160+/-40	-25.2	3980-3960 cal BC	4040-3940 cal BC 3850-3820 cal BC
Beta 246778	uzorak 113 (zub), SJ 327 / sample 113 (tooth), SU 327	5210+/-40	-21.2	4040-3970 cal BC	4140 cal BC 4060-3960 cal BC
Beta 246781	uzorak 62 (ugljen), SJ 401/ sample 62 (charcoal), SU 401	5230+/-40	-25.8	4050-3980 cal BC	4220-4200 cal BC 4160-4120 cal BC 4110-4100 cal BC 4070-3960 cal BC
Beta 246776	uzorak 101 (ugljen), SJ 275 / sample 101 (charcoal), SU 275	5240+/-40	-25.0	4050-3980 cal BC	4230-4200 cal BC 4170-3970 cal BC
Beta 246777	uzorak 122 (kost), SJ 289 / sample 122 (bone), SU 289	5330+/-50	-19.8	4250-4050 cal BC	4320-4040 cal BC 4010-4000 cal BC

Tablica / Table 1. Apsolutni datumi za lasinjsku kulturu s lokaliteta Jurjevac-Stara Vodenica / Absolute dates of the Lasinja culture from the site of Jurjevac-Stara Vodenica.

prostorima. Konkretni dokazi o postojanju stambenih objekata na ovom nalazištu nisu pronađeni iako neki od stupova, poredani u pravilne redove, daju naslutiti postojanje nadzemnih objekata – međutim, teško ih sa sigurnošću možemo pripisati jednome od tri naselja ustanovljena na nalazištu.

of residential structures at this site has not been found, although some poles, arranged in regular lines, hint at the existence of above-ground dwellings. However, it is very difficult to definitively ascribe them to one of the three settlements discovered at the site.

KERAMOGRAFIJA LASINJSKE KULTURE

Keramički je materijal prilično loše kvalitete, grube fakture. Gruba je keramika sive do najčešće oker boje, sa zamjetnim primjesama usitnjenoga kamena i pijeska. Daleko pretežu zaobljeni oblici (zdjele, vjedra, lonci), uglavnom ukrašeni kljunastim ručkama (T. 2: 4; 5: 1, 3, 6: 3), dugmetastim aplikacijama (T. 2: 2; 3: 1, 2; 4: 3; 7: 1; 12: 9) i plastičnim trakama (T. 3: 7; 7: 2). Česte su i plitke tave vrlo velika promjera (T. 4: 1, 2), tip koji je također čest među keramičkim nalazima u Beketincima.[5]

Fina je keramika u znaku tamnijih boja, a u sastavu je tek malo pijeska kao primjesa. Najtipičniji je oblik bikonična zdjela, često na nozi, s različito velikom jezičastom aplikacijom na prijelomu (T. 5: 8), no relativno su česte i zaobljene ili blago bikonične zdjele (T. 7: 4; 8: 1), kao i vrčevi s trakastom ručkom (T. 5: 5; 6: 4, 7; 8: 3). Vrlo čest su ukras velika jezičasta plastična izbočenja na zdjelama (T. 5: 8) i kombinacija urezanih motiva te nizova uboda ili kratkih zareza (T. 10: 1-12; 11: 1-12; 12: 1-8, 10, 11) koje tvore motive riblje kosti, bodljikave žice ili jednostavne paralelne crte.

Žlice s tuljcem za nasad, kao karakterističan nalaz gotovo na svim nalazištima lasinjske kulture, prisutne su i na ovome lokalitetu (T. 1: 3, 7, 8).[6]

Keramički repertoar iz ovog naselja najviše sličnosti pokazuje sa zemljopisno najbližim nalazištem lasinjske kulture u Beketincima.[7]

POTTERY PRODUCTION OF THE LASINJA CULTURE

The pottery material is of fairly low quality and has a coarse surface. Coarse pottery varies in color from gray to the most common ochre, and has notable inclusions of crushed stone and sand. Rounded forms are the most common (bowls, pails, pots), mostly decorated with beak-like handles (Pl. 2: 4; 5: 1, 3; 6: 3), button-like applications (Pl. 2: 2; 3: 1, 2; 4: 3; 7: 1; 12: 9), and applied ribbons (Pl. 3: 7; 7: 2). Shallow pans with a large diameter are also common (Pl. 4: 1, 2), a type which also frequently appears among the pottery finds from Beketinci.[5]

Fine pottery appears in darker colors, with only small amounts of sand as an inclusion. The most common type is the biconical bowl, often on a foot and with a tongue-like application which varies in size and appears on the bent part of the vessel (Pl. 5: 8), but rounded or slightly biconical bowls are also quite common (Pl. 7: 4; 8: 1), as are jugs with a triangular handle (Pl. 5: 5; 6: 4, 7; Pl. 8: 3). Large tongue-like plastic protrusions are a very common decoration (Pl.5:8), as is the combination of incised motifs and series of stabs or short cuts (Pl. 10: 1-12; 11: 1-12; 12: 1-8, 10, 11) that form fish bones, barbed wire, or simple parallel lines.

Spoons with a shaft for hafting, a characteristic find of almost all Lasinja culture settlements, have also been recovered from this site (Pl. 1: 3, 7, 8).[6]

The most similar pottery finds to the pottery repertoire from this settlement are the geographically closest finds of the Lasinja culture in Beketinci.[7]

Izrađevine od kamena

Cjelokupni kameni materijal s nalazišta Jurjevac – Stara Vodenica možemo podijeliti na:

a) glačane kamene izrađevine

b) izrađevine s abrazivnim svojstvima

c) lomljene kamene izrađevine.

Stone artifacts

The entire stone material from the site of Jurjevac-Stara Vodenica can be divided as follows:

a) Polished stone artifacts,

b) Artifacts with abrasive properties,

c) Knapped stone artifacts.

[5] Minichreiter, Marković 2013, 84, T. 16, 17.

[6] Čataj, Janeš 2013, 187; Minichreiter, Marković 2013, 84.

[7] Minichreiter, Marković 2009; 2013, 82-84.

[5] Minichreiter, Marković 2013, 84, T. 16, 17.

[6] Čataj, Janeš 2013, 187; Minichreiter, Marković 2013, 84.

[7] Minichreiter, Marković 2009; 2013, 82-84.

Glačane kamene izrađevine

Pod pojmom glačane alatke[8] obuhvaćeni su svi predmeti koji su mogli služiti za bilo kakvu vrstu posla,[9] a koji su primarno oblikovani tehnikom udaranja i lomljena sirovine, a zatim su dodatno brušeni i glačani uz pomoć ručnih i statičnih glačalica.[10] Na lokalitetu Jurjevac – Stara Vodenica pronađene su četiri glačane sjekire trapezastog oblika (T. 1: 1, 5, 6), dlijeto (T. 1: 2), bradva i ulomak kamenog brusa.

Sjekire pripadaju tipu I/1 – sjekire sa širim distalnim i užim proksimalnim krajem (T. 1: 1, 5) te tipu I/2 – sjekire sa širim distalnim krajem i ukošenom oštricom (T. 1: 6).[11] Ovakve sjekire često se pronalaze u kontekstima lasinjske kulture.[12]

Izrađevine s abrazivnim svojstvima

Pronađena su tri ulomka žrvnjeva. Riječ je o posebnom nalazu 10, pronađenom u jami SJ 200 s dvije nasuprotne obrađene plohe i posebnom nalazu 106, pronađenom u jami SJ 399, te posebnom nalazu 173 pronađenom u naplavinskom sloju SJ 489 na južnom dijelu lokaliteta, a koji imaju jednu obrađenu plohu.

Lomljene kamene izrađevine

U naselju, koje možemo pripisati pripadnicima lasinjske kulture, pronađene su ukupno 44 lomljene kamene izrađevine koje potječu iz 38 različitih stratigrafskih jedinica. Budući da iz većine stratigrafskih jedinica potječe manji broj lomljenih kamenih izrađevina (Sl. 2), zaključuje se da je njihova prostorna distribucija na ovome lokalitetu slučajna.

[8] Cjelovite glačane kamene izrađevine s lokaliteta definirane su i uklopljene u tipologiju koju je D. Antonović izradila na temelju nalaza s teritorija Srbije (Antonović 2003).

[9] Antonović, Đorđević 2003, 47.

[10] Antonović 2003, 51.

[11] Antonović 2003, 54.

[12] Marković 1979, 37; Balen-Letunić 1981, 7; Marković 1986, 95; Težak-Gregl 1993, 27; Balen 1998, T.8:5; Težak-Gregl 2001, 15.

Polished stone artifacts

The term polished stone tool[8] includes all finds which could be used to carry out any kind of work,[9] and which were primarily shaped by hitting and breaking the raw material to be additionally polished by handheld and static polishers.[10] The site of Jurjevac-Stara Vodenica yielded four trapezoidal polished stone axes (Pl. 1: 1, 5, 6), a chisel (Pl. 1: 2), an adze, and a fragment of a whetstone.

Axes are defined as type I/1 - axes with a wider distal and narrower proximal part (Pl. 1: 1, 5), and type I/2 - axes with a wider distal part and a slanted blade (Pl. 1: 6).[11] These types of axes are often found in contexts of the Lasinja culture.[12]

Artifacts with abrasive properties

Three fragments of grindstones were found. These include special find 10, which has two opposite processed surfaces and was found in pit SU 200, as well as special find 106 recovered from pit SU 399, and special find 173, which has one processed surface and was found in alluvial layer SU 489 on the southern part of the site.

Knapped stone artifacts

The settlement that can be ascribed to the Lasinja culture population includes a total of 44 knapped stone artifacts, which were found in 38 different stratigraphic units. Seeing as the majority of the stratigraphic units yielded only a small number of knapped stone artifacts (Fig. 2), we can conclude that their spatial distribution at the site is random.

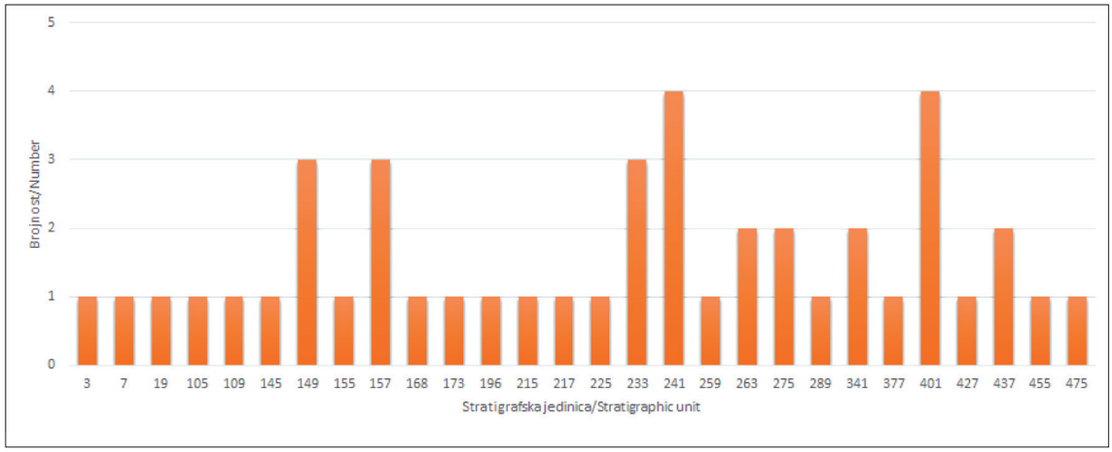
[8] Completely preserved polished stone tools from the site were defined according to D. Antonović's typology based on finds from the territory of Serbia (Antonović 2003).

[9] Antonović, Đorđević 2003, 47.

[10] Antonović 2003, 51.

[11] Antonović 2003, 54.

[12] Marković 1979, 37; Balen-Letunić 1981, 7; Marković 1986, 95; Težak-Gregl 1993, 27; Balen 1998, T.8:5; Težak-Gregl 2001, 15.



Slika / Figure 2. Histogram zastupljenosti lomljenoga kamenog materijala s lokaliteta Jurjevac-Stara Vodenica s obzirom na pripadajuće stratigrafske jedinice / A histogram of the representation of knapped stone material from the site of Jurjevac-Stara Vodenica with respect to the corresponding stratigraphic units.

Litičkom su analizom materijala ustanovljeni sljedeći proizvodni tipovi: odbojak s okorinom, sječivo / pločica s okorinom, odbojak, sječivo / pločica, jezgra za sječiva, kombinirana jezgra, ulomak jezgre, dotjerujući odbojak jezgre te krhotine (Tab. 2). Najzastupljeniji su proizvodni tip sječiva, odnosno pločice, koja su zastupljena sa 12 komada, tj. 27,3%. Najveći broj sječiva, njih 6, sačuvano je u cijelosti (Sl. 5-6). Tri su sječiva sačuvana u medijalnom, a 3 u distalnom i medijalnom dijelu. Devet je sječiva manje od 3 cm, dok su dva cjelovita sječiva duljine 31,5 mm i 33 mm. Jezgre za sječiva koničnog su oblika, s tim da jedna od njih ima jednu udarnu platformu (T. 13: 11), a druga dvije udarne platforme (T. 13: 10). Od kombiniranih jezgri, jedna je pločastog oblika i ima četiri udarne platforme (T. 13: 9), dok je druga nepravilnog oblika te ima dvije udarne platforme. Jezgre su malih dimenzija, a to može biti posljedica nekoliko razloga: maksimalnog iskorištavanja jezgri, malih dimenzija dostupne sirovine i / ili planske izrade sječiva / pločica malih dimenzija. Okorina je zabilježena na 15 izrađevina, odnosno na 34,1%. Na 5 izrađevina riječ je o 20 do 30% površine prekrivene okorinom, na 1 izrađevini radi se o 40% površine, dok se na 9 izrađevina radi o znatnijoj količini okorine, između 60 i 100% prekrivenosti površine. Najveći su broj izrađevina s okorinom odbojci s okorinom, a radi se o 5 izrađevina.

The analysis of knapped stone material revealed the following production types: flake with cortex, blade/bladelet with cortex, flake, blade/bladelet, blade core, combined core, core fragment, core rejuvenation flake, and chunk (Tab. 2). The most common production type includes blades, that is, bladelets, with a total of 12 finds or 27.3%. The largest number of blades, a total of six of them, is completely preserved; three blades are preserved in the medial, and three in the distal and medial part. Nine blades are smaller than 3 cm, while two complete blades measure 31.5 mm and 33 mm in length. Blade cores have a conical shape; one has a single striking platform (Pl. 13: 11) while the other has two striking platforms (Pl. 13: 10). Out of the combined cores, one is flat and has four striking platforms (Pl. 13: 9), while the other is irregular in shape and has two striking platforms. The cores are small, which can be a result of several factors: maximal core exploitation, small dimensions of the available raw material, and/or the preplanned production of small blades/bladelets. Cortex was noted on 15 artifacts, that is, 34.1%. Five artifacts are 20 to 30% covered by cortex, one artifact is 40% covered, while nine artifacts are significantly covered with between 60 and 100%. The largest number of artifacts with cortex includes flakes with cortex - five artifacts.

JURJEVAC-STARA VODENICA – PROIZVODNI TIPOVI / PRODUCTION TYPES		
Tip / Type	**N**	**%**
odbojak s okorinom / flake with cortex	5	11,4
sječivo ili pločica s okorinom / blade or bladelet with cortex	4	9,1
odbojak / flake	10	22,7
sječivo ili pločica / blade or bladelet	12	27,3
jezgra za sječiva / blade core	2	4,5
kombinirana jezgra / combined core	2	4,5
ulomak jezgre / core fragment	2	4,5
dotjerujući odbojak jezgre / core rejuvenation flake	2	4,5
krhotina / chunk	5	11,4
UKUPNO / TOTAL	44	100,0

Tablica / Table 2: Zastupljenost proizvodnih tipova lomljenih kamenih izrađevina na lokalitetu Jurjevac-Stara Vodenica / The representation of knapped stone tool production types at the site of Jurjevac-Stara Vodenica.

Lanac operacija (Tab. 3)

Najveći broj lomljenih kamenih izrađevina pripada 2. fazi lanca operacija, odnosno proizvodnji i upotrebi, a riječ je o 30 izrađevina, odnosno 68,2%. Devet izrađevina pripada 1. fazi lanca operacija, odnosno fazi prethodne obrade, što je 20,4%. Za pet izrađevina ne može se ustanoviti pripadnost određenoj fazi lanca operacija, odnosno te izrađevine mogu potjecati iz bilo koje od faza, a riječ je o krhotinama. Ovakva struktura zastupljenosti faza ukazuje na to da je dio izrađevina bio proizveden *in situ*, odnosno da su ih samostalno proizvodili pripadnici naselja u samome naselju. Preostale su izrađevine, budući da su gotovo sve izrađene na lokalno dostupnoj sirovini, vjerojatno proizveli stanov-

Operational chain (Tab. 3)

The largest number of knapped stone artifacts is ascribed to the 2nd phase of the operational chain, that is, to production and use, and it includes 30 artifacts, or 68.2%. Nine artifacts are ascribed to the 1st phase of the operational chain, that is, to the phase of previous preparation, which amounts to 20.4%. Five artifacts, notably chunks, cannot be ascribed to a certain phase of the operational chain, that is, the artifacts could fall into any of the phases. Such a representation of phases points to the fact that some artifacts were produced *in situ*, i.e. that they were independently made by the inhabitants of the settlement at the site itself. The remaining artifacts, seeing as almost all of them were made on locally available raw material, were also probably produced by the settlement

JURJEVAC-STARA VODENICA – FAZE PROIZVODNJE / PRODUCTION PHASES		
Faza / Phase	**N/F**	**%**
prethodna obrada / preparation	9	20,4
proizvodnja i upotreba / production and use	30	68,2
neodredivo / undetermined	5	11,4
UKUPNO / TOTAL	44	100,0

Tablica / Table 3: Zastupljenost faza proizvodnje lomljenih kamenih izrađevina na lokalitetu Jurjevac-Stara Vodenica / The representation of knapped stone artifact production phases at the site of Jurjevac-Stara Vodenica.

nici naselja, međutim, izvan samog naselja, moguće na mjestu prikupljanja sirovine. Unatoč tomu, valja podsjetiti da se ovaj skup nalaza sastoji od 44 izrađevine, stoga se rezultati litičke analize trebaju razmatrati s određenim oprezom.

inhabitants, but outside the settlement, possibly at the place where they collected raw materials. Despite all of this, it is important to note that this assemblage includes 44 artifacts, so that the results of this knapped stone analysis should be taken with a grain of salt.

Tipološka analiza (Tab. 4)

Od 44 lomljene kamene izrađevine, njih 16, odnosno 36,4% obrađeno je u alatke pa je riječ o visokom udjelu alatki u ovome skupu nalaza (Tab. 4, Sl. 3). Među alatkama prevladavaju one kombinirane koje su zastupljene sa 5 komada. Među kombiniranim alatkama česta je kombinacija udubak te komad s obradom (T. 13: 2) (Sl. 5), udubak i grebalo (T. 13: 1), ali pojavljuju se i tri kombinacije alatki poput grebala, nazupka te komada s obradom na 2 ruba (T. 13: 3) ili npr. perforatora, udupka te komada s obradom na jednom rubu (T. 13: 6). Osim kombiniranih alatki, s po dva komada zastupljeni su komadi s obradom, zatim grebala (T. 13: 4), nazupci (T. 13: 5) te geometrijski oblici (T. 13: 8). Perforatori, udupci te zarupci prisutni su sa po jednim primjerkom. Najviše je alatki izrađeno na sječivima, a nešto manje na odbojcima. Najmanje je alatki izrađeno na odbojcima s okorinom, sječivima / pločicama s okorinom te krhotinama, dok na

Typological analysis (Tab. 4)

Out of the 44 knapped stone tools, 16, or 36.4% of them were processed into tools, which is a high percentage in this collection of finds (Tab. 4, Fig. 3). Combination tools prevail in the assemblage, and a total of five pieces was found at the site. Combined tools often include the combination of a notched piece and a retouched piece (Pl.13:2), a notched piece and an endscraper (Pl. 13: 1), but also three combinations of tools like endscrapers, denticulates and pieces retouched on two edges (Pl. 13: 3) or, e.g. perforators, notched pieces, and pieces retouched on one edge (Pl. 13: 6). Apart from combined tools, there are two retouched pieces, two endscrapers (Pl. 13: 4), two denticulates (Pl. 13: 5), and two geometrical pieces (Pl. 13: 8). Perforators, notched pieces, and truncations are represented by one find each. Most tools were made on blades, and somewhat less on flakes. The smallest number of tools was made on flakes with cortex, blades/bladelets with cortex, and chunks, while other production categories from

JURJEVAC-STARA VODENICA – TIPOVI ALATKI / TOOL TYPES		
Tip / Type	N	%
komad s obradom / retouched piece	2	4,5
Grebalo / endscraper	2	4,5
Perforator / perforator	1	2,3
geometrijski oblik / geometrical shape	2	4,5
zarubak / truncation	1	2,3
udubak / notched piece	1	2,3
nazubak / denticulate	2	4,5
kombinirana alatka / combination tool	5	11,5
ukupno alatki / total tools	16	36,4
UKUPNO / TOTAL	44	100,0

Tablica / Table 4: Zastupljenost tipova alatki među lomljenim kamenim izrađevinama na lokalitetu Jurjevac-Stara Vodenica / The representation of tool types among the knapped stone artifacts from the site of Jurjevac-Stara Vodenica.

drugim proizvodnim kategorijama u ovom skupu nalaza alatke nisu izrađivane. Dimenzije alatki usporedne su dimenzijama jezgri, kao i dimenzijama poluproizvoda te, iako se radi o malim dimenzijama, alatke su pažljivo izrađene pa nije riječ o *ad hoc* alatkama na odbojcima, kao što je to slučaj s lasinjskim lokalitetima u sjeverozapadnoj Hrvatskoj.[13]

Što se tiče sirovinskog materijala, 42 lomljene kamene izrađevine napravljene su na rožnjacima / radiolaritima, dok je po jedna napravljena na kvarcu, kvarcitu iz jezerskih naslaga te na opsidijanu (T. 1: 4).

Tragovi sjaja srpa, za koje se smatra da nastaju kao posljedica rezanja biljaka, ustanovljeni su na dvije izrađevine, odnosno 4,5% (T. 13: 3) (Sl. 5). Iskrzanost je ruba zabilježena na 5 izrađevina, odnosno 11,4% (T. 13: 7), dok su specifični tragovi upotrebe, tzv. ogrebotine koje nastaju sječom biljaka, zabilježene na 3 izrađevine, odnosno na 6,8% materijala (T. 13: 7) (Sl. 6).

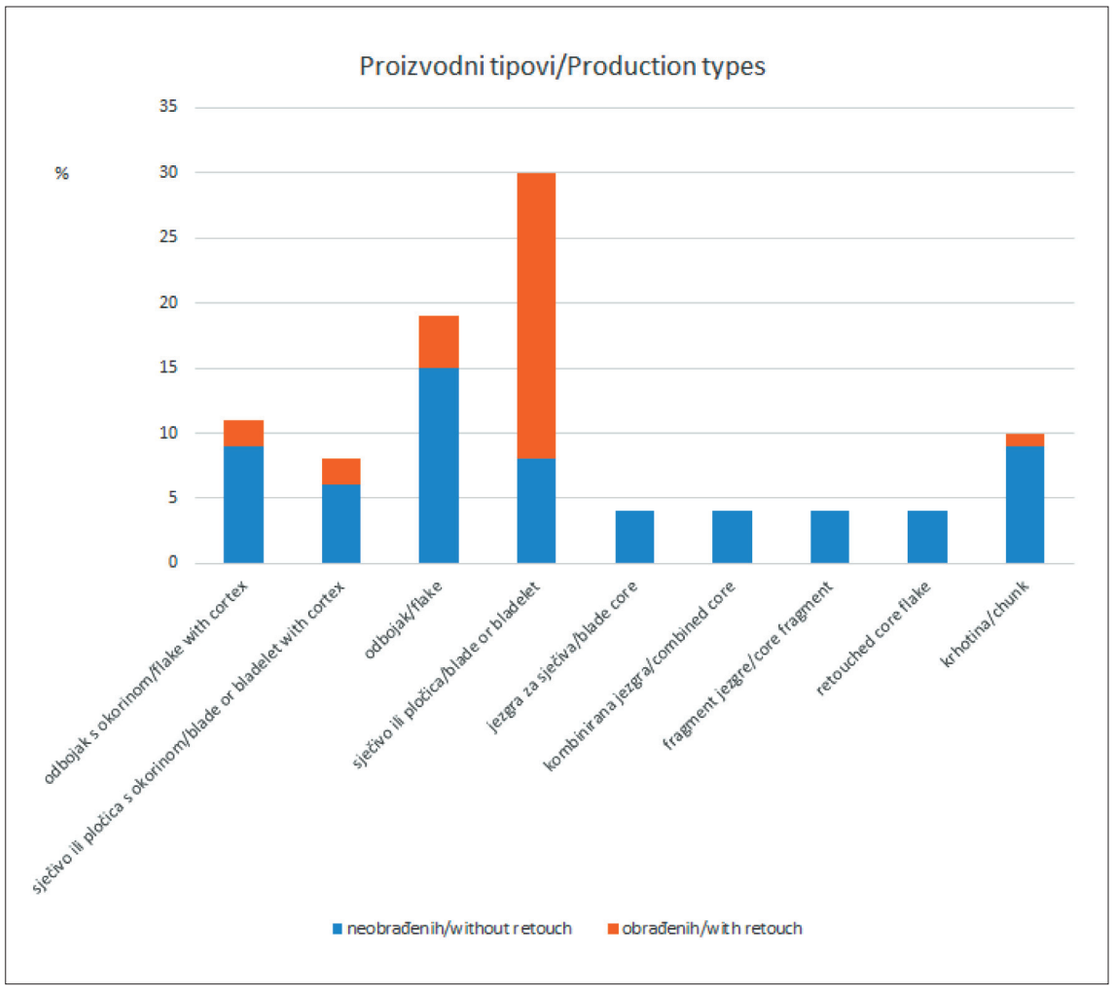
[13] Komšo 2006a, 102; Komšo 2008, 103.

this assemblage were not used to produce tools. Tool dimensions are similar to core dimensions, as well as to half-product dimensions. Although they are small, these tools were carefully made and are not *ad hoc* tools on flakes as is the case with Lasinja culture sites in northwestern Croatia.[13]

When it comes to raw material, 42 knapped stone artifacts were made out of chert/radiolarites, one artifact was made out of quartz, one out of quartzite from lake sediments, and one out of obsidian (Pl. 1: 4).

Traces of shine, thought to be the consequence of plant cutting, are present on two artifacts, that is, on 4.5% (Pl. 13: 3). Edge chipping was noted on five artifacts, or 11.4% (Pl. 13: 7), while specific traces of plant cutting were noted on three artifacts, or 6.8% of the material (Pl. 13: 7).

[13] Komšo 2006a, 102; Komšo 2008, 103.



Slika / Figure 3: Histogram učestalosti obrađenih i neobrađenih proizvodnih tipova lomljenih kamenih izrađevina na lokalitetu Jurjevac-Stara Vodenica / A histogram of the frequency of retouched and non-retouched production types at the site of Jurjevac-Stara Vodenica.

Tragovi organskih materijala ustanovljeni su na 3 izrađevine, odnosno na 6,8% izrađevina (T. 13: 7), a smatra se kako je vjerojatno riječ o materijalu organskog podrijetla kojim se olakšavalo uglavljivanje i fiksiranje sječiva u kompozitnim srpovima.

Gorenje je zabilježeno na 5 izrađevina, odnosno 11,4% materijala, a mali broj izrađevina s tragovima gorenja često se objašnjava slučajnim, odnosno nekontroliranim izlaganjem vatri, iako o vrsti tragova, koji se mogu pojavljivati u obliku promjene boje sirovinskog materijala, u linijskim pukotinama, kružnim dubljim pukotinama itd., ovisi radi li se o zagrijavanju sirovine prije lomljenja ili o nekontroliranom izlaganju vatri.

Traces of organic materials are present on three artifacts, or 6.8% (Pl. 13: 7), and they are thought to be traces of organic material used for setting and fixating blades in composite sickles.

Traces of burning are present on five artifacts, or 11.4% of the material. The small number of artifacts with traces of burning is explained by accidental exposure, i.e. uncontrolled exposure to fire, although it depends on the type of traces, which can appear as changes in the color of the raw material, linear breakage, deeper circular cracks and the like, depending on whether the material was heated before knapping or was exposed to uncontrolled fire.

LOKALITET / SITE	REGIJA / REGION	N / F	KULTURA / CULTURE	LITERATURA / BIBLIOGRAPHY
Blizna	SZ Hrvatska / NW Croatia	92	lasinjska kultura / the Lasinja culture	Komšo 2006a.
Čanjevo	SZ Hrvatska / NW Croatia	211	Eneolitik / Eneolithic	Komšo 2008.
Gromače 2	SZ Hrvatska / NW Croatia	23	Eneolitik / Eneolithic	Komšo 2006.
Slavča	Posavina / Sava River basin	257	lasinjska i kostolačka kultura / the Lasinja and the Kostolac culture culture	Šošić, Karavanić 2004.
Beketinci-Bentež	I Hrvatska / E Croatia	81	lasinjska kultura / the Lasinja culture	Šošić Klindžić 2013.
Jurjevac-Stara Vodenica	I Hrvatska / E Croatia	44	lasinjska kultura / the Lasinja culture	
Josipovac Punitovački	I Hrvatska / E Croatia	157	Retz-Gajary kultura / the Retz-Gajary culture	Komšo 2009.
Pajtenica-Velike livade	I Hrvatska / E Croatia	268	lasinjska kultura / the Lasinja culture	
Tomašanci-Palača	I Hrvatska / E Croatia	380	lasinjska kultura / the Lasinja culture	Špoljar 2011.
Golinci-Selište	Podravina / Drava River basin	15	lasinjska kultura / the Lasinja culture	Čataj, Janeš 2013.

Tablica / Table 5: Brojnost dosad analiziranih skupova lomljenog materijala iz razdoblja eneolitika na području sjeverne Hrvatske / The number of analyzed knapped stone assemblages dated to the Eneolithic in northern Croatia to this day.

Prema broju pronađenih lomljenih kamenih izrađevina, lokalitet Jurjevac – Stara Vodenica među manjim je skupovima litičkih nalaza lasinjske kulture (Tab. 5, Sl. 4).

Dominacija sječiva, odnosno pločica, dosad je zabilježena i na drugim lasinjskim lokalitetima na području Đakovštine, poput npr. lokaliteta Pajtenica – Velike Livade (sječiva – 20,1%, odbojci – 19%) te lokaliteta Tomašanci – Palača (sječiva – 35%, odbojci – 20,3%).[14] Ipak, situacija je donekle drugačija na lasinjskom naselju Beketinci Bentež, gdje su dominantni odbojci sa zastupljenošću od 40,7%, dok su sječiva zastupljena sa 34,6%.[15] Slično je i s eneolitičkim skupom

Based on the number of recovered knapped stone artifacts, the site of Jurjevac-Stara Vodenica yielded one of the smaller assemblages ascribed to the Lasinja culture (Tab. 5, Fig. 4).

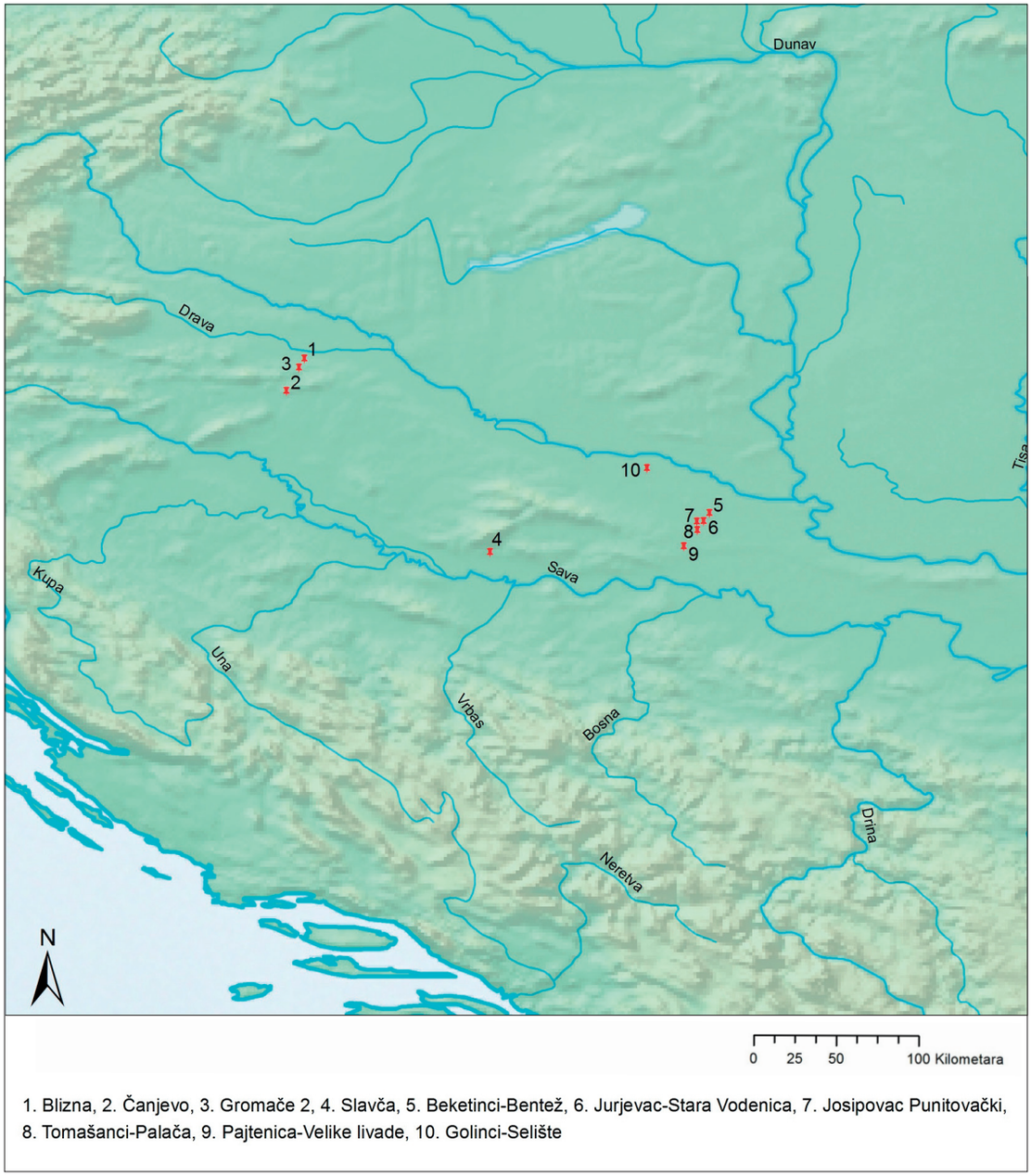
The prevalence of blades, that is, bladelets, has so far been noted on other sites of the Lasinja culture in the Đakovo region, e.g. Pajtenica-Velike Livade (blades - 20.1%, flakes - 19%) and Tomašanci-Palača (blades - 35%, flakes - 20.3%).[14] However, the situation is somewhat different at the settlement of Beketinci Bentež where flakes prevail with 40.7%, while blades amount to 34.6%.[15] A similar situation is noted in the assemblage from Slavča near Nova Gradiška, where flakes make up 22.18%, and blades

[14] Špoljar, 2011.

[15] Šošić Klindžić 2013, 130.

[14] Špoljar 2011.

[15] Šošić Klindžić 2013, 130.



Slika / Figure 4: Smještaj eneolitičkih lokaliteta s kojih je analizirana lomljevina / The positions of Eneolithic sites with analyzed knapped stone assemblages.

nalaza u Slavči kod Nove Gradiške, gdje odbojci čine 22,18%, a sječiva 17,12% materijala.[16] Na lokalitetima lasinjske kulture u sjeverozapadnoj Hrvatskoj dominiraju odbojci, dok su sječiva znatno manje zastupljena.[17] Zaključuje se da struktura proizvodnih tipova varira, ovisno o kojem je

[16] Šošić, Karavanić 2004, 28.

[17] Komšo 2006a, 100.

17.12% of the material.[16] Flakes are dominant on sites of the Lasinja culture in northwestern Croatia, and blades are significantly less represented.[17] We can conclude that the structure of production types varies depending on the settlement, but that Lasinja culture sites in northwestern Croatia are dominated by flakes as a

[16] Šošić, Karavanić 2004, 28.

[17] Komšo 2006a, 100.

naselju riječ, međutim, da su za lasinjske lokalitete u sjeverozapadnoj Hrvatskoj karakteristični poluproizvod odbojci, a za njima suvremene lokalitete u istočnoj Hrvatskoj sječiva / pločice, uz mogućnost iznimki, poput npr. lokaliteta Beketinci Bentež. Situacija na područjima između sjeverozapadne i istočne Hrvatske je, prema sadašnjem stanju istraživanja, nepoznata, uz iznimku lokaliteta Slavča kod Nove Gradiške. Prema dimenzijama poluproizvoda, sječiva / pločica i odbojaka, lasinjski lokaliteti na području sjeverne Hrvatske ne slijede tendencije povećanja dimenzija rukotvorina, a koje su obilježile skupove nalaza iz razdoblja ranog neolitika u nekim dijelovima srednje i istočne Europe.[18] Iako se dimenzije izrađevina ponekad pokušavaju objasniti u svjetlu kulturnog odabira,[19] determiniranost okolišem, odnosno karakteristikama sirovinskog materijala te dimenzijama same sirovine, mogla je također biti uzrok manjih dimenzija izrađevina. Jedan od primjera determiniranosti dimenzija izrađevina dimenzijama te karakteristikama sirovinskog materijala karpatski je opsidijan tijekom razdoblja ranog neolitika te tijekom kasnog neolitika, kada se zbog dostupnosti sirovine većih dimenzija intenzivira izrada duljih sječiva, kao što je to slučaj na lokalitetu Méhtelek u Mađarskoj.[20]

Struktura proizvodnih tipova na ovom nalazištu ukazuje na djelomičnu proizvodnu aktivnost *in situ*, dok su se ostali poluproizvodi, odnosno sječiva / pločice te odbojci proizvodili izvan naselja. Djelomična proizvodna aktivnost u samome naselju dosad je zabilježena na svim lokalitetima lasinjske kulture na području Slavonije s kojih su analizirani skupovi litičkih nalaza: Beketinci Bentež,[21] Tomašanci – Palača,[22] Pajtenica – Velike Livade,[23] Slavča kod Nove Gradiške.[24]

[18] Kaczanowska, Kozłowski 1997.

[19] Šošić Klindžić 2013, 128-139.

[20] Biagi, Starnini 2010, 120.

[21] Šošić Klindžić 2013, 128-139.

[22] Špoljar 2011.

[23] Analiza litičkog materijala s nalazišta Pajtenica – Velike Livade je u tijeku, a provodi je Davor Špoljar.

[24] Šošić, Karavanić 2004, 28.

half-product, while contemporaneous sites in eastern Croatia are dominated by blades, with possible exceptions like the site of Beketinci Bentež. The situation in areas between western and eastern Croatia is still unknown, with the exception of Slavča near Nova Gradiška. Based on half-product dimensions, blades/bladelets, and flakes, sites of the Lasinja culture in northern Croatia do not follow the tendency to increase artifact dimensions, which marked Early Neolithic assemblages in some parts of central and eastern Europe.[18] Although artifact dimensions are sometimes explained in the light of cultural choices,[19] the specificity of the landscape, that is, characteristics of the raw material and its dimensions could also be the reason why artifacts are small. One of the examples of determining artifact dimensions based on raw material size and characteristics is Carpathian obsidian used in the Early and Late Neolithic, when longer blade production intensified due to the availability of material, as is the case at the site of Méhtelek in Hungary.[20]

The structure of production types at this site points to partial production *in situ*, while other half-products, i.e. blades/bladelets and flakes were produced outside the settlement. Partial production activity inside a settlement has so far been noted on all sites of the Lasinja culture in Slavonia where knapped stone assemblages were analyzed: Beketinci Bentež,[21] Tomašanci-Palača,[22] Pajtenica-Velike Livade,[23] Slavča near Nova Gradiška.[24]

[18] Kaczanowska, Kozłowski 1997.

[19] Šošić Klindžić 2013, 128-139.

[20] Biagi, Starnini 2010, 120.

[21] Šošić Klindžić 2013, 128-139.

[22] Špoljar 2011.

[23] Knapped stone finds are currently being analyzed by Davor Špoljar.

[24] Šošić, Karavanić 2004, 28.

Ipak, intenzitet proizvodnje varira pa su tako neka naselja u većoj mjeri izrađivala poluproizvode *in situ*, poput npr. Pajtenice i Slavče,[25] dok su se u Tomašancima[26] i Jurjevcu poluproizvodi u manjoj mjeri izrađivali *in situ*, a najslabija proizvodnja *in situ* zabilježena je u naselju Beketinci Bentež.[27] Zasad se može ustvrditi da su lasinjska naselja u smislu produkcije lomljenoga litičkog materijala prilično sličnog karaktera, odnosno da je riječ o djelomično proizvodnim naseljima, što je različito od starčevačkih naselja na području Slavonije, a koja se prema karakteru dijele na proizvodna, djelomično proizvodna i konzumentska naselja.[28]

Prema stupnju obrađenosti proizvodnih tipova u alatke od 36,4%, može se zaključiti da je na ovome lokalitetu prisutan visok postotak alatki. Udjeli alatki na ostalim eneolitičkim i / ili lasinjskim lokalitetima su: Beketinci Bentež (34,5%),[29] Tomašanci – Palača (29,7%),[30] Pajtenica – Velike Livade (26,5%), Josipovac Punitovački (36,94%),[31] Slavča (12,8%),[32] Blizna (21,7%),[33] Čanjevo (8,5%).[34] Zaključuje se da su prema udjelu alatki ovome lokalitetu najsličniji lokaliteti Beketinci Bentež, Tomašanci – Palača i Josipovac Punitovački. Smatra se da je proizvodna aktivnost *in situ* obrnuto proporcionalna udjelu alatki, a opravdanost te teze iznova se potvrdila i rezultatima analize ovog skupa nalaza. Dobar je primjer za to u slučaju lasinjske kulture u Slavoniji naselje Beketinci Bentež koje karakterizira niska proizvodna aktivnost, odnosno dominacija poluproizvoda, dok je s druge strane riječ o lasinjskom naselju koje ima najveći udio alatki među izrađevinama.[35] Među alatkama na ovome lokalitetu dominiraju kombinirane alatke, a riječ je o kombinacijama

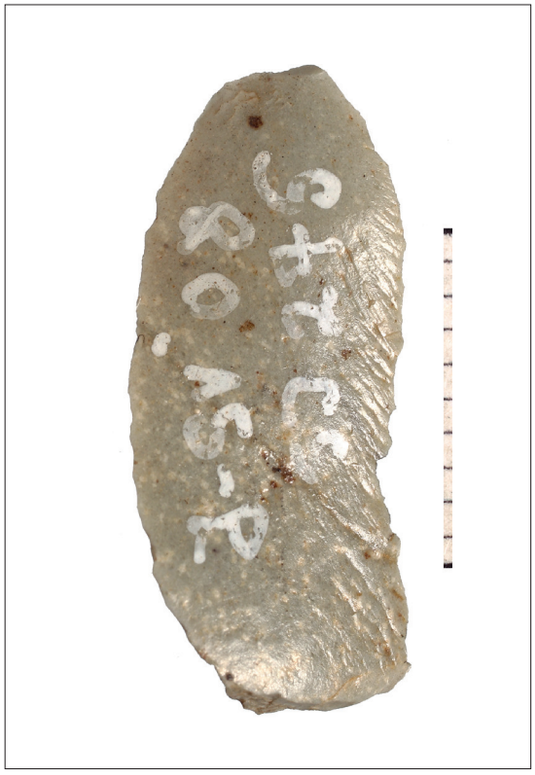
[25] Šošić, Karavanić 2004, 28.
[26] Špoljar 2011.
[27] Šošić Klindžić 2013, 128-139.
[28] Šošić Klindžić 2010.
[29] Šošić Klindžić 2013, 132.
[30] Špoljar 2011.
[31] Komšo 2009, 267.
[32] Šošić, Karavanić 2004, 32.
[33] Komšo 2006a, 101.
[34] Komšo 2008, 99.
[35] Šošić Klindžić 2013, 128-139.

However, the intensity of production varies, so some settlements largely produced half-products *in situ*, e.g. Pajtenica and Slavča,[25] while Tomašanci[26] and the settlement studied here produced somewhat less half-products *in situ.* The weakest production of half-products was noted at Beketinci Bentež.[27] So far we can say that settlements of the Lasinja culture, in the sense of knapped stone production, are fairly similar, i.e. that they were partially productive settlements, which diferentiates them from settlements of the Starčevo culture in Slavonia, which can be divided into productive, partially productive, and consumer settlements.[28]

According to the degree of processing production types into tools - 36.4%, we can conclude that this site has a large percentage of tools. The percentages of other Eneolithic and/or Lasinja culture settlements are as follows: Beketinci Bentež (34.5%),[29] Tomašanci-Palača (29.7%),[30] Pajtenica-Velike Livade (26.5%), Josipovac Punitovački (36.94%),[31] Slavča (12.8%),[32] Blizna (21.7%),[33] and Čanjevo (8.5%).[34] This shows that, based on tool presence in the assemblage, this site resembles Beketinci Bentež, Tomašanci-Palača, and Josipovac Punitovački the most. It is considered that production activities *in situ* are inversely proportional to the number of tools, and this presumption has once again been confirmed by the results of this analysis. A good example of that in the case of the Lasinja culture in Slavonia is the settlement of Beketinci Bentež which is characterized by low productivity, that is, the prevalence of half-products, especially because this is the site with the largest percentage of tools among knapped stone artifacts.[35] Tools found at this site are dominated by combination tools, more precisely combinations of notched pieces, endscrapers, and retouched pieces. Apart from combination tools, there are

[25] Šošić, Karavanić 2004, 28.
[26] Špoljar 2011.
[27] Šošić Klindžić 2013, 128-139.
[28] Šošić Klindžić 2010.
[29] Šošić Klindžić 2013, 132.
[30] Špoljar 2011.
[31] Komšo 2009, 267.
[32] Šošić, Karavanić 2004, 32.
[33] Komšo 2006a, 101.
[34] Komšo 2008, 99.
[35] Šošić Klindžić 2013, 128-139.

Slika / Figure 5: Tragovi sjaja srpa na dorzalnoj strani lijevoga lateralnog ruba sječiva, izrađenog na rožnjaku i potom dodatno obrađenog u kombiniranu alatku (komad s obradom i udubak) iz SJ 109 / Traces of sickle shine on the dorsal side of the left lateral edge of a flint blade which was processed into a combination tool (retouched piece and notched piece) found in SU 109.



Slika / Figure 6: Specifični tragovi upotrebe, tzv. ogrebotine na ventralnoj strani lijevog lateralnog ruba sječiva, izrađenog na rožnjaku iz SJ 275 / Specific traces of use, the so called edge chipping on the ventral side of the left lateral edge of a flint blade found in SU 275.

udubaka, grebala i komada s obradom. Osim kombiniranih alatki, nešto su više zastupljeni upravo komadi s obradom, grebala, geometrijski oblici i nazupci. Grebala se često pojavljuju među alatkama u naseljima lasinjske kulture, a njihova je zastupljenost nešto izraženija na sljedećim lokalitetima: Pajtenica – Velike Livade, Tomašanci – Palača,[36] Beketinci Bentež,[37] Slavča kod Nove Gradiške,[38] Blizna kod Jakopovca,[39] Čanjevo.[40] Alatke koje se najčešće dovode u vezu s poljodjelstvom, kao što su to npr. lunarni segmenti, u ovome skupu nalaza u potpunosti nedostaju.

[36] Špoljar 2011.
[37] Šošić Klindžić 2013, 132.
[38] Šošić, Karavanić 2004, 33.
[39] Komšo 2006a, 101.
[40] Komšo 2008, 99.

a lot of retouched pieces, endscrapers, geometrical shapes, and denticulates. Endscrapers appear quite often in Lasinja culture settlements, and are more numerous at the following sites: Pajtenica-Velike Livade, Tomašanci-Palača,[36] Beketinci Bentež,[37] Slavča near Nova Gradiška,[38] Blizna near Jakopovac,[39] Čanjevo.[40] Tools which are most often associated with agriculture, like lunar segments, are completely absent from this assemblage.

Međutim, takva situacija nije na svim eneolitičkim lokalitetima pa tako, npr. na lokalitetu Josipovac Punitovački, segmenti srpa čine većinu alatki.[41]

Makroskopski vidljivi tragovi upotrebe, poput sjaja srpa te ogrebotina na lateralnim rubovima, a koji se također smatraju posljedicom korištenja rukotvorina u poljodjelstvu, također su vrlo malo zastupljeni na ovom lokalitetu, dok su u znatnijoj mjeri prisutni na lokalitetu Josipovac Punitovački.[42]

Budući da je sirovinski materijal lokalnog porijekla i da je riječ o oblutcima rožnjaka / radiolarita, koji se mogu pronaći na čitavom području između Save i Drave istočno od slavonskih planina, vjerojatno su pripadnici lasinjskog naselja samostalno prikupljali sirovinu i izrađivali željene / potrebne proizvode i alatke. Prema strukturi sirovinskog materijala, ovaj lokalitet ne razlikuje se mnogo od ostalih spomenutih lokaliteta lasinjske kulture na području Đakovštine, međutim, određene razlike postoje u strukturi sirovine s obzirom na kvalitetu lomljenja. U ovom je skupu nalaza osrednjih karakteristika lomljenja 40,9% materijala, dok ih je, primjera radi, na lokalitetu Pajtenica 23,1%, a na lokalitetu Tomašanci – Palača 7,4%.[43] Veći udjeli lokalno dostupnoga sirovinskog materijala osrednjih i lošijih karakteristika lomljenja mogu biti posljedica smanjene selektivnosti pri prikupljanju sirovine i / ili oportunističkog pristupa u smislu pribavljanja litičkoga sirovinskog materijala.

Za razliku od lokaliteta lasinjske kulture, na kojima su pronađene izrađevine načinjene na opsidijanu, poput Tomašanaca – Palače,[44] Pajtenice – Velikih Livada, Čepinskih Martinaca,[45] zatim lasinjske ostave na lokalitetu Vinkovci – Hotel[46] itd., na ovome je lokalitetu opsidijan zabilježen samo u slučaju jedne izrađevine, a riječ je o odbojku – PN 77 iz stratigrafske jedinice 401

41 Komšo 2009, 271.
42 Komšo 2009, 271.
43 Špoljar 2011.
44 Špoljar 2011.
45 Kalafatić 2009, 22.
46 Dimitrijević 1979, 43.

However, this is not the case with all Eneolithic sites, and sickle segments make up the largest portion of tools at the site of Josipovac Punitovački.[41]

Macroscopically visible traces of use like sickle shine and edge chipping, which are also thought to be the result of agricultural activities, are poorly represented in the assemblage from this site, while they are more common in the assemblage from Josipovac Punitovački.[42]

Seeing as the raw material is of local origin and that it mostly comes in pebbles of chert/radiolarites which can be found in the entire area between the Sava and Drava rivers east of the Slavonian mountains, the inhabitants of the Lasinja settlement probably collected the raw material themselves and made the desired/needed products and tools. Based on the structure of the raw material, this site does not greatly differ from the other mentioned sites of the Lasinja culture in the Đakovo region, but there are certain differences in the structure of breakage quality of the raw material. This assemblage includes 40.9% material of mediocre quality, while, for example, the site of Pajtenica includes 23.1%, and the site of Tomašanci-Palača 7.4%.[43] Larger shares of locally available material of mediocre and bad breakage quality can be a consequence of reduced selectivity in raw material collecting and/or an opportunistic approach to collecting raw material for knapping.

Unlike the Lasinja culture sites where artifacts made out of obsidian were found like Tomašanci-Palača,[44] Pajtenica-Velike Livade, Čepinski Martinci,[45] as well as the Lasinja culture hoard from Vinkovci-Hotel[46] and the like, this site yielded only one obsidian artifact – a flake, SF 77 found in stratigraphic unit 401 (Pl. 1: 4).[47]

41 Komšo 2009, 271.
42 Komšo 2009, 271.
43 Špoljar 2011.
44 Špoljar 2011.
45 Kalafatić 2009, 22.
46 Dimitrijević 1979, 43.
47 One find of obsidian was obtained at Beketinci, see: Šošić Klindžić 2013, 134.

(T.1:4).[47] Balkanski rožnjak, koji je pronađen u naselju lasinjske kulture na lokalitetu Tomašanci – Palača[48] i vjerojatno na lokalitetu Beketinci Bentež[49], nije pronađen na ovome nalazištu.

Privreda i svakodnevni život

Arheobotaničke je analize biljnih ostataka s ovog lokaliteta provela Kelly Reed koja je uspješno analizirala 12 uzoraka.[50] Zbog loše očuvanosti, većina ih je svrstana u kategoriju „neodredivo".[51] Ostali su uzorci svrstani u žitarice, voće i mekinje. Kategorija žitarica i mekinja uključuje dvozrnu pšenicu i neodredive žitarice. Kategorija voća uključuje drijen i šljivu.[52] Biljni ostaci s obližnjega lasinjskog lokaliteta Pajtenica – Velike Livade, [53]gdje su analizirana 23 uzorka,[54] uglavnom su u kategoriji „neodredivo", ali ostaci žitarica uključuju ječam, jednozrnu pšenicu, dvozrnu pšenicu, odnosno vrste koje se u Đakovštini koriste od ranog neolitika, a pronađeni su i ostaci drijena, šljive i trave koja nalikuje broćiki, što pokazuje da je populacija iskorištavala lokalno dostupne divlje resurse. Oba lokaliteta uklapaju se u širu ekonomsku sliku lasinjske kulture i na oba su pronađeni ostaci žitarica koje se tipično pojavljuju u njezinu kontekstu (različite vrste pšenice i ječam). Korištenje i procesuiranje biljaka na lokalitetu Jurjevac – Stara Vodenica dokazuje i nalaz žrvnja koji, iako nije pronađen u izravnoj asocijaciji s biljnim ostacima, ima svoju namjenu i dokazuje da su se biljke, vjerojatno žitarice, obrađivale na samom lokalitetu.[55] Važno je istaknuti činjenicu da se spektar korištenih biljaka, kako kultiviranih tako i divljih, smanjuje u usporedbi s drugim ranijim i istovremenim lokalitetima te utvrđenim kulturnim poja-

[47] Jedan primjerak opsidijana zabilježen je i u Beketincima, vidi: Šošić Klindžić 2013, 134.

[48] Špoljar 2011.

[49] Šošić Klindžić 2013, 134.

[50] Reed, 2016.

[51] Reed 2012, vol. 2., 341-342, t. 4.20,.

[52] Đukić 2014, t. 4, 16-17.

[53] Balen 2007, 27.

[54] Reed 2012, vol. 1., 151; vol. 2., 344.

[55] Đukić 2014, 29.

Balkan chert, which was present in the Lasinja culture settlement at Tomašanci-Palača[48] and probably at the site of Beketinci Bentež,[49] was not found at this site.

Economy and everyday life

Archaebotanical analyses of plant remains from this site were conducted by Kelly Reed, who successfully analyzed 12 samples.[50] Due to the poor state of preservation, most finds were placed in the "undeterminable" category.[51] The rest of the samples were determined as cereals, fruit, and bran. The category of cereals and bran includes emmer and indeterminable cereals. The category of fruit includes Cornelian cherry and plum.[52] Plant remains from the nearby Lasinja culture site of Pajtenica-Velike Livade,[53] where 23 samples were analyzed,[54] are mostly placed in the "undeterminable" category, but the remains of cereals include barley, einkorn, emmer, i.e. species used in the Đakovo region from the Early Neolithic. Remains of Cornelian cherry, plum, and a weed which resembles Lady's Bedstraw were also found, indicating that the population also used locally available wild resources. Both of these sites fit into the larger economic picture of the Lasinja culture, and both yielded remains of cereals which typically appear in the contexts of the Lasinja culture (different kinds of wheat and barley). The use and processing of plants at the site of Jurjevac-Stara Vodenica is additionally attested to by a grindstone which, although not found in direct association with plant remains, has a clear function and proves that plants, probably cereals, were processed at the site.[55] It is important to highlight the fact that the spectrum of used plants, both cultivated and wild, decreases in comparison to other earlier and contemporaneous sites in the Đakovo region, that is, that the use of some plants con-

[48] Špoljar 2011.

[49] Šošić Klindžić 2013, 134.

[50] Reed, 2016.

[51] Reed 2012, vol. 2., 341-342, t. 4.20.

[52] Đukić 2014, t. 4, 16-17.

[53] Balen 2007, 27.

[54] Reed 2012, vol. 1., 151; vol. 2., 344.

[55] Đukić 2014, 29.

vama na prostor Đakovštine, odnosno da se nastavlja korištenje nekih biljaka koje su korištene u kasnom neolitiku[56], a što bi sugeriralo da populacija nije doživjela tradicionalno predlaganu naglu promjenu u ekonomiji u smislu prijelaza s intenzivne na ekstenzivnu zemljoradnju (koja bi zahtijevala mnogo veće područje za život i veću mobilnost).[57] Ipak, s obzirom na to da biljni ostaci na drugim istovremenim lokalitetima nisu sustavno uzimani, tek će buduća istraživanja pokazati koji je točan odnos kultiviranja biljaka i promjena u društvenoj strukturi populacije.[58]

Analizom skupa lomljenih kamenih izrađevina, iako nevelikog, dobiveno je također mnoštvo informacija o svakodnevnom životu pripadnika naselja lasinjske kulture na lokalitetu Jurjevac – Stara Vodenica, počevši od porijekla sirovinskog materijala, izrade poluproizvoda i alatki te namjene izrađevina. Prema lokalnom porijeklu sirovinskog materijala, ovaj lokalitet uklapa se u već postojeće rezultate analiza provedenih na skupovima nalaza lasinjske kulture s područja Đakovštine. Više od 40% izrađevina napravljeno je na sirovini osrednjih karakteristika lomljenja, što može ukazivati na smanjenu selektivnost prilikom prikupljanja sirovinskog materijala. Unatoč tomu, većina je izrađevina ipak napravljena na sirovini izvrsnih i dobrih karakteristika lomljenja, čime se ovaj lokalitet također uklapa u već postojeća gledišta o lasinjskoj kulturi na prostoru istočne Hrvatske, dok s druge strane pokazuje znatne razlike u odnosu na skupove nalaza lasinjske kulture s područja sjeverozapadne Hrvatske. Ovo je naselje bilo djelomično proizvodnog karaktera u smislu produkcije izrađevina pa je po tome najsličnije naselju lasinjske kulture na lokalitetu Tomašanci – Palača iako i ostali dosad analizirani skupovi lasinjske kulture s područja istočne Hrvatske ukazuju na to da je riječ o djelomično proizvodnim naseljima, a razlika među njima u intenzitetu je spomenute produkcije.

[56] Reed, 2016.

[57] Đukić 2014, 30, Reed 2016.

[58] Reed, 2016.

tinues from the Late Neolithic[56], which suggests that the population did not go through the traditionally accepted sudden change in economy in the sense of transition from intensive to extensive agriculture (which would require a much larger living area and greater mobility).[57] However, seeing as plant remains from other sites were not systematically collected, only future research will show the exact relations between plant cultivation and changes in the population's social structure.[58]

The analysis of the relatively small knapped stone assemblage also produced a multitude of information about the everyday life of the inhabitants of the Lasinja culture settlement at Jurjevac-Stara Vodenica, including the origin of the raw material, information about the production of half-products and tools, and the purpose for which the artifacts were made. Based on the local origin of the raw material, this site fits into the already known results of analyses conducted on assemblages ascribed to the Lasinja culture in the Đakovo region. Over 40% of artifacts are made on raw material of mediocre breakage quality, which can point to decreased selectivity in collecting raw material. Despite this fact, most artifacts are made on raw material of excellent and good breakage characteristics, which also positions this site into the existing opinions on the Lasinja culture in eastern Croatia. On the other hand, this site displays significant differences in relation to Lasinja assemblages from northwestern Croatia. This settlement is partially productive in character when it comes to producing knapped stone artifacts, and most closely resembles the Lasinja culture settlement at Tomašanci-Palača, even though other analyzed assemblages of the Lasinja culture from eastern Croatia suggest that these were partially productive sites which differ in production intensity.

[56] Reed, 2016.

[57] Đukić 2014, 30; Reed 2016.

[58] Reed, 2016.

Lokalitet Jurjevac – Stara Vodenica dao nam je posve standardan keramički materijal poznat i s ostalih lasinjskih lokaliteta. Zastupljeni su svi za tu kulturu karakteristični oblici, od zdjela bikoničnog i zaobljenog tijela, vrčevi, lonci, zdjele na nozi te žlice. Ukrašavanjem su urezani i ubodni motivi povezani, složeni u kompoziciji, a evidentan je i motiv bodljikave žice. Najbliže analogije građi pronalazimo na obližnjem nalazištu Beketinci Bentež.

Premda je istražena dosta velika površina, na nalazištu nisu ustanovljeni sigurni tragovi nadzemnih objekata, koje možemo pripisati lasinjskom naselju, pa nam o svakodnevnom životu može najviše reći analiza kamena koja, zajedno s arheobotaničkim rezultatima, potvrđuje da je lasinjska populacija u velikoj mjeri nastavila tradiciju obrade i korištenja resursa, kao i u prethodnom razdoblju. Ipak, bez obzira na to što je danas poznata velika količina lasinjskih nalazišta, koja upotpunjena sa sve većim brojem apsolutnih datuma sigurno smještaju populaciju u vremenski kontekst,[59] stanje obrade kamenih izrađevina još je nedovoljno. Iako analiza kamenih alatki često nije dostatno sredstvo za rekonstrukciju ekonomije nekog naselja, može nam poslužiti kao uvid u svakodnevne aktivnosti pretpovijesnih ljudi, a provođenjem i objavljivanjem analiza ovog tipa na drugim skupovima nalaza olakšat će nam slaganje mozaika života ljudi u svim pretpovijesnim razdobljima, pa tako i u lasinjskoj kulturi.

[59] Balen 2008; Balen, Drnić 2014, 48-53.

The site of Jurjevac-Stara Vodenica yielded a completely standard pottery assemblage known from other sites of the Lasinja culture. All forms characteristic of this culture have been defined at the site, including bowls with a biconical and rounded body, jugs, pots, bowls on a foot, and spoons. Decorations appear as combinations of incised and stabbed motifs brought together in different compositions, and the motif of barbed wire is also evident. The closes analogies to this material are found at the nearby site of Beketinci Bentež.

Although a relatively large surface was excavated, the site did not yield definitive traces of aboveground dwellings which could be ascribed to the Lasinja culture settlement, so we can learn the most about everyday life from analyses of stone which, together with archaeobotany, confirms that the Lasinja population largely continued the tradition of processing and using resources from the previous periods. However, regardless of the fact that, today, we know about a large number of Lasinja sites which, along with the evergrowing number of absolute dates place this population in a temporal context,[59] the number of stone artifact analyses is still insufficient. Although stone tool analysis is quite often not an adequate means to reconstruct the economy of a certain settlement, it can provide us with an insight into the everyday activities of prehistoric people, and conducting and publishing these types of analyses done on other assemblages will make it easier for us to put together the mosaic of human lives in all prehistoric periods, including those ascribed to the Lasinja culture.

[59] Balen 2008; Balen, Drnić 2014, 48-53.

KATALOG PREDMETA: [60]

Tabla 1

1. SJ 2; PN 7, glačana sjekira trapezastog oblika sa širim distalnim i užim proksimalnim krajem, s tragovima oštećenja na stražnjem dijelu; dužina: 3,8 cm, širina: 2,5 cm, debljina: 1,0 cm.

2. SJ 2; PN 26, glačano kameno dlijeto s vidljivim oštećenjima na površini; dužina: 7,1 cm, širina: 2,8 cm, debljina: 2,2 cm.

3. SJ 401; PN 75, ulomak keramičke žlice s tuljcem za nasad drške; površina: gruba, oker-crvenkaste boje; dužina: 6,3 cm, širina: 4,9 cm, debljina: 2,0 cm.

4. SJ 401; PN 77, odbojak od opsidijana; dužina: 1,7 cm, širina: 1,4 cm, debljina: 0,4 cm.

5. SJ 259; PN 104, glačana sjekira trapezastog oblika sa širim distalnim i užim proksimalnim krajem, s tragovima oštećenja na stražnjem dijelu; dužina: 6,0 cm, širina: 4,3 cm; debljina: 1,7 cm.

6. SJ 341; PN 167, glačana sjekira trapezastog oblika sa širim distalnim krajem i ukošenom oštricom, napravljena od alunita; dužina: 3,7 cm, širina: 2,8 cm, debljina: 1,5 cm.

7. SJ 259; PN 177, ulomak keramičke žlice s tuljcem za nasad drške; površina: gruba, oker boje; dužina: 2,8 cm, širina: 3,9 cm, debljina: 3,1 cm.

8. SJ 259; PN 180, ulomak keramičke žlice s tuljcem za nasad drške; površina: gruba, oker boje; dužina: 4 cm, širina: 3 cm, debljina: 2,6 cm.

9. SJ 401; PN 181, keramička čaša manjih dimenzija s ravnim rubom i ravnim dnom; površina: gruba, oker-crvenkaste boje s tamnijom mrljom od gorenja pri rubu; promjer otvora: 3,5 cm, visina: 2,7 cm, debljina stijenke: 0,5 cm.

[60] Materijal na tablama nacrtao je Krešimir Rončević, a table je obradio Marin Mađerić.

CATALOGUE OF FINDS:[60]

Plate 1

1. SU 2; SF 7, trapezoidal polished stone axe with a wider distal and narrower proximal end, with traces of use on the back end; length: 3.8cm, width: 2.5 cm, thickness 1 cm.

2. SU 2; SF 26, polished stone chisel with visible damage on the surface; length: 7.1cm, width: 2.8 cm, thickness 2.2 cm.

3. SU 401; SF 75; fragment of a pottery spoon with a shaft for hafting, surface: coarse, ochre-reddish; length: 6.3 cm, width: 4.9 cm, thickness 2 cm.

4. SU 401; SF 77, obsidian flake; length: 1.7 cm, width: 1.4 cm, thickness 0.4 cm.

5. SU 259; SF 104, trapezoidal polished stone axe with a wider distal and narrower proximal end, with traces of use on the back end; length: 6.0 cm, width: 4.3 cm; thickness 1.7 cm.

6. SU 341; SF 167, trapezoidal polished stone axe with a wider distal end and a slanted blade, made out of alunite; length: 3.7 cm, width: 2.8 cm, thickness 1.5 cm.

7. SU 259; SF 177; fragment of a ceramic spoon with a shaft for hafting, surface: coarse, ochre; length: 2.8 cm, width: 3.9 cm, thickness 3.1 cm.

8. SU 259; SF 180, fragment of a ceramic spoon with a shaft for hafting, surface: coarse, ochre; length: 4 cm, width: 3 cm, thickness 2.6 cm.

9. SU 401; SF 181, smaller pottery glass with a straight rim and a straight bottom, surface: coarse, ochre-reddish with a darker stain from burning near the rim, rim diameter: 3.5 cm, height: 2.7 cm, vessel wall: 0.5 cm.

[60] The material on the plates was drawn by Krešimir Rončević, and the plates were digitally processed by Marin Mađerić.

Tabla 2

1. SJ 9, rekonstruirana konična keramička zdjelica s nepravilnim ravnim rubom i ravnim dnom; površina: gruba, smeđe boje; promjer otvora: 4,8 cm, visina: 2,5 cm, stijenka: 0,5 cm.

2. SJ 105, probušena dugmetasta keramička aplikacija, površina: fina, tamnije sivo-smeđe boje; visina: 5,7 cm, širina: 6,3 cm, stijenka: 0,8 cm.

3. SJ 105, ulomak blago izvučenog ruba keramičke posude, vjerojatno zdjele koničnog oblika, ukrašen trakastim aplikacijama koje tvore motive visećih trokuta; visina: 7,5 cm, širina: 7,9 cm, debljina: 0,7 cm.

4. SJ 121, ulomak keramičke posude s kljunastom ručkom; površina: fina, tamnosive boje, visina: 15,86 cm, širina: 12, 4 cm, debljina: 1,2 cm.

Tabla 3

1. SJ 121, ulomak keramičke posude, ukrašen dugmetastom aplikacijom; površina: gruba, oker-sivkaste boje, sendvič presjeka; visina: 6,8 cm, širina: 3,4 cm, stijenka: 1,2 cm.

2. SJ 121, ulomak keramičke posude, ukrašen dugmetastom aplikacijom; površina: gruba, svjetlije oker-smeđe boje; visina: 6,8 cm, širina: 8,6 cm, stijenka: 1 cm.

3. SJ 196, ulomak izvučenog ruba keramičke posude s trakastom ručkom koja malo prelazi rub i koja je uža na središnjem dijelu; visina: 3,4 cm, širina: 4,4 cm, stijenka: 0,4 cm.

4. SJ 200, rekonstruirana keramička čaša većih dimenzija, blago zaobljenog tijela s ravnim rubom i ravnim dnom te kljunastom ručkom ovalnog presjeka; površina: gruba, smeđe boje; promjer otvora: 10,4 cm, visina: 17,4 cm, stijenka: 0,8 cm.

5. SJ 200, ulomak zdjelice izvučenog ruba koji je zaravnjen na gornjoj strani; površina: gruba, svjetlije sivkasto-crvenkaste boje; visina: 5,4 cm, širina: 8,4 cm, stijenka: 0,7 cm.

Plate 2

1. SU 9, reconstructed conical pottery bowl with an irregular straight rim and a straight bottom, surface: coarse, brown; rim diameter: 4.8 cm, height: 2.5 cm, vessel wall: 0.5 cm.

2. SU 105, pierced button-like pottery application, surface: fine, darker gray-brown; height: 5.7 cm, width: 6.3 cm, vessel wall: 0.8 cm.

3. SU 105, fragment of a slightly outward-facing rim of a pottery vessel, probably a conical bowl, decorated with ribbon-like applications creating hanging triangles; height: 7.5 cm, width: 7.9 cm, thickness 0.7 cm.

4. SU 121, fragment of a pottery vessel with a beak-like handle, surface: fine, dark gray, height: 15.86 cm, width: 12, 4 cm, thickness 1.2 cm.

Plate 3

1. SU 121, fragment of a pottery vessel decorated with a button-like application, surface: coarse, ochre-grayish, sandwich cross-section; height: 6.8 cm, width: 3.4 cm, vessel wall: 1.2 cm.

2. SU 121, fragment of a pottery vessel decorated with a button-like application; surface: coarse, lighter ochre-brown; height: 6.8 cm, width: 8.6 cm, vessel wall: 1 cm.

3. SU 196, fragment of an outward-facing rim a pottery vessel with a ribbon-like handle which slightly goes over the rim and which is thinner in the central part; height: 3.4 cm, width: 4.4 cm, vessel wall: 0.4 cm.

4. SU 200, larger reconstructed pottery glass with a slightly rounded body, with a straight rim and a straight bottom and a beak-like handle with an oval cross-section, surface: coarse, brown; rim diameter: 10.4 cm, height: 17.4 cm, vessel wall: 0.8 cm.

5. SU 200, fragment of a bowl with an outward-facing rim which is straightened on the upper side, surface: coarse, lighter grayish-reddish; height: 5.4 cm, width: 8.4 cm, vessel wall: 0.7 cm.

6. SJ 200, veći dio keramičke čaše, blago zaobljenog tijela i blago profiliranog dna; površina: gruba, svjetlije sivo-smećkaste boje; visina: 10,5 cm, promjer dna: 8,4 cm, stijenka: 0,6 cm.

7. SJ 200, ulomak ravnog ruba posude većih dimenzija, ukrašen dvjema horizontalnim plastičnim trakama na kojima se vidi utiskivanje noktom; površina: gruba, smeđe boje s tamnijom mrljom od gorenja na donjem dijelu; visina: 20,4 cm, širina: 24,6 cm, stijenka: 1,4 cm.

6. SU 200, larger part of a pottery glass with a rounded body and a slightly protruding bottom, surface: coarse, lighter gray-brownish; height: 10.5 cm, bottom diameter: 8.4 cm, vessel wall: 0.6 cm.

7. SU 200, fragment of a straight rim of a larger pottery vessel, decorated with two horizontal ribbon-like applications which have nail impressions, surface: coarse, brown with a darker stain from burning in the bottom part, height: 20.4 cm, width: 24.6 cm, vessel wall: 1.4 cm.

Tabla 4

1. SJ 225, rekonstruirana plitka keramička tava, ravnog ruba i ravnog dna s izljevom; površina: gruba, tamnije crvenkasto-smeđe boje; promjer otvora: 35,8 cm, visina: 7,6 cm, stijenka: 1 cm.

2. SJ 237, rekonstruirana plitka keramička tava ravnog ruba i ravnog dna s izljevom; površina: gruba, tamnije smeđe-sivkaste boje; promjer otvora: 33,4 cm, visina: 7 cm, stijenka: 1,2 cm.

3. SJ 259, ulomak ravnog ruba keramičke posude, ukrašen dugmetastom aplikacijom; površina: gruba, oker-narančaste boje, sendvič presjeka; visina: 14,2 cm, širina: 13,6 cm, stijenka: 0,9 cm.

4. SJ 259, ulomak izvučenog ruba keramičke posude, koji je zaravnjen s gornje strane i ima izljev; površina: gruba, oker-narančaste boje, sendvič presjeka; visina: 11,4 cm, širina: 10,9 cm, stijenka: 0,9 cm.

Plate 4

1. SU 225, reconstructed shallow pottery pan with a straight rim, a straight bottom and an outflow, surface: coarse, darker reddish-brown; rim diameter: 35.8 cm, height: 7.6 cm, vessel wall: 1 cm.

2. SU 237, reconstructed shallow pottery pan with a straight rim, a straight bottom and an outflow, surface: coarse, darker brown-grayish; rim diameter: 33.4 cm, height: 7 cm, vessel wall: 1.2 cm.

3. SU 259, fragment of a straight rim of a pottery vessel decorated with a button-like application, surface: coarse, ochre-orange, sandwich cross-section; height: 14.2 cm, width: 13.6 cm, vessel wall: 0.9 cm.

4. SU 259, fragment of an outward-facing rim a pottery vessel which is straightened on the upper side and has an outflow, surface: coarse, ochre-orange, sandwich cross-section; height: 11.4 cm, width: 10.9 cm, vessel wall: 0.9 cm.

Tabla 5

1. SJ 259, kljunasta ručka keramičke posude; površina: gruba, crvenkasto-oker boje, sendvič presjeka; visina: 7,8 cm, širina: 4,6 cm, stijenka: 1,8 cm.

2. SJ 259, ulomak keramičke posude s kljunastom drškom; površina: gruba, svjetlije oker-sive boje; visina: 5,6 cm, širina: 7,2 cm, stijenka: 1,1 cm.

3. SJ 259, ulomak keramičke posude s okomito probušenom kljunastom ručkom; po-

Plate 5

1. SU 259, beak-like handle of a pottery vessel, surface: coarse, reddish-ochre, sandwich cross-section; height: 7.8 cm, width: 4.6 cm, vessel wall: 1.8 cm.

2. SU 259, fragment of a pottery vessel with a beak-like handle, surface: coarse, lighter ochre-gray; height: 5.6 cm, width: 7.2 cm, vessel wall: 1.1 cm.

3. SU 259, fragment of a pottery vessel with a vertically pierced beak-like handle, surface:

vršina: gruba, narančasto-smeđe boje; visina: 12,8 cm, širina: 13,8 cm, stijenka: 0,9 cm.

4. SJ 259, ulomak blago prstenastog dna keramičke posude manjih dimenzija; površina: fina, tamnije sive boje; visina: 2,5 cm, promjer dna: 5,1 cm, stijenka: 0,3 cm.

5. SJ 259, ulomak keramičkog vrča s trakastom ručkom, ukrašen urezivanjem i ubadanjem; površina: fina, tamnije sive boje; visina: 4,6 cm, širina: 2,5 cm, stijenka: 0,4 cm.

6. SJ 275, ulomak ravnog ruba zaobljene keramičke posude, vjerojatno zdjelice, s perforacijom pri rubu; površina: gruba, oker-narančaste boje, sendvič presjeka; visina: 4,2 cm, širina: 5,3 cm, stijenka: 0,9 cm.

7. SJ 275, ulomak ravnog ruba keramičke posude sa zadebljanim vodoravnim trakama; površina: gruba, oker-smeđe boje, sendvič presjeka; visina: 6,8 cm, širina: 3,8 cm, stijenka: 1,2 cm

8. SJ 289, rekonstruirana bikonična keramička zdjela na koničnoj šupljoj nozi, s četiri jezičasta izbočenja na prijelomu; površina: finija, tamnije crveno-smeđe boje; promjer otvora: 24,6 cm, visina: 19,5 cm, stijenka: 0,9 cm.

coarse, orange-brown; height: 12.8 cm, width: 13.8 cm, vessel wall: 0.9 cm.

4. SU 259, fragment of a slightly protruding bottom of a smaller pottery vessel, surface: fine, darker gray; height: 2.5 cm, bottom diameter: 5.1 cm, vessel wall: 0.3 cm.

5. SU 259, fragment of a pottery jug with a ribbon-like handle, decorated by incising and stabbing, surface: fine, darker gray; height: 4.6 cm, width: 2.5 cm, vessel wall: 0.4 cm.

6. SU 275, fragment of a straight rim of a rounded pottery vessel, probably a bowl, with a perforation near the rim, surface: coarse, ochre-orange, sandwich cross-section; height: 4.2 cm, width: 5.3 cm, vessel wall: 0.9 cm.

7. SU 275, fragment of a straight rim of a pottery vessel with thickened horizontal ribbons, surface: coarse, ochre-brown, sandwich cross-section; height: 6.8 cm, width: 3.8 cm, vessel wall: 1.2 cm

8. SU 289, reconstructed biconical pottery bowl on a hollow conical foot, with four tongue-like protrusions at the bend, surface: finer, darker red-brown; rim diameter: 24.6 cm, height: 19.5 cm, vessel wall: 0.9 cm.

Tabla 6

1. SJ 289, ulomak ravnog dna posude, blago zaobljenog tijela; površina: gruba, svjetlije oker boje, sendvič presjeka; visina: 8 cm, promjer dna: 11 cm, stijenka: 0,8 cm.

2. SJ 289, ulomak keramičke posude s ručkom ovalnog presjeka; površina: gruba, svjetlije oker boje, sendvič presjeka; visina: 6,9 cm, širina: 6,1 cm, stijenka: 0,8 cm.

3. SJ 289, ulomak keramičke posude s kljunastom drškom, površina: gruba, sivkasto-smeđe boje sa svjetlijom oker mrljom; visina: 10,2 cm, širina: 13,6 cm, stijenka: 0,6 cm.

4. SJ 289, ulomak keramičkog vrča s ručkom nepravilnoga trokutastog presjeka, ukrašen urezivanjem; površina: fina, tamnosive boje; visina: 6,6 cm, širina: 7 cm, stijenka: 0,7 cm.

Plate 6

1. SU 289, fragment of a straight bottom of a vessel with a slightly rounded body, surface: coarse, lighter ochre, sandwich cross-section; height: 8 cm, bottom diameter: 11 cm, vessel wall: 0.8 cm.

2. SU 289, fragment of a pottery vessel with a handle with an oval cross-section, surface: coarse, lighter ochre, sandwich cross-section; height: 6.9 cm, width: 6.1 cm, vessel wall: 0.8 cm.

3. SU 289, fragment of a pottery vessel with a beak-like handle, surface: coarse, grayish-brown with a lighter ochre stain; height: 10.2 cm, width: 13.6 cm, vessel wall: 0.6 cm.

4. SU 289, fragment of a pottery jug with a handle with an irregular triangular cross-section, decorated by incising, surface: fine, dark gray; height: 6.6 cm, width: 7 cm, vessel wall: 0.7 cm.

5. SJ 289, ulomak profiliranog dna keramičke posude; površina: gruba, svjetlije oker-smeđe boje; visina: 15 cm, promjer dna: 14,5 cm, stijenka: 0,8 cm.

6. SJ 289, ulomak blago izvučenog ruba keramičke posude, s bradavičastim zadebljanjem na samom rubu; površina: gruba, sivkasto-smeđe boje; visina: 9,5 cm, širina: 11,4 cm, stijenka: 1 cm.

7. SJ 289, ulomak keramičkog vrča izvučenog ruba s trakastom ručkom koja spaja rub i tijelo posude; površina: gruba, svjetlije oker-narančaste boje; visina: 7,8 cm, širina: 4,9 cm, stijenka: 0,8 cm.

5. SU 289, fragment of a protruding bottom of a pottery vessel, surface: coarse, lighter ochre-brown; height: 15 cm, bottom diameter: 14.5 cm, vessel wall: 0.8 cm.

6. SU 289, fragment of a slightly outward-facing rim a pottery vessel with a nipple-like thickening on the rim, surface: coarse, grayish-brown; height: 9.5 cm, width: 11.4 cm, vessel wall: 1 cm.

7. SU 289, fragment of a pottery jug with an outward-facing rim with a ribbon-like handle connecting the rim and the body of the vessel, surface: coarse, lighter ochre-orange; height: 7.8 cm, width: 4.9 cm, vessel wall: 0.8 cm.

Tabla 7

1. SJ 289, ulomak blago izvučenog ruba keramičke posude, s dugmetastom aplikacijom na tijelu; površina: gruba, oker-narančaste boje; visina: 11,5 cm, širina: 4,2 cm, stijenka: 1,1 cm.

2. SJ 289, ulomak ravnog ruba keramičke posude, ukrašen plastičnom trakom s utiskivanjem; površina: gruba, smeđe boje; visina: 7,4 cm, širina: 8,8 cm, stijenka: 0,8 cm.

3. SJ 327, ulomak ravnog dna keramičke posude koničnog oblika; površina: gruba, tamnije smeđe boje; visina: 9 cm, promjer dna: 9,2 cm, stijenka: 0,9 cm.

4. SJ 327, ulomak blago izvučenog ruba, zaobljene ili blago bikonične keramičke zdjele; površina: finija, tamnije sive boje; visina: 21,7 cm, širina: 13 cm, stijenka: 1,1 cm.

Plate 7

1. SU 289, fragment of a slightly outward-facing rim a pottery vessel with a button-like application on the body, surface: coarse, ochre-orange; height: 11.5 cm, width: 4.2 cm, vessel wall: 1.1 cm.

2. SU 289, fragment of a straight rim of a pottery vessel, decorated with a ribbon-like application by impressing, surface: coarse, brown; height: 7.4 cm, width: 8.8 cm, vessel wall: 0.8 cm.

3. SU 327, fragment of a straight bottom of a conical pottery vessel, surface: coarse, darker brown; height: 9 cm, bottom diameter: 9.2 cm, vessel wall: 0.9 cm.

4. SU 327, fragment of a slightly outward-facing rim of a rounded or slightly biconical pottery bowl; surface: finer, darker gray; height: 21.7 cm, width: 13 cm, vessel wall: 1.1 cm.

Tabla 8

1. SJ 327, ulomak blago izvučenog ruba, zaobljene ili blago bikonične keramičke zdjele; površina: gruba, svjetlije oker boje; visina: 20,6 cm, širina: 14,3 cm, stijenka: 1,1 cm.

2. SJ 327, ulomak konične šuplje noge keramičke posude; površina: gruba, svjetlije oker boje; visina: 9,4 cm, promjer dna: 23,8 cm, stijenka: 0,8 cm.

3. SJ 341, ulomak trbušastog tijela keramičkog vrča, koji obično ima trakastu ručku; površina: fina, tamnije sive boje, ukrašen

Plate 8

1. SU 327, fragment of a slightly outward-facing rim of a rounded or slightly biconical pottery bowl; surface: coarse, lighter ochre; height: 20.6 cm, width: 14.3 cm, vessel wall: 1.1 cm.

2. SU 327, fragment of a hollow conical foot of a pottery vessel, surface: coarse, lighter ochre; height: 9.4 cm, bottom diameter: 23.8 cm, vessel wall: 0.8 cm.

3. SU 341, fragment of a rounded body of a pottery jug which usually has a ribbon-like handle, surface: fine, darker gray, decorated with incised

urezanim linijama koje tvore viseće trokute; visina: 7,1 cm, širina: 8,1 cm, stijenka: 0,7 cm.

4. SJ 389, trakasta ručka keramičke posude; površina: gruba, oker-crvenkaste boje; visina: 5,8 cm, širina: 6,8 cm, stijenka: 0,6 cm.

5. SJ 403, ulomak dna keramičke posude trbušastog tijela, možda vrča s trakastom ručkom; površina: fina, tamnosive boje, ukrašena urezanim linijama koje tvore mrežu na jednoj, a paralelne su na drugoj strani; visina: 4 cm, promjer dna: 8,3 cm, stijenka: 0,7 cm.

lines which form hanging triangles; height: 7.1 cm, width: 8.1 cm, vessel wall: 0.7 cm.

4. SU 389, ribbon-like handle of a pottery vessel, surface: coarse, ochre-reddish; height: 5.8 cm, width: 6.8 cm, vessel wall: cm.

5. SU 403, fragment of a bottom of a pottery vessel with a rounded body, possibly a jug with a ribbon-like handle, surface: fine, dark gray, decorated with incised lines which form a net on one, and parallel lines on the other side; height: 4 cm, bottom diameter: 8.3 cm, vessel wall: 0.7 cm.

Tabla 9

Primjeri ukrasa na keramici grube fakture.

1. SJ 121, ulomak ukrašen dvjema udubljenim okomitim linijama.

2. SJ 121, ulomak ukrašen četirima udubljenim vodoravnim linijama.

3. SJ 123, ulomak ukrašen dvjema vodoravnim trakastim aplikacijama.

4. SJ 341, ulomak ukrašen dvjema vodoravnim trakastim aplikacijama; a gornja je dodatno ukrašena utiskivanjem nokta.

5. SJ 19, ulomak ukrašen trima bradavičastim aplikacijama u vodoravnom nizu.

6. SJ 19, ulomak ukrašen dvjema bradavičastim aplikacijama u vodoravnom nizu.

Plate 9

Examples of decorations on coarse ware.

1. SU 121, fragment decorated with two indented vertical lines.

2. SU 121, fragment decorated with four indented vertical lines.

3. SU 123, fragment decorated with two horizontal ribbon-like applications.

4. SU 341, fragment decorated with two horizontal ribbon-like applications; the upper one is additionally decorated with nail impressions.

5. SU 19, fragment decorated with s tri nipple-like applications in a horizontal line.

6. SU 19, fragment decorated with two nipple-like applications in a horizontal line.

Tabla 10

Primjeri ukrasa na keramici fine fakture.

1. SJ 171, ulomak ukrašen urezanim paralelnim linijama koje tvore viseći trokut i omeđene su linijom izvedenom nizom kratkih ureza.

2. SJ 171, ulomak ukrašen nizovima urezanih paralelnih linija koje tvore nepravilne geometrijske motive.

3. SJ 171, ulomak ukrašen paralelnim linijama izvedenim nizovima kratkih ureza.

4. SJ 171, ulomak ukrašen vodoravnim nizom kratkih zareza.

5. SJ 171, ulomak ukrašen vodoravnim nizom duguljastih uboda.

Plate 10

Examples of decorations on fine ware.

1. SU 171, fragment decorated with incised parallel lines which form a hanging triangle and are bordered by a line composed of a series of short incisions.

2. SU 171, fragment decorated with a series of incised parallel lines which form irregular geometrical motifs.

3. SU 171, fragment decorated with parallel lines composed on series of short incisions.

4. SU 171, fragment decorated with a horizontal line of short incisions.

5. SU 171, fragment decorated with a horizontal line of elongated stabs.

6. SJ 173, ulomak ukrašen nizovima paralelnih linija, od kojih neke idu vodoravno, a neke tvore motiv visećeg trokuta.

7. SJ 173, ulomak ukrašen nizovima vodoravnih paralelnih urezanih linija iznad kojih je jedan red kratkih kosih zareza.

8. SJ 173, ulomak ukrašen nizovima paralelnih urezanih linija koje tvore viseći trokut koji je omeđen nizom uboda.

9. SJ 173, ulomak ukrašen vodoravnim nizom uboda.

10. SJ 173, ulomak ukrašen nizom vodoravnih urezanih paralelnih linija.

11. SJ 173, ulomak ukrašen nizom okomitih urezanih linija koje su omeđene nizom uboda.

12. SJ 173, ulomak ukrašen nizom kosih urezanih linija.

6. SU 173, fragment decorated with a series of parallel lines some of which are horizontal, and some of which form a hanging triangle.

7. SU 173, fragment decorated with a series of horizontal parallel incised lines with a single row of short slanted incisions above them.

8. SU 173, fragment decorated with a series of parallel incised lines which form a hanging triangle bordered by a line of stabs.

9. SU 173, fragment decorated with a horizontal line of stabs.

10. SU 173, fragment decorated with a series of horizontal incised parallel lines.

11. SU 173, fragment decorated with a series of vertical incised lines bordered by a line of stabs.

12. SU 173, fragment decorated with a line of slanted incised lines.

Tabla 11

Primjeri ukrasa na keramici fine fakture.

1. SJ 341, ulomak ukrašen nizovima paralelnih linija.

2. SJ 196, ulomak ukrašen dvama vodoravnim nizovima uboda ispunjenih inkrustacijom.

3. SJ 196, ulomak ukrašen nizovima paralelnih linija između i oko kojih su nizovi uboda ispunjenih inkrustacijom.

4. SJ 196, ulomak ukrašen nizovima vodoravnih paralelnih linija iznad kojih je niz uboda ispunjenih inkrustacijom.

5. SJ 196, ulomak ukrašen nizom kosih paralelnih urezanih linija.

6. SJ 196, ulomak ukrašen trima ubodima koji su raspoređeni u polukrug.

7. SJ 196, ulomak ukrašen vodoravnim nizom kosih zareza ispod kojih je niz uboda ispunjenih inkrustacijom.

8. SJ 401, ulomak ukrašen nizom kosih, paralelnih urezanih linija.

9. SJ 401, ulomak ukrašen urezanim linijama koje tvore mrežasti motiv.

10. SJ 401, ulomak ukrašen nizom paralelnih urezanih linija, između kojih je niz kratkih zareza.

Plate 11

Examples of decorations on fine ware.

1. SU 341, fragment decorated with a series of parallel lines.

2. SU 196, fragment decorated with two horizontal lines of stabs filled with incrustation.

3. SU 196, fragment decorated with a series of parallel lines with a line of stabs between and around them, filled with incrustation.

4. SU 196, fragment decorated with a series of horizontal parallel lines with a line of stabs filled with incrustation above them.

5. SU 196, fragment decorated with a series of slanted parallel incised lines.

6. SU 196, fragment decorated with three stabs arranged in a semicircle.

7. SU 196, fragment decorated with a horizontal series of slanted incisions with a line of stabs filled with incrustation beneath them.

8. SU 401, fragment decorated with a series of slanted parallel incised lines.

9. SU 401, fragment decorated with incised lines which form a net.

10. SU 401, fragment decorated with a series of parallel incised lines with a series of short incision between them.

11. SJ 275, ulomak ukrašen vodoravnim nizom kratkih kosih zareza.

12. SJ 121, ulomak ukrašen motivom riblje kosti, izvedenim kombinacijom kosih paralelnih urezanih linija i kosih linija s kratkim zarezima koje tvore motiv bodljikave žice.

11. SU 275, fragment decorated with a horizontal series of short slanted incisions.

12. SU 121, fragment decorated with a fish bone motif done in a combination of slanted incised parallel lines and slanted lines with short incisions which form barbed wire.

Tabla 12

Primjeri ukrasa na keramici fine fakture.

1. SJ 105, ulomak ukrašen urezanim linijama koje tvore mrežasti motiv.

2. SJ 259, ulomak ukrašen paralelnim urezanim linijama koje tvore motiv riblje kosti.

3. SJ 259, ulomak ukrašen paralelnim kosim i vodoravnim nizovima urezanih linija.

4. SJ 259, ulomak ukrašen urezanim linijama koje tvore mrežasti motiv.

5. SJ 259, ulomak ukrašen vodoravnom urezanom linijom iznad koje je niz okomitih kratkih zareza.

6. SJ 259, ulomak ukrašen paralelnim kosim i vodoravnim nizovima urezanih linija.

7. SJ 259, ulomak ukrašen jednom vodoravnom urezanom linijom, ispod koje je motiv visećeg trokuta, izveden paralelnim urezanim linijama.

8. SJ 259, ulomak ukrašen paralelnim urezanim linijama i linijom izvedenom ubadanjem, koji tvore geometrijske motive.

9. SJ 55, ulomak ukrašen dugmetastom aplikacijom.

10. SJ 289, ulomak ukrašen urezanim linijama koje tvore mrežasti motiv.

11. SJ 289, ulomak ukrašen visećim trokutima koji su izvedeni urezanim linijama, a koji su u sredini ispunjeni kružnim ubodima.

12. SJ 327, ulomak ukrašen dvjema vodoravnim trakastim aplikacijama.

Plate 12

Examples of decorations on fine ware.

1. SU 105, fragment decorated with incised lines which form a net.

2. SU 259, fragment decorated with parallel incised lines which form a fish bone.

3. SU 259, fragment decorated with parallel slanted and horizontal series of incised lines.

4. SU 259, fragment decorated with incised lines which form a net.

5. SU 259, fragment decorated with a horizontal incised line with a series of vertical short incisions above it.

6. SU 259, fragment decorated with parallel slanted and horizontal series of incised lines.

7. SU 259, fragment decorated with a single incised line with a hanging triangle below it formed by parallel incised lines.

8. SU 259, fragment decorated with parallel incised lines and a line of stabs which form geometrical motifs.

9. SU 55, fragment decorated with a button-like application.

10. SU 289, fragment decorated with incised lines which form a net.

11. SU 289, fragment decorated with hanging triangles formed by incised lines, and which are filled with circular stabs.

12. SU 327, fragment decorated with two horizontal ribbon-like applications.

Tabla 13

1. SJ 233, kombinirana alatka, grebalo na distalnom i udubak na desnome lateralnom rubu sječiva sačuvanog u distalnom i medijalnom dijelu, rožnjak; dužina: 11 mm, širina: 12 mm, debljina: 5 mm, težina: 0,83 g.

Plate 13

1. SU 233, combination tool, endscraper on the distal and notched piece on the right lateral edge of a blade preserved on the distal and the medial part, chert; length: 11 mm, width: 12 mm, thickness 5mm, weight: 0.83 g.

2. SJ 109, kombinirana alatka, udubak na desnome lateralnom rubu i komad s djelomičnom obradom na lijevom lateralnom rubu sječiva, rožnjak; dužina: 29,5 mm, širina: 11 mm, debljina: 4,5 mm, težina: 1,51 g.

3. SJ 173, kombinirana alatka, grebalo na distalnom i udubak na lijevom lateralnom rubu te komad s cjelovitom obradom na oba lateralna ruba sječiva. Sjaj srpa i ogrebotine na lateralnom rubu, rožnjak; dužina: 33 mm, širina: 14 mm, debljina: 4,5 mm, težina: 3,14 g.

4. SJ 145; grebalo na distalnom rubu sječiva, rožnjak; dužina: 19,5 mm, širina: 12 mm, debljina: 3,5 mm, težina: 1,07 g.

5. SJ 289, nazubak na lateralnim rubovima sječiva; dužina: 26 mm, širina: 11 mm, debljina: 5,5 mm, težina: 1,2 g.

6. SJ 155, kombinirana alatka, perforator, udubak i komad s obradom na krhotini, silicificirani vapnenac; dužina: 26 mm, širina: 7,5 mm, debljina: 6,5 mm, težina: 1,63 g.

7. SJ 275, pločica s tragovima ogrebotina, iskrzanim desnim lateralnim rubom te tragovima organskog materijala, rožnjak; dužina: 22 mm, širina: 10,5 mm, debljina: 3 mm, težina: 0,69 g.

8. SJ 157, geometrijski oblik, trokut na sječivu sačuvanom u medijalnom dijelu, rožnjak; dužina: 14 mm, širina: 11 mm, debljina: 2 mm, težina: 0,31 g.

9. SJ 3, kombinirana jezgra za sječiva / pločice i odbojke pločastog oblika s četiri udarne platforme te 70% površine prekrivene okorinom, rožnjak; dužina: 44 mm, širina: 20,5 mm, debljina: 44 mm, težina: 59,09 g.

10. SJ 475, jezgra za sječiva / pločice koničnog oblika s dvjema udarnim platformama te 30% površine prekrivene okorinom, rožnjak; dužina: 35 mm, širina: 39 mm, debljina: 27 mm, težina: 53, 69 g.

11. SJ 259, jezgra za sječiva / pločice koničnog oblika s jednom udarnom platformom te 70% površine prekrivene okorinom, rožnjak; dužina: 28 mm, širina: 24 mm, debljina: 30 mm, težina: 25,30 g.

2. SU 109, combination tool, notched piece on the right lateral edge and a partially retouched piece on the left lateral edge of a blade, chert; length: 29.5 mm, width: 11 mm, thickness 4.5 mm, weight: 1.51 g.

3. SU 173, combination tool, endscraper on the distal and notched piece on the left lateral edge and a completely retouched piece on both lateral edges of a blade. Sickle shine and chipping on the lateral edge, chert; length: 33 mm, width: 14 mm, thickness 4.5 mm, weight: 3.14 g.

4. SU 145; endscraper on the distal edge of a blade, chert; length: 19.5 mm, width: 12 mm, thickness 3.5 mm, weight: 1.07 g.

5. SU 289, denticulate on the lateral edges of a blade; length: 26 mm, width: 11 mm, thickness 5.5 mm, weight: 1.2 g.

6. SU 155, combination tool, perforator, notched piece and retouched piece on a chunk, silicified limestone; length: 26 mm, width: 7.5 mm, thickness 6.5 mm, weight: 1.63 g.

7. SU 275, bladelet with scratch marks, a chipped lateral edge and traces of organic material, chert; length: 22 mm, width: 10.5 mm, thickness 3 mm, weight: 0.69 g.

8. SU 157, geometrical shape, triangle on a blade preserved in the medial part, chert; length: 14 mm, width: 11 mm, thickness 2 mm, weight: 0.31 g.

9. SU 3, flat combined core for blades/bladelets and flakes with four striking platforms, 70% of the surface is covered with cortex, chert; length: 44 mm, width: 20.5 mm, thickness 44 mm, weight: 59.09 g.

10. SU 475, conical core for blades/bladelets with two striking platforms, 30% of the surface is covered with cortex, chert; length: 35 mm, width: 39 mm, thickness 27 mm, weight: 53, 69 g.

11. SU 259, conical core for blades/bladelets with a single striking platform, 70% of the surface is covered with cortex, chert; length: 28 mm, width: 24 mm, thickness 30 mm, weight: 25.30 g.

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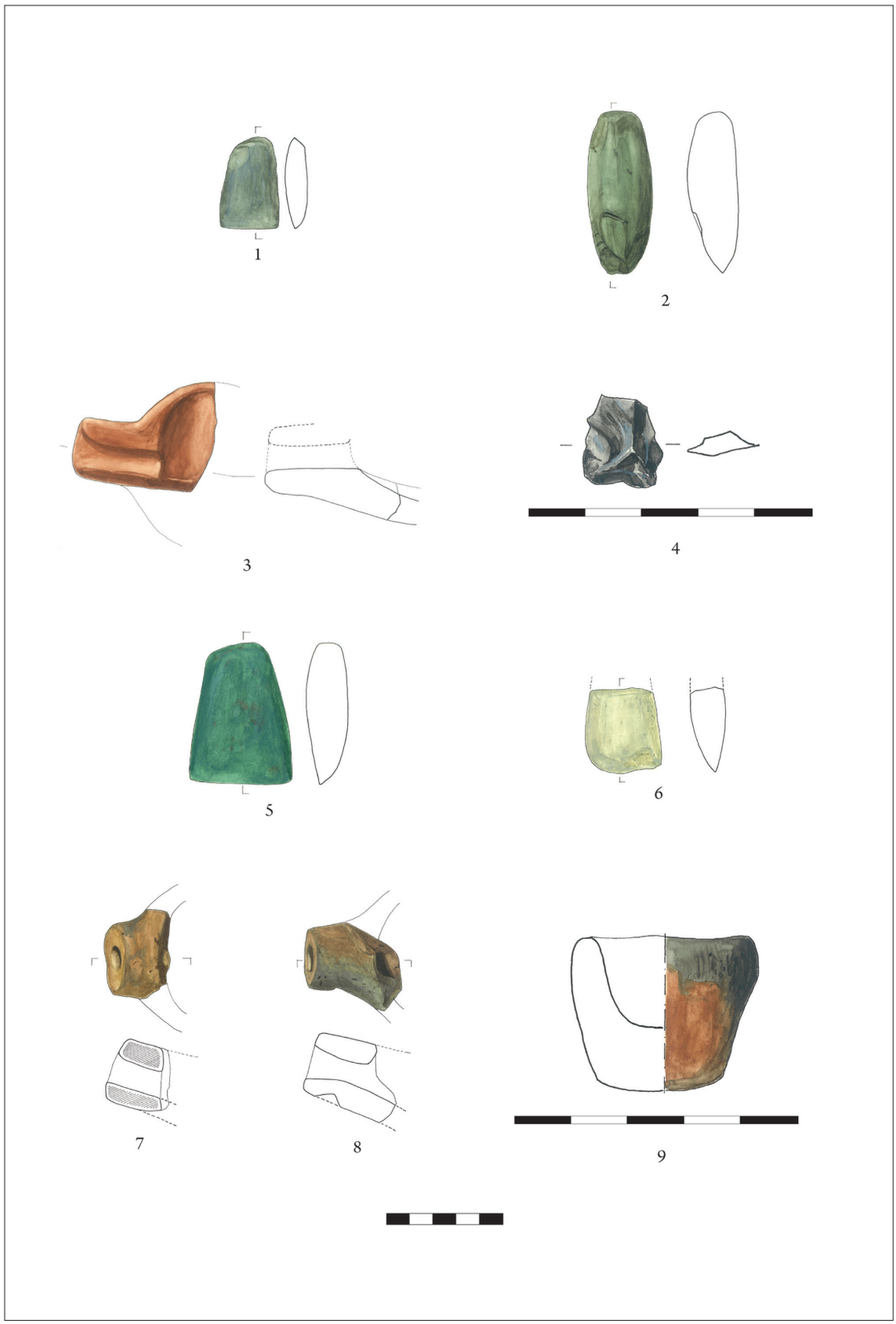

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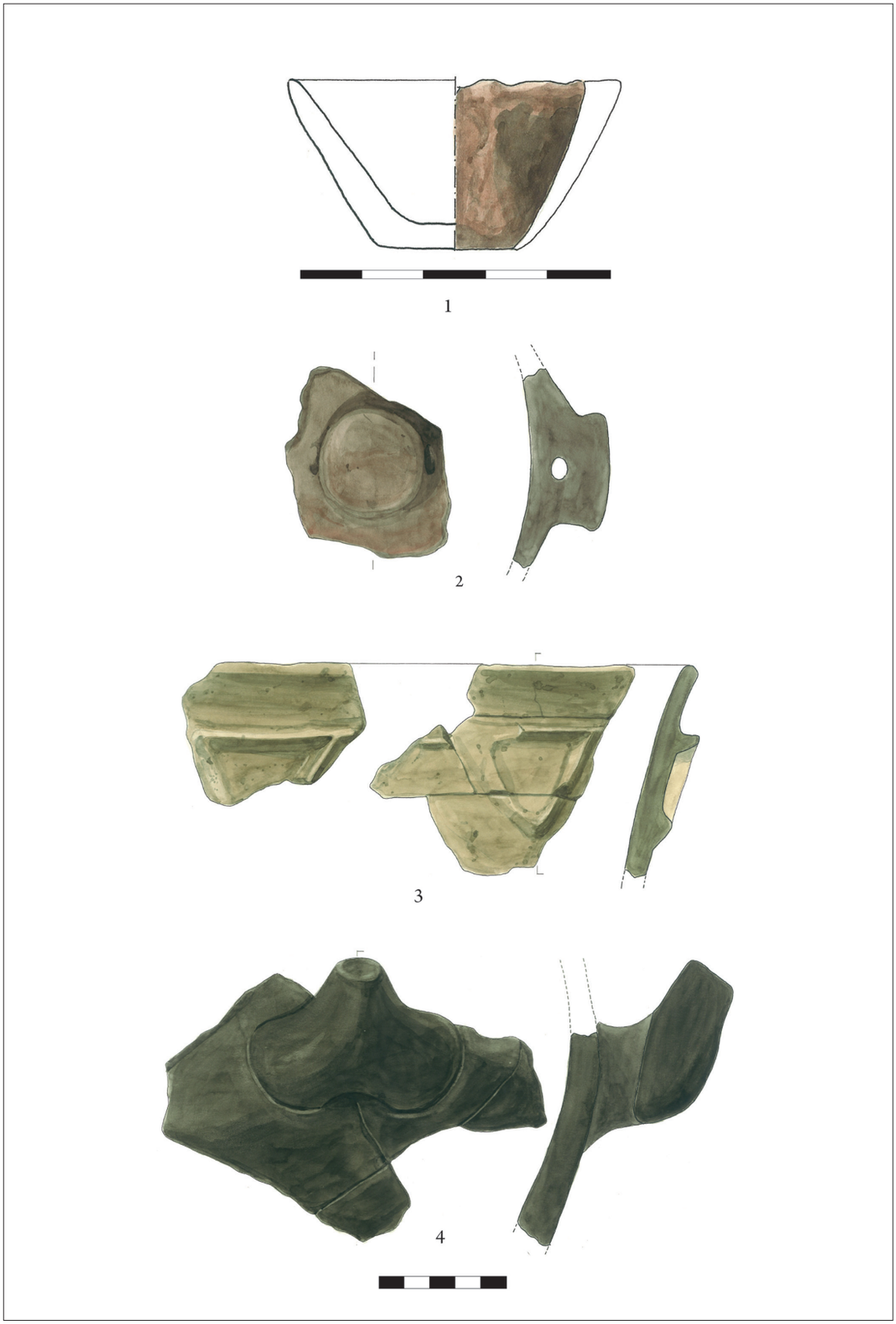

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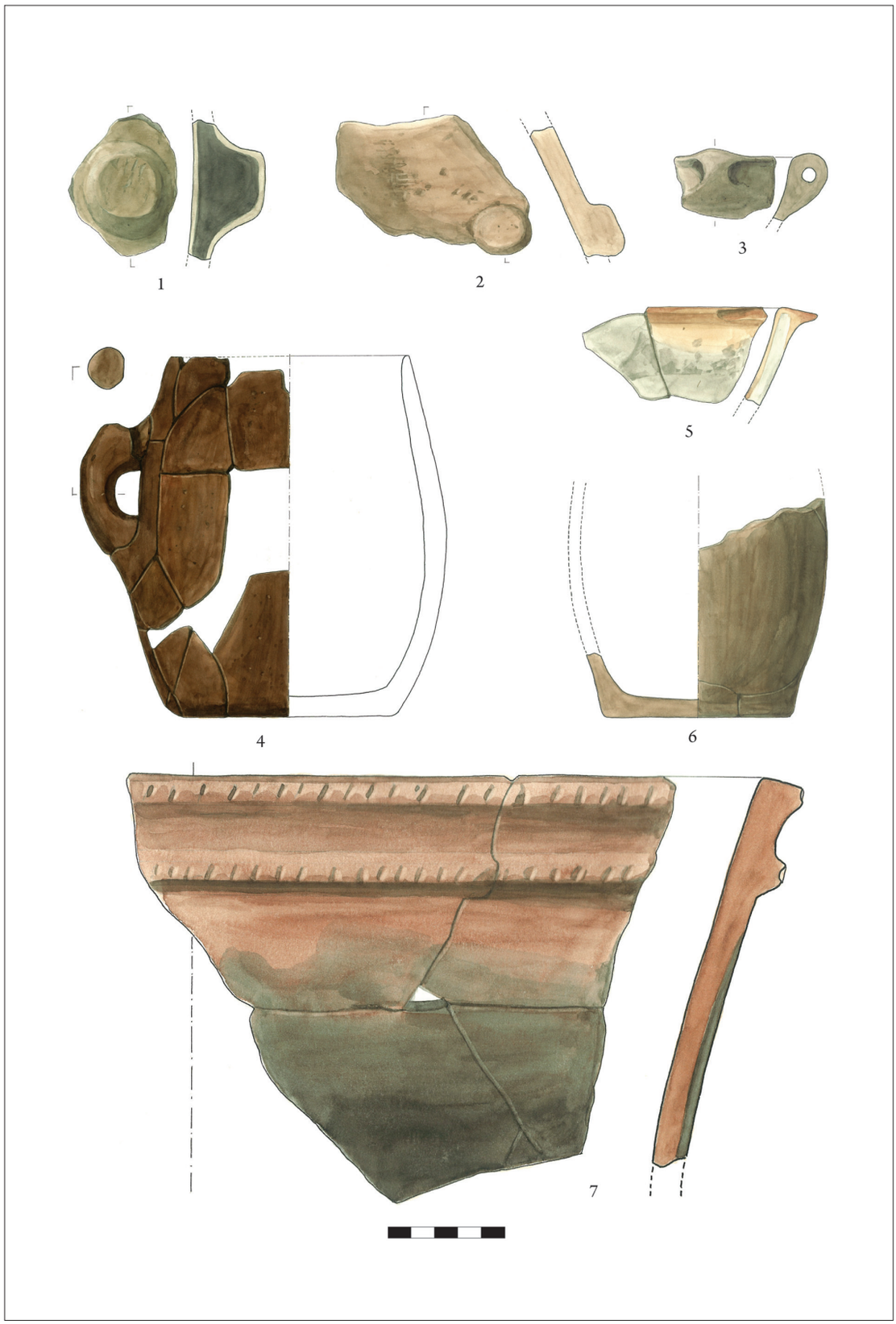

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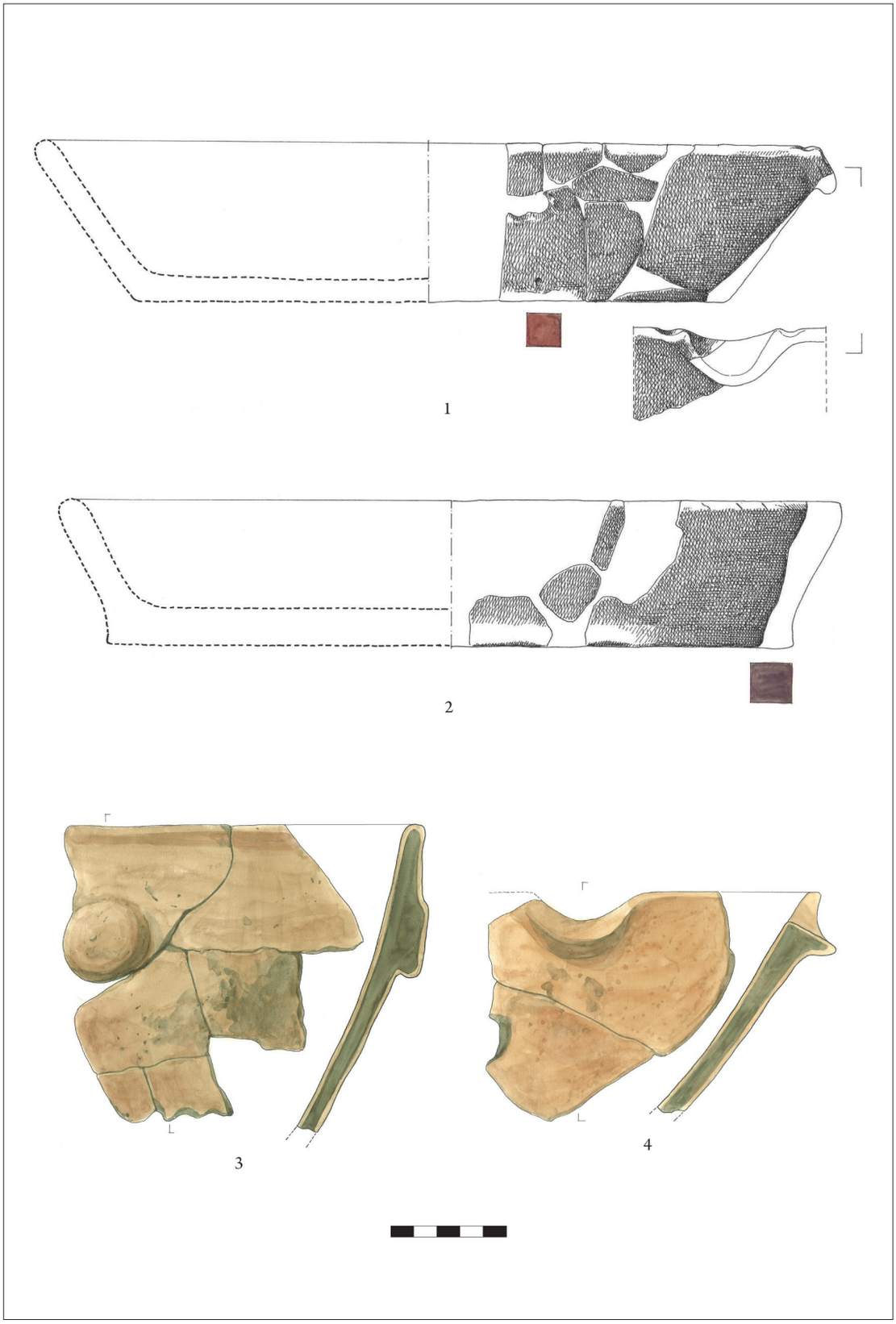

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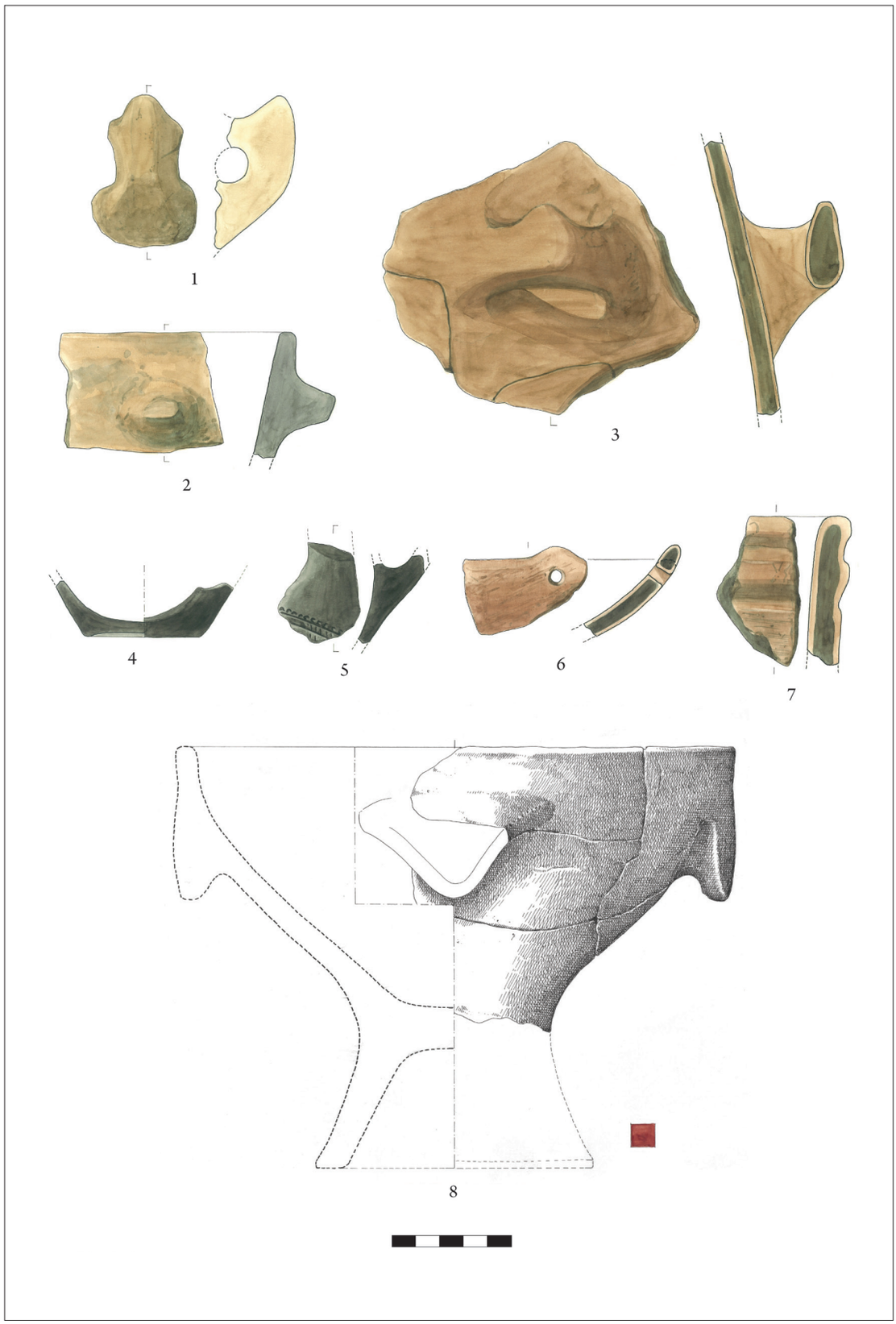

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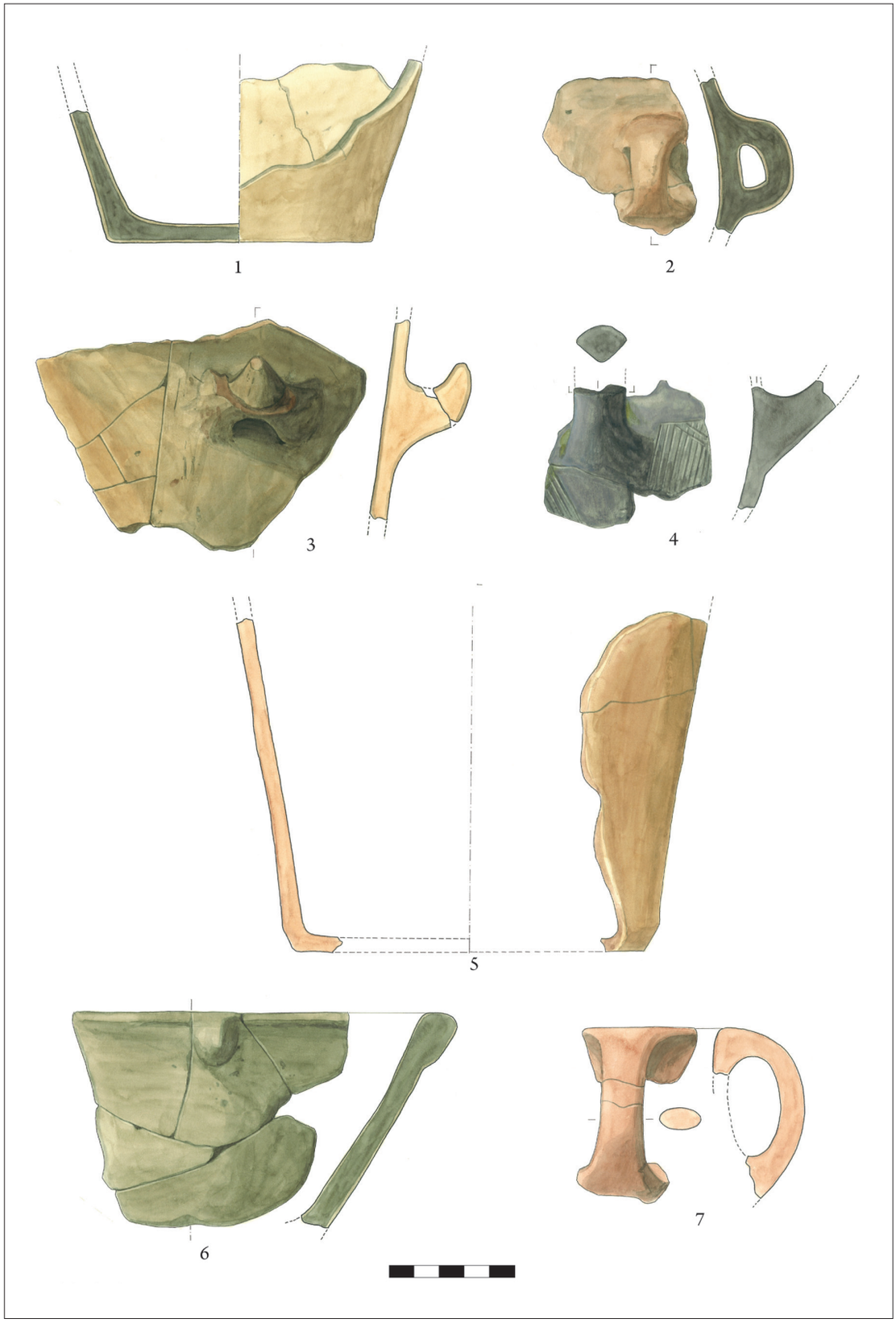

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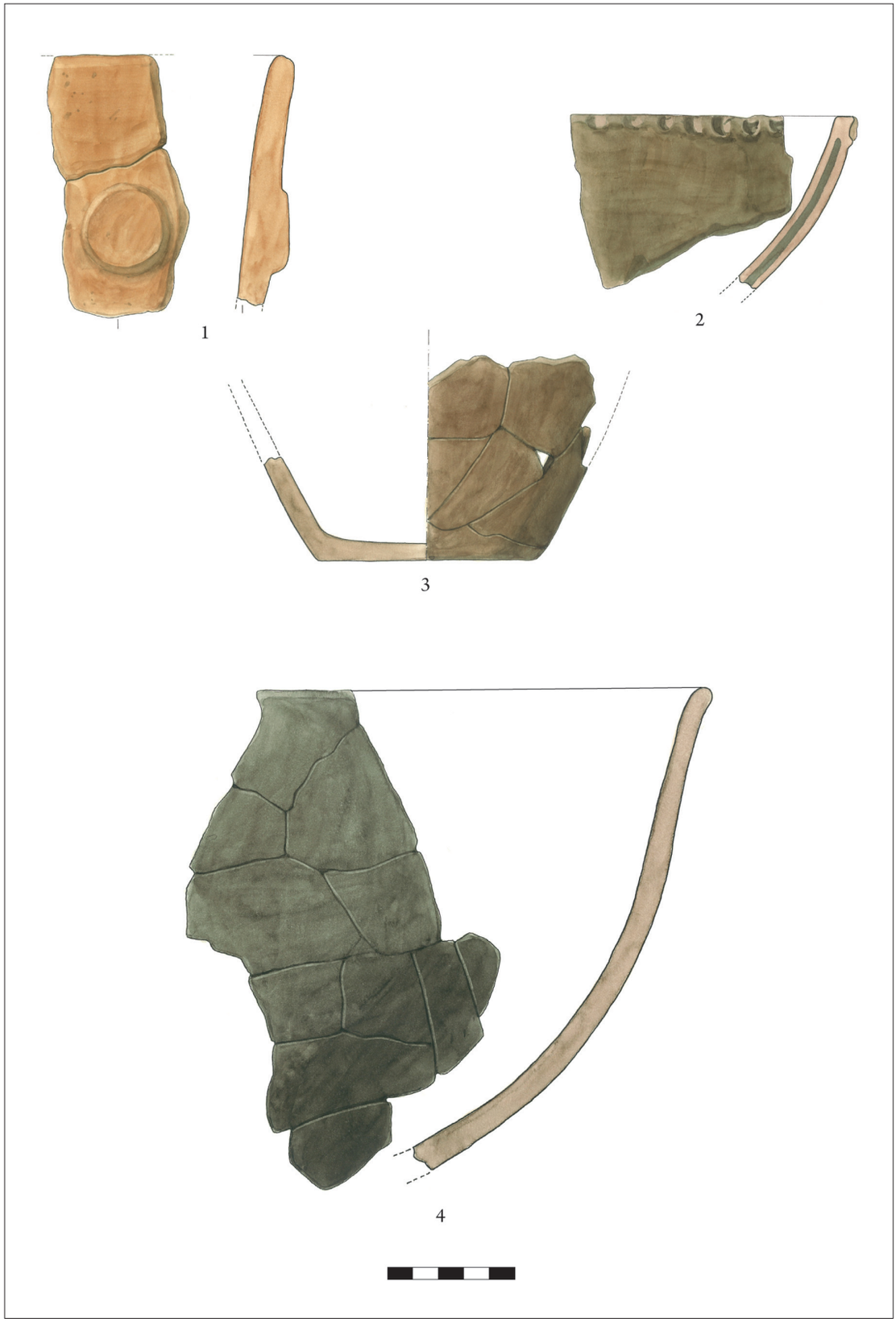

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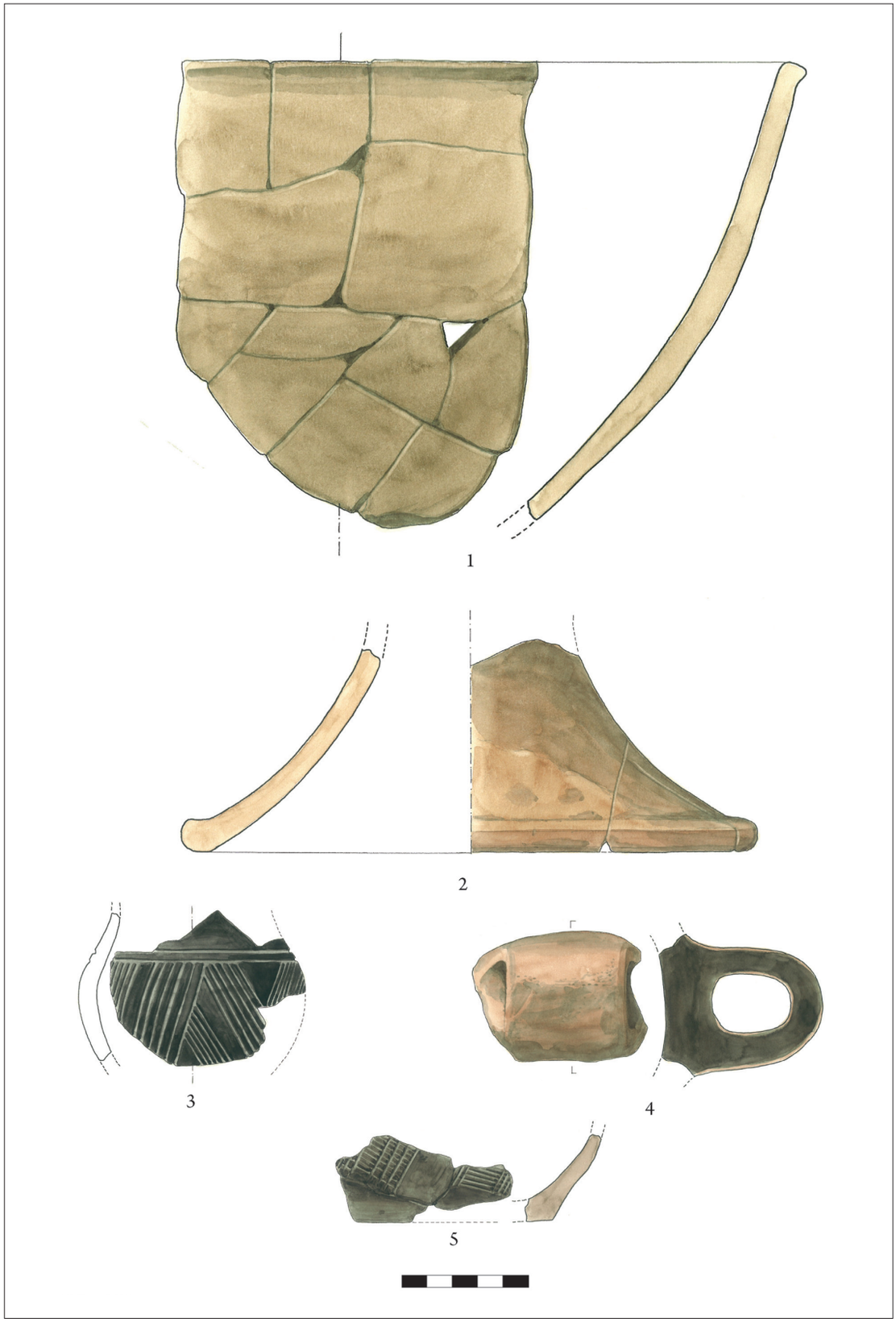

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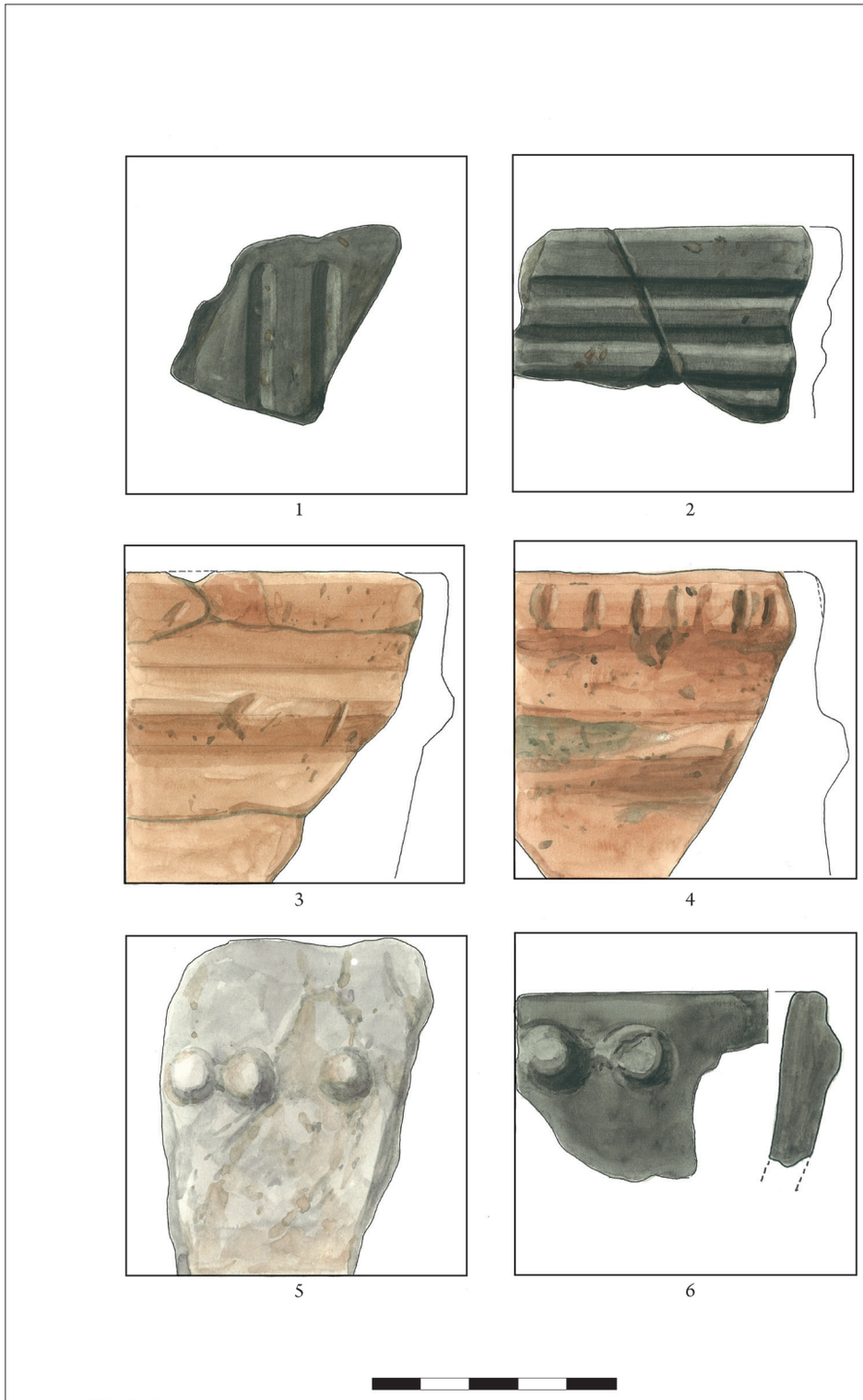

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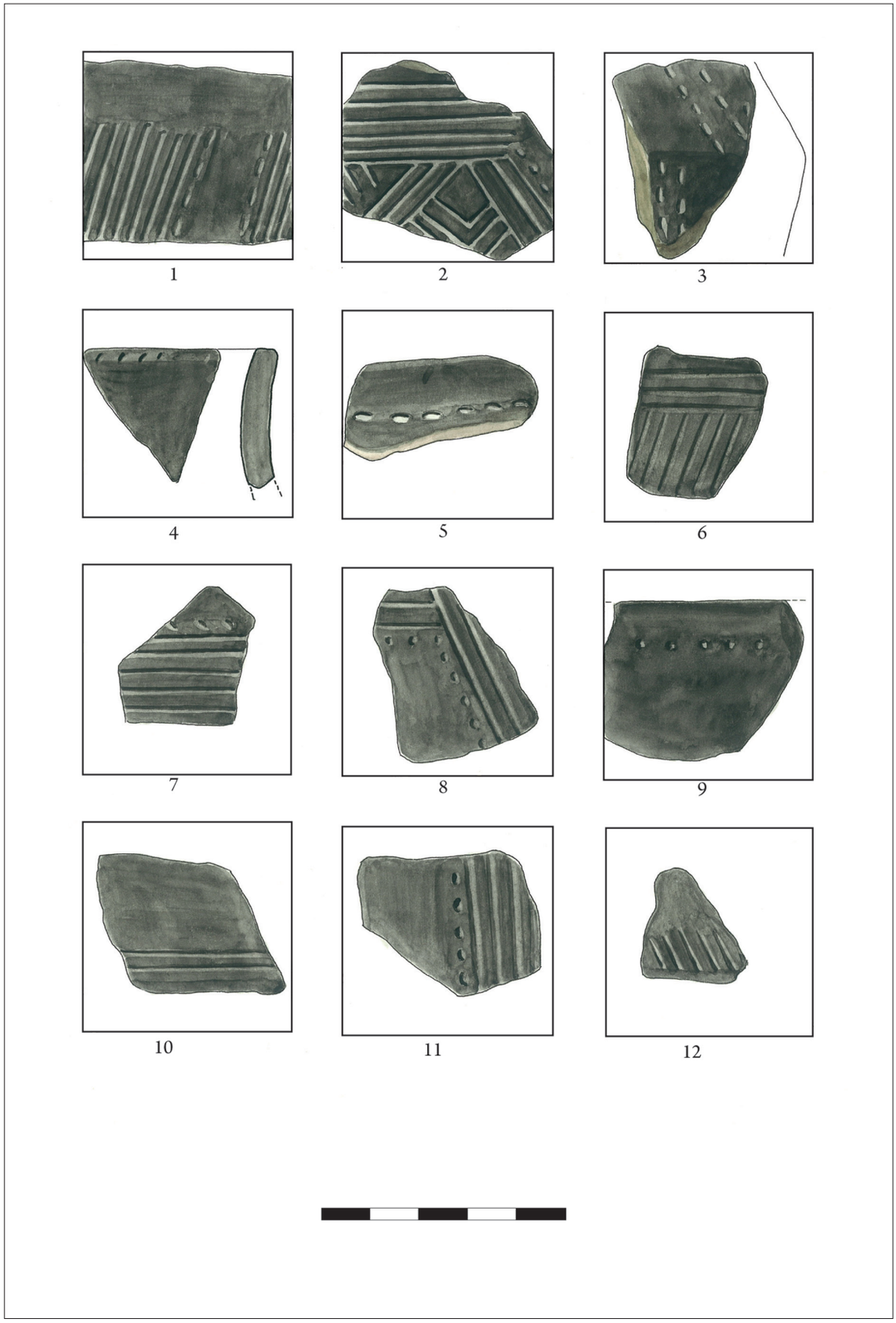

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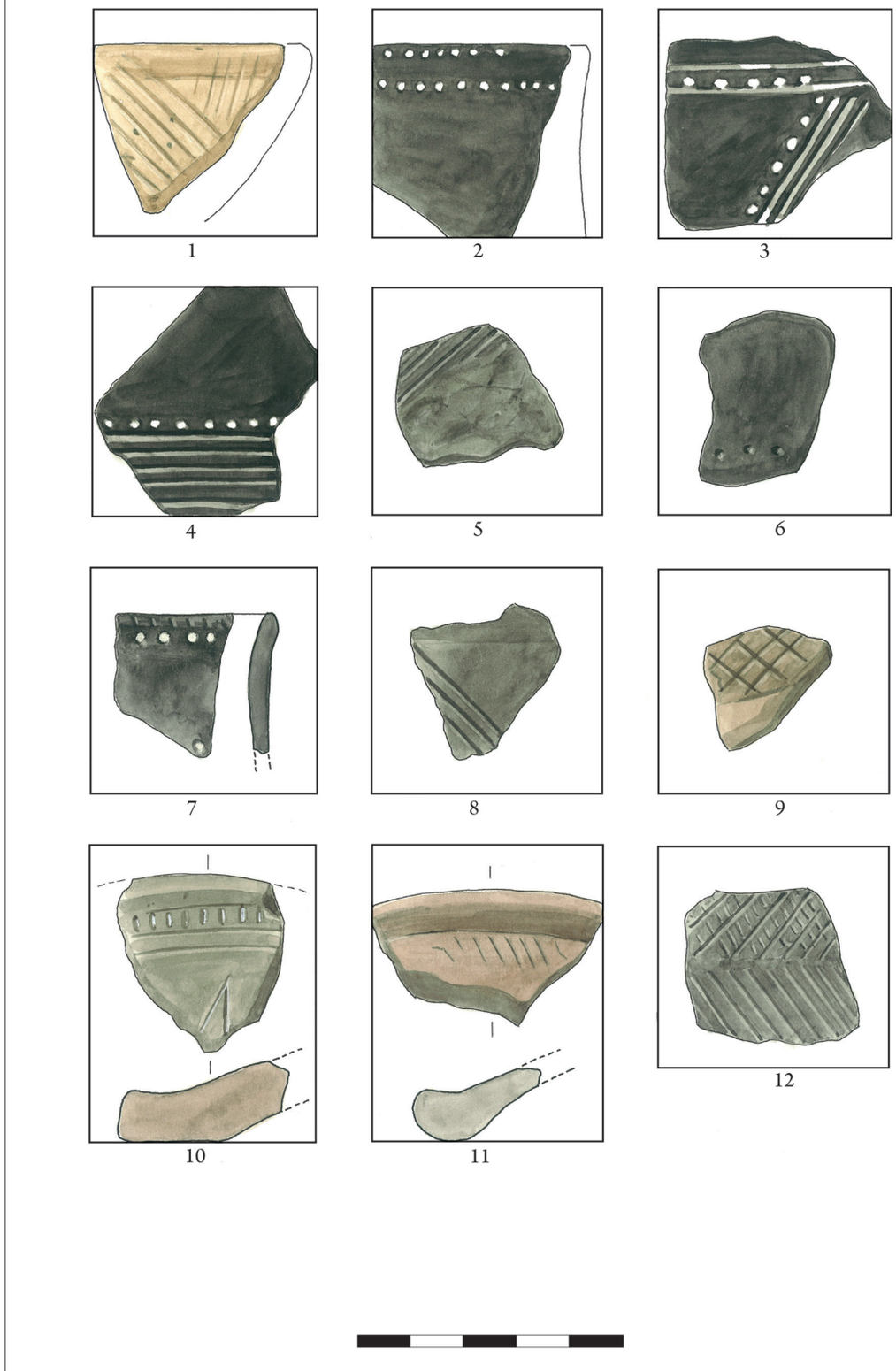

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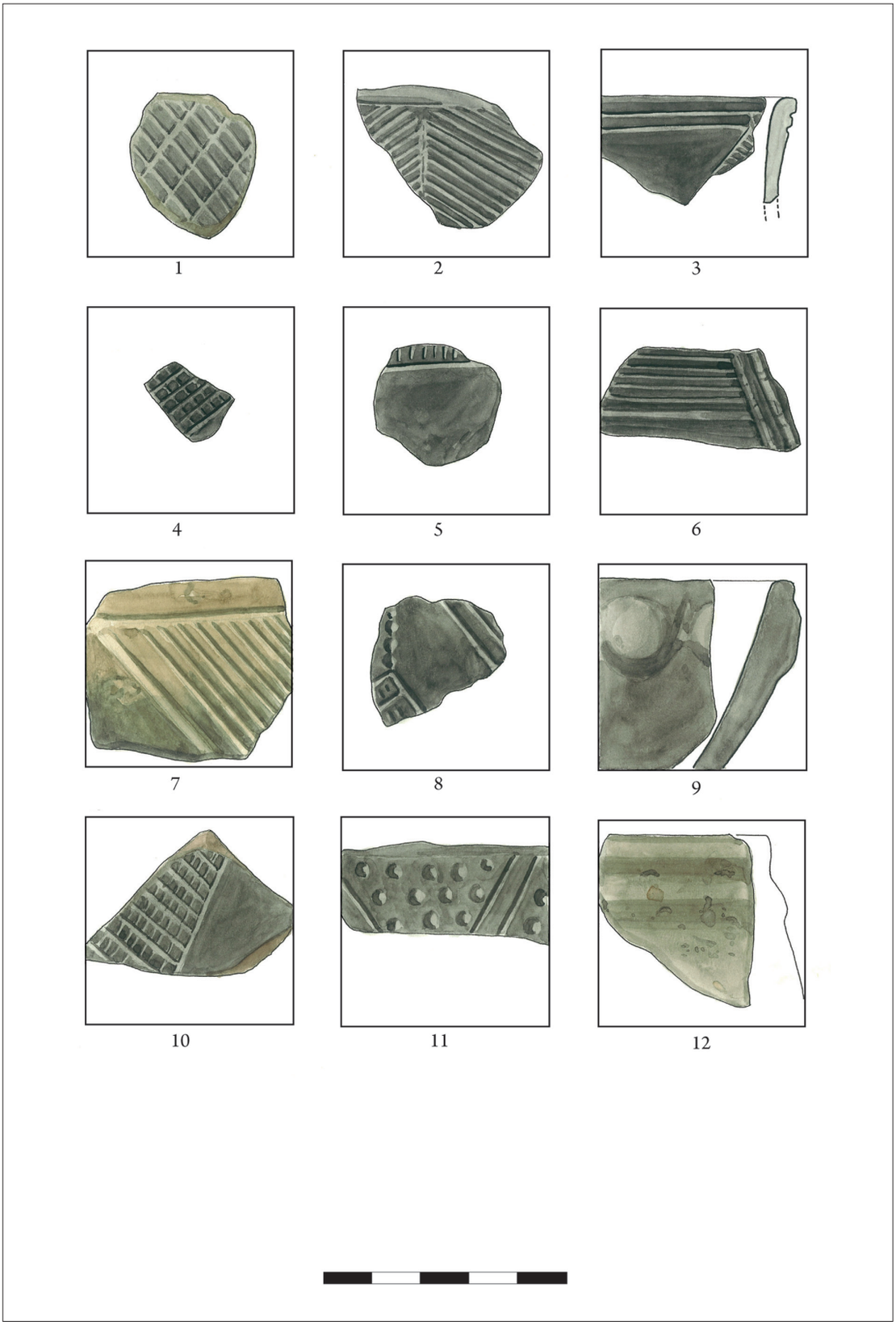

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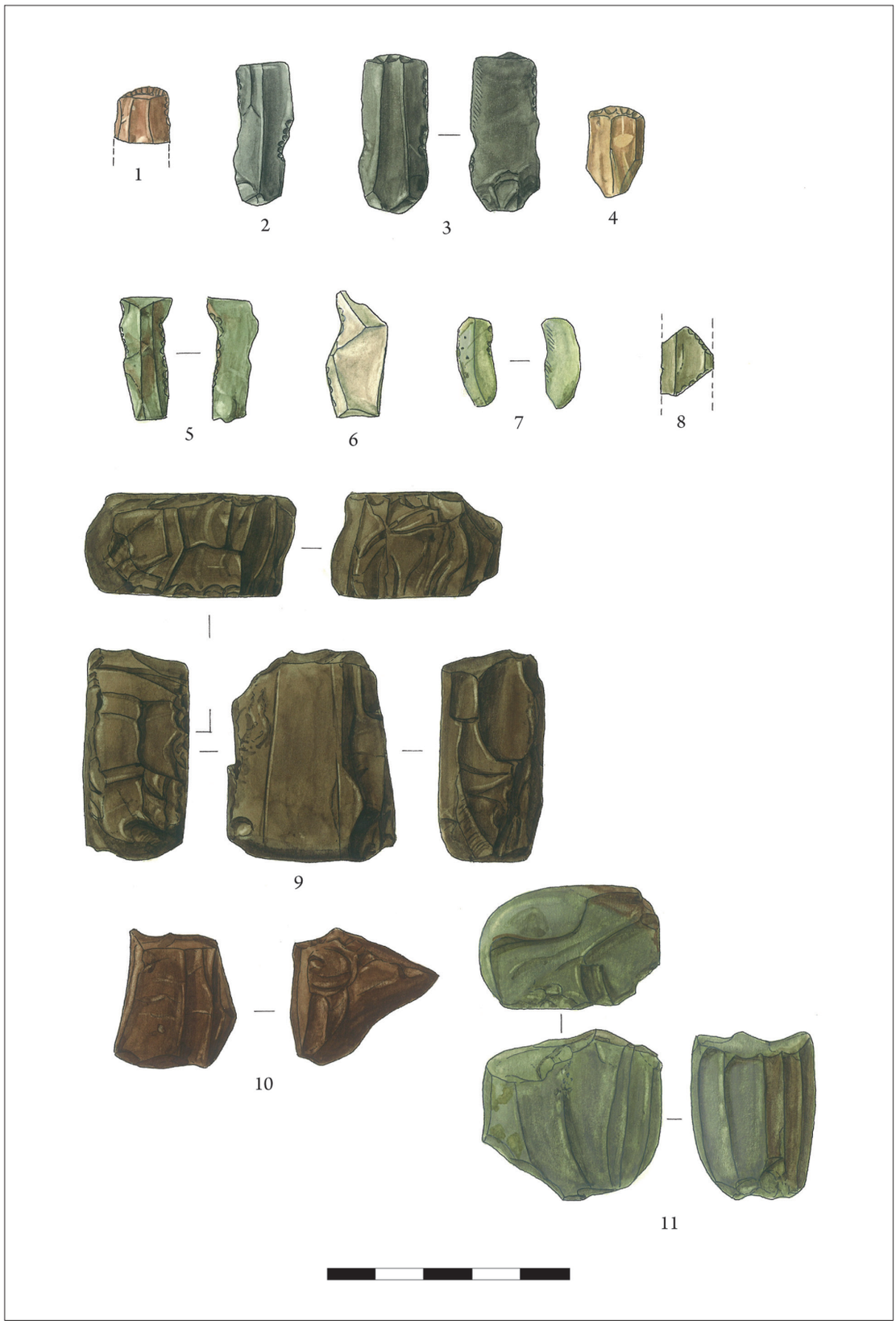

Tabla / Plate 13

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Litička analiza eneolitičkih kamenih izrađevina s lokaliteta Crkvišće-Bukovlje

Lithic analysis from Copper Age site of Crkvišće-Bukovlje

UDK / UDC: 903.01(497.5 Crkvišće-Bukovlje)"636"
Izvorni znanstveni rad / Original scientific paper

Rad donosi tehnološku i tipološku analizu eneolitičkih lomljenih i glačanih izrađevina te abrazivnog oruđa s lokaliteta Crkvišće-Bukovlje u središnjoj Hrvatskoj. Preliminarno su određene i sirovinske kategorije i njihovo moguće podrijetlo te se na kraju pokušalo rekonstruirati lanac operacija. Analizirani nalazi većinom pripadaju lasinjskoj kulturi. Kako bi se dobio bolji uvid u litičku produkciju navedenog razdoblja, kao usporedni materijal korišteni su nalazi s tri lasinjska lokaliteta: Tomašanci – Palača, Kuševac – Topolina i Slavča – Nova Gradiška.

Ključne riječi: *Eneolitik, lasinjska kultura, litička analiza, središnja Hrvatska*

The article presents technological and typological analysis of chipped, polished and abrasive artifacts from Crkvišće-Bukovlje site in central Croatia. Raw material and its possible origin is preliminary determined, and attempt was made to reconstruct the chaîne opératoire. Most of the analyzed finds are attributable to the Lasinja culture. In order to obtain a better insight into lithic production of the Lasinja culture period, comparative material from three Lasinja sites, Tomašanci – Palača, Kuševac – Topolina i Slavča – Nova Gradiška was used.

Keywords: *Copper Age, Lasinja culture, lithic analysis, central Croatia*

UVOD

Eneolitička društva tradicionalno su analizirana kroz keramičke i metalne nalaze. Takve analize pomažu u razumijevanju razvoja zanata i socijalne organizacije u društvu. U ovom radu analiziran je litički materijal s lokaliteta Crkvišće – Bukovlje s posebnim naglaskom na materijal iz slojeva pripisanih lasinjskoj kulturi, odnosno razdoblju između 4350/4300-3950/3900 cal BC.[1] Lokalitet Crkvišće nalazi se na području Karlovačke županije u središnjoj Hrvatskoj. Smješten je na prirodnoj uzvisini nad riječnim zavojem rijeke Mrežnice. Plato na kojem se nalazi lokalitet sa sjeverne strane blago pada prema plodnoj površini (Popovska luka), sa zapadne strane je prirodno zaštićen strmom padinom prema kanjonu rijeke Mrežnice, dok mu s istočne strane prirodnu zaštitu pružaju visoke stijene i drage. Plato je nepravilnog trokutastog oblika, dimenzija 110 x 80 x 85 metara.[2] Lokalitet pokazuje kontinuitet u naseljenosti od prapovijesti do srednjeg vijeka.[3,4] Na istom lokalitetu nalaze se kasnoantička utvrda s obrambenim zidovima i minimalno dvije kule (4./5. st), jednobrodna crkva sa sačuvanim ožbukanim subselijem, katedrom i vjerojatno sakrarijem (5/6. st.) te prapovijesna gradina.[5]

Eneolitički slojevi, koje je na temelju keramičkih nalaza moguće pripisati lasinjskoj kulturi, zabilježeni su u istraživanju 2010. godine.[6] Materijal obrađen u ovom radu rezultat je istraživanja koje od 2013. – 2015. provodi A. Azinović Bebek (Hrvatski restauratorski zavod).[7]

METODOLOGIJA

Na materijalu s lokaliteta Crkvišće – Bukovlje provedena je tehnološka i tipološka analiza te rekonstruiran lanac operacija.

1 Čataj 2014, 404; Balen 2008; Balen, Drnić 2014; Bekić 2006.

2 Azinović Bebek, Sekulić 2016.

3 Azinović Bebek, Sekulić 2016.

4 Karavanić, Kudelić 2010, 83.

5 Azinović Bebek, Sekulić 2016.

6 Karavanić, Kudelić 2010, 83.

7 Azinović Bebek, Sekulić 2016.

INTRODUCTION

Copper age societies have traditionally been analyzed through ceramic and metal findings. Such analyzes help in understanding of development of trade and social organization in a comunity. This article presents results of lithic analysis of the material from Crkvišće-Bukovlje site, with a particular reference to the material from the layers attributable to Lasinja culture, or the period between 4350 / 4300 – 3950 / 3900 cal BC.[1] The site is located in the county of Karlovac in central Croatia. It is located on a natural hill above the bend of the Mrežnica river. The plateau on which the site is located slopes to the fertile land (Popovska port) on the north side, the west side is protected by a steep canyon of the Mrežnica river, while the east side is naturally protected by high clifs and inlets (draga).The plateau is of irregular triangular shape, measuring 110 x 80 x 85 meters.[2] The site shows continuity of settlement, from prehistoric times to the Middle Ages.[3,4] A late antique fort with defense walls and a minimum of two towers (4/5 c.), a single-nave church with preserved plastered subsellium, tenure (katedra) and probably sacrarium (5./6. C.) and prehistoric ruins all can be found at the site.[5] Copper age layers, that, based on the ceramic finds can be attributed to the Lasinja culture, have been found during the survey in 2010.[6] The material analyzed in this paper was discovered during the research campaigns 2013 to 2015 under the direction of A. Azinović Bebek of the Croatian Conservation Institute.[7]

METHODOLOGY

Technological and typological analysis, and a reconstruction of the chaîne opératoire was undertaken on the lithic assemblage from

[1] Čataj 2014, 404; Balen 2008; Balen, Drnić 2014; Bekić 2006.

[2] Azinović Bebek, Sekulić 2016.

[3] Azinović Bebek, Sekulić 2016.

[4] Karavanić, Kudelić 2010, 83.

[5] Azinović Bebek, Sekulić 2016.

[6] Karavanić, Kudelić 2010, 83.

[7] Azinović Bebek, Sekulić 2016.

Tehnološke kategorije definirane su prema metodologiji Inizan et al. (1999),[8] i obuhvaćaju četiri kategorije: odbojci, sječiva, jezgre i krhotine.[9] Sječiva su odbojci dobiveni posebnim proizvodnim postupkom čija dužina barem dva puta premašuje širinu.[10] Odbojci i sječiva određeni su prema karakterističnim značajkama ventralne i dorzalne strane.[11] Kod sječiva dodatan su kriterij paralelni rubovi. Jezgre su definirane prema Inizan et al. (1999),[12] te su podijeljene u tri kategorije: jezgre za odbojke, jezgre za sječiva/pločice i mješovite jezgre. Posljednja tehnološka kategorija su krhotine, odnosno komadi kod kojih nije moguće odrediti smjerove loma, a koji mogu biti rezultat prirodnih sila.[13] Na svakoj pojedinoj lomljevini bilježena je količina okorine u četiri kategorije: 1) bez okorine, 2) do 50%, 3) više od 50% - 70%, 4) od 70 – 100%. Tip plohka određen je kod cjelovitih lomljevina i onih koje su sačuvane u proksimalnom dijelu. Kategorije tipa plohka su: okorinski, gladak, dvopovršinski, obrađen, linearan, točkast.[14] Određena je i razina fragmentiranosti prema kategorijama: cjelovito, baza, vrh, medijalni, vrh i medijalni dio, baza i medijalni dio, lateralno oštećenje, razna oštećenja. Prilikom analize, svakom litičkom nalazu izmjerena je duljina, širina, debljina i težina.[15] Jezgrama je izmjerena duljina (visina), širina i težina, ali je korištena i metoda gdje se mjeri najduža linearna dimenzija jezgre (MLD[16]) koja se pomnoži sa težinom te se dobije vrijednost jezgre koja se može rangirati i uspoređivati s ostalim jezgrama.[17] Artefakti s obradom podvrgnuti su tipološkoj analizi i podijeljeni u kategorije: komadić s obradom, grebalo, svrdlo, udubak, zaru-

[8] Inizan, Reduron-Ballinger, Roche, Tixier 1999.
[9] Inizan, Reduron-Ballinger, Roche, Tixier 1999.
[10] http://struna.ihjj.hr/naziv/sjecivo/28823/#naziv.
[11] Patterson 1983.
[12] Inizan, Reduron-Ballinger, Roche, Tixier 1999.
[13] http://struna.ihjj.hr/naziv/krhotina/30266/#naziv.
[14] Inizan, Reduron-Ballinger, Roche, Tixier 1999.
[15] Debénath, Dibble 1994, 17.
[16] Maksimalna linearna dimenzija.
[17] Andrefsky, 1998 145.

Crkvišće-Bukovlje site. Technological categories are defined according to Inizan et al. (1999),[8] and include four categories: flakes, blades, cores and chunks.[9] Blades are flakes made by special manufacturing process whose lenght is at least two times the width.[10] Flakes and blades were determined according to the characteristic features of ventral and dorsal sides.[11] Additional criteria for blades are parallel edges. Cores are defined by Inizan et al. (1999),[12] and are divided into three categories: cores for flakes, cores for blades / bladelets, and mixed cores. The last technological category includes shards, or pieces for which the direction of fracture cannot be determined and can be a result of natural forces.[13] The presence of cortex was determined for each piece and assigned to one of four categories: 1) witout cortex, 2) up to 50%, 3) 50% to 70%, 4) 70% to 100%. Butt type was determined for complete artifacts and those with preserved proximal part. Butt type categories are: cortical, plain, dihedral, retuched, linear and punctiform butt.[14] Categories of fragmentation level are: complete, distal, proximal, medial, proximal and medial, distal and medial, lateral damage, various damages. During the analysis, lenght, width, thickness and weight was measured for each piece.[15] Cores were measured by two methods. First, lenght (height), thickness and weight, was measured. In addition to this, the longest linear dimension of the core (MLD[16]) was measured, that, multiplied with the weight gives the value of the core that can be ranked and compared with other cores.[17] Artifacts with retouch were subjected to the typological analysis and divided into following categories: piece with retouch, endscraper, perforator, notch, truncation, geometric piece and combined tool.[18] The position and side of retouch, sickle

[8] Inizan, Reduron-Ballinger, Roche, Tixier 1999.
[9] Inizan, Reduron-Ballinger, Roche, Tixier 1999.
[10] http://struna.ihjj.hr/naziv/sjecivo/28823/#naziv.
[11] Patterson 1983.
[12] Inizan, Reduron-Ballinger, Roche, Tixier 1999.
[13] http://struna.ihjj.hr/naziv/krhotina/30266/#naziv.
[14] Inizan, Reduron-Ballinger, Roche, Tixier 1999.
[15] Debénath, Dibble 1994, 17.
[16] Maximum linear dimension.
[17] Andrefsky, 1998 145.
[18] Šarić 2006.

bak, geometrijski komadić i višestruko oruđe.[18] Na oruđu je bilježen položaj i strana obrade, sjaj srpa te oštećenja od gorenja i pseudoobrada.[19] Glačane izrađevine i abrazivna oruđa sagledani su kroz tehnološki i tipološki aspekt. Tehnološke kategorije korištene za ovaj tip nalaza preuzete su iz metodologije za lomljene izrađevine: gomolj ili oblutak, jezgra, odbojak, krhotine i neodredivi ulomci.[20] S obzirom na razliku procesa proizvodnje lomljenih i glačanih izrađevina, značajke prema kojima se određuje tehnološki tip kod lomljenih izrađevina često neće biti uočljive na glačanim izrađevinama zbog procesa glačanja. Tipološke kategorije su: sjekira, tesla, dlijeto, čekić, klin, glačalica, brus, rastirač i žrvanj prema tipologiji D. Antonović.[21] Izmjerene su im duljina, širina, debljina i težina,[22] nakon čega su opisane prema fragmentiranosti i makroskopski razvrstane u nekoliko sirovinskih kategorija. Deskriptivna statistika napravljena je za prosječne vrijednosti mjera lomljenih i glačanih izrađevina te za sve gore navedene kategorije.

gloss, burning damage and edge damage was noted.[19] Technological and typological analysis was done for the polished artefacts and abrasive tools. Technological categories used for this type of findings are based on the methodology for chipped lithics and include: nodule, core, flake, chunck, and indeterminate.[20] Due to the difference in the production process for chipped and polished atrifacts, features on which the technological type for chipped artifacts are based will often not be visible on polished artifacts, due to the polishing process. Typological categories used are based on typology of D. Antonović and include: axe, adze, punch, smoothing tool, grindstone, handstone, and quern-stone.[21] Lenght, width, thickness and weight were measured,[22] the fragmentation level noted, and classified in several raw material categories based on macroscopic properties. Descriptive statistics provides the average values for all of the above categories of chipped and polished artifacts.

REZULTATI TEHNOLOŠKE ANALIZE LOMLJEVINE

Ukupno je analizirano 265 izrađevina odlomljenih od jezgre, koje obuhvaćaju odbojke, sječiva, pločice, odbojke od dotjerivanja jezgre, krestasta sječiva i otpad.[23] Analizom su obuhvaćeni cjeloviti i fragmentirani kameni nalazi ukupne težine 2,2 kg. Tehnološke kategorije svedene su na minimalan broj kako bi bile jednostavnije za komparaciju. Najbrojnije su krhotine koje čine gotovo polovicu ukupnog materijala, slijede odbojci i sječiva (slika 1), dok su jezgre prisutne u najmanjem broju (tablica 1).

RESULTS OF TECHNOLOGICAL ANALYSIS OF LITHICS

A total of 265 artifacts detached from the core (including flakes, blades, bladelets, core timming flake, crested blade and debris) were analyzed in this study.[23] Analyses included included complete and fragmented lithics with a total weight of 2.2kg. Technological categories are reduced to a minimal number for easier comparison. The most numerous are fragments that comprize nearly a half of the total assemblage, followed by flakes and blades (Figure 1), while cores are least common (Table 1).

[18] Šarić 2006,

[19] Oštećenja na izrađevini koja sliče obradbi, a nastala su prirodnim putem (http://struna.ihjj.hr/naziv/paobradba / 32695/#naziv).

[20] Inizan, Reduron-Ballinger, Roche, Tixier 1999.

[21] Antonović 2003.

[22] Debénath, Dibble 1994, 17.

[23] http://struna.ihjj.hr/naziv/lomljevina/28822/#naziv.

[19] Retouch-like damage resulting from natural processes (http://struna.ihjj.hr/naziv/paobradba /32695/#naziv).

[20] Inizan, Reduron-Ballinger, Roche, Tixier 1999.

[21] Antonović 2003.

[22] Debénath, Dibble 1994, 17.

[23] http://struna.ihjj.hr/naziv/lomljevina/28822/#naziv.

TEHNOLOŠKE KATEGORIJE / TECHNOLOGICAL CATEGORIES	N	%
Odbojci / Flakes	70	26,41
Sječiva / Blades	38	14,34
Jezgre / Cores	25	9,43
Krhotine / Chunks	132	49, 81
UKUPNO / TOTAL	265	100

Tablica / Table 1. Broj i postotak litičkih komada po tehnološkim kategorijama na lokalitetu Crkvišće – Bukovlje / Number and percentage of lithic pieces per technological categories from Crkvišće – Bukovlje site.

Slika / Fig 1. Kamena oruđa s lokaliteta Crkvišće-Bukovlje / Stone tools from Crkvišće-Bukovlje site. Gornji red s lijeva na desno: komadić s obradom, svrdlo, udubak, višestruko oruđe. Donji red s lijeva na desno: grebalo, zarubak, geometrijski komadić (snimila A.Barbir, 2017) / Top row from left to right: piece with retouch, perforator, notch, combined tool. Bottom row from left to right: end-scraper, truncation, geometric piece (photo by A. Barbir, 2017).

Prosječna duljina odbojaka iznosi 24,93 mm, širina 19,57 mm, debljina 8,22 mm, a težina 4,14 g. Prosječna duljina sječiva je 22,84 mm, širina 12,14 mm, debljina 3,4 mm, a težina 1,305 g. Kod jezgara prosječna duljina iznosi 25,70 mm, širina 24,07 mm, a težina 18,32 g. U literaturi se često mogu naći dimenzije jezgara, ali ne i točan način na koji su mjerene, te je na taj način otežana komparacija među različitim lokalitetima.[24] Zbog toga je na cjelovitim jezgrama s lokaliteta Crkvišće – Bukovlje primijenjena i druga metoda mjerenja koja podrazumijeva maksimalnu linearnu duljinu i težinu. Naime, većina jezgara, bez obzira na njihov oblik i broj udarnih ploha, ima jednu prepoznatljivo najdužu liniju koja, kada se pomnoži s težinom, daje uniforman način mjerenja veličine[25] (tablica 2).

[24] Andrefsky, 1998, 145 - 146.
[25] Andrefsky, 1998, 145.

The average lenght for flakes is 24.93mm, width 19.57mm, thickness 8.22mm, and weight 4.14g. The average length for blades is 22.84 mm, 12.14 mm width, thickness 3.4 mm, and weight 1,305 g. Core average lenght is 25.70mm, width 24.07mm, and weight 18.32mm. The literature often cites core dimensions, but not the exact measuring protocols, which complicates comparison among different sites.[24] Therefore we used a method which includes the maximum linear lenght multiplied by weight for complete cores from Crkvišće-Bukovlje site. Most cores, regardless of their shape and number of impact surfaces, have a recognizable longest line which, when multiplied by the weight, provides an uniform way of measuring size [25] (Table 2).

[24] Andrefsky, 1998, 145 - 146.
[25] Andrefsky, 1998, 145.

SIGNATURA / LABEL	MLD (cm)	TEŽINA / WEIGHT (g)	VELIČINA / SIZE	POREDAK / LIST
299	46,45	60,4	2805	1
172	39,92	37,7	1504	2
56	34,12	48,7	1661	3
135A	29	10,7	310	4
303	20,14	3	60	5
165	12,11	2,5	30	6

Tablica / Table 2.Prosječna veličina cjelovitih jezgara određena metodom mjerenja maksimalne linearne linije i težine. / Complete core average size measure by maximum linear dimension and height.

Pregled fragmentiranosti odbojaka pokazao je da je najviše cjelovitih odbojaka, a odbojci s očuvanim vrhom i medijalnim dijelom, te bazom i medijalnim dijelom podjednako su zastupljeni. Najmanje je onih koji su imali očuvan samo vrh ili bazu. Slični rezultati su i kod sječiva, gdje je najviše cjelovitih, a slijede sječiva s vrhom i medijalnim dijelom. Podjednako su zastupljena sječiva kojima je očuvan samo medijalni dio te sječiva s očuvanom bazom i medijalnim dijelom.

Prisutnost okorine na nalazima bilježena je prema tehnološkim kategorijama: odbojci, sječiva i jezgre, a rezultati su pokazali sličnost u zastupljenosti okorine kod svih navedenih tehnoloških kategorija. Najviše odbojaka i sječiva nema okorinu, dok znatno manji dio ima okorinu do 50% prekrivenosti. Samo jedan odbojak ima zabilježenu okorinu na više od 50% površine. Najviše jezgara ima okorinu do 50%, a slijede jezgre bez okorine.

Ove tri tehnološke kategorije nemaju zabilježene komade u kategoriji od 100% prekrivenosti okorinom.

An overview of flake fragmentation shows the highest representation of complete flakes. Flakes with preserved distal and medial part and proximal and medial part are evenly represented. Least frequent are those wthich preserve only top or base. Similar results are seen in blades, for which most comommon are complete artifacts, followed by blades with proximal and medial part. Equally represented are blades with preserved only medial part and blades with preserved proximal and medial part.

The presence of cortex is recorded by technological categories (flakes, blades, and cores). The results show similarity in cortex presence in all mentioned technological categories. Most flakes and blades do not have cortex, while a much smaller fraction of assemblage have cortex on more than 50% of the surface. Most cores have up to 50%, of cortex, followed by cores without cortex.

None of the finds fromthese three categories show 100% cortex.

KATEGORIJE / CATEGORIES	ODBOJCI / FLAKES (N)	SJEČIVA / BLADES (N)
Cjelovito / Complete	34	15
Baza / Base	2	0
Vrh / Tip	1	2
Medijalni dio / Medial part	3	4
Vrh i medijalni dio / Tip and medial part	11	12
Baza i medijalni dio / Base and medial part	11	4
Lateralno oštećenje / Lateral damage	3	0
Razna oštećenja / Various damages	5	1
UKUPNO / TOTAL	70	38

Tablica / Table 3. Fragmentiranost odbojaka i sječiva / Flake and blade fragmentation.

KATEGORIJE / CATEGORIES	ODBOJCI / FLAKES (N)	SJEČIVA / BLADES (N)	JEZGRE / CORES (N)
0%	48	31	12
< 50 %	21	7	13
50 – 70 %	1	0	0
70 – 100%	0	0	0
UKUPNO / TOTAL	70	38	25

Tablica / Table 4. Zastupljenost okorine na odbojcima, sječivima i jezgrama / Cortex visibility on flakes, blades and cores.

Na 108 komada odbojaka i sječiva bilježena je prisutnost i tip plohka. Na 46,29 % komada plohak nije prisutan ili je oštećen, a idući najzastupljeniji je gladak plohak s 25,71%.

Butt type / presence was determined for a total of 108 pieces. In 46,29% cases butt is not present or it is damaged, while the most common type is plain butt with 25.71%.

KATEGORIJE PLOHKA / BUTT CATEGORIES	N	%
Nema – oštećen / Absent - damaged	50	46,29
Okorinski / Cortex butt	2	1,85
Gladak / Flat butt	27	25
Dvopovršinski / Dihedral butt	4	3,7
Obrađeni / Retuched butt	6	5,55
Linearni / Linear butt	4	3,7
Točkasti / Punctiform butt	15	13,89

Tablica / Table 5. Zastupljenost i tip plohka na odbojcima i sječivima / Butt type on flakes and blades.

REZULTATI TIPOLOŠKE ANALIZE LOMLJEVINE

Tipološka analiza pokazala je najveću zastupljenost komada s obradom i visok postotak grebala (tablica 7). Najčešća je obrada na oba lateralna ruba, zatim na lijevom, te desnom rubu (tablica 8). Najviše oruđa (96,61%) pokazuje izravnu obradu, odnosno obradu dorzalne strane oruđa udarcima po ventralnoj strani.[26] Na samo dva komada zabilježena je naizmjenična obrada, odnosno obrada koja se po dužini ruba izmjenjuje na dorzalnoj i ventralnoj strani.[27] Sjaj srpa, odnosno trajni sjaj na kamenome oruđu koji nastaje intenzivnom sječom bilja,[28] zabilježen je na 23 komada odbojaka i sječiva, što govori o gospodarstvu Crkvišća u eneolitiku.

Najčešća sirovina korištena za izradu lomljenih izrađevina na nalazištu Crkvišće - Bukovlje je rožnjak, gusta silicijska sedimentna stijena iverasta ili školjkasta loma izgrađena od kriptokristalnoga ili mikrokristalnoga kvarca.[29] Zbog svojih karakteristi-

[26] http://struna.ihjj.hr/naziv/izravna-obradba /30303/#naziv.

[27] http://struna.ihjj.hr/naziv/naizmjenicna-obradba /30308/#naziv.

[28] http://struna.ihjj.hr/naziv/sjaj-srpa/30285/#naziv.

[29] http://struna.ihjj.hr/naziv/roznjak/31606/#naziv.

RESULTS OF TYPOLOGICAL ANALYSIS OF LITHICS

Typological analysis showed major presence of pieces with retouch and a high percentage of endscrapers (Table 7). The most common retouch position is on both lateral edges, followed by left edge, and then the right edge (Table 8). Most of the tools (96,61%) show direct retouch (retouch on dorsal side made by impact on ventral side).[26] Only two pieces of show alternating retouch (retouch on the edge that changes from dorsal to ventral side).[27] Sickle gloss or lasting glow on the stone tools that appears after intensive harvesting of plants,[28] was recorded on 23 pieces of flakes and blades, which adds to our understanding of the economy of Crkvićе-Bukovlje site during the Copper Age.

The most common raw material used to produce chipped artifacts at the Crkvišće-Bukovlje site is chert, a dense silicon sedimentary rock with splintery or shelly fracture built from microcrystalline quartz.[29] Due to its characteristics (hardness and relative fragility) that cause shell type of breakage when struck, chert is

[26] http://struna.ihjj.hr/naziv/izravna-obradba /30303/#naziv.

[27] http://struna.ihjj.hr/naziv/naizmjenicna-obradba /30308/#naziv.

[28] http://struna.ihjj.hr/naziv/sjaj-srpa/30285/#naziv.

[29] http://struna.ihjj.hr/naziv/roznjak/31606/#naziv.

TIPOLOŠKE KATEGORIJE / TYPOLOGICAL CATEGORIES	N	%
Komad s obradom / Piece with retouch	29	49,2
Grebalo / Endscraper	17	28,8
Svrdlo / Drill	3	5,1
Udubak / Notch	5	8,47
Zarubak / Truncation	1	1,69
Kombinirano oruđe - Combined tool	3	5,1
Trokut / Triangle	1	1,69

Tablica / Table 6. Tipološke kategorije s lokaliteta Crkvišće - Bukovlje / Typological categories from Crkvišće-Bukovlje site

POLOŽAJ OBRADE/ RETOUCH LOCATION	N
Lijevi rub / Left edge	9
Desni rub / Right edge	7
Lateralni rubovi / Lateral edges	11
Lateralni rubovi + distalni rub / Lateral edges + distal edge	2
Lateralni rubovi distalnog dijela / Lateral edges of the distal part	1
Lateralni rubovi proksimalnog dijela / Lateral edges of the proximal part	0
Proksimalni i distalni rub / Proximal and distal edge	1
Proksimalni rub / Proximal edge	2
Distalni rub / Distal edge	3
Desni i distalni rub / Right and distal edge	1
Lijevi i distalni rub / Left and distal edge	0
Desni proksimalni rub /Right proximal edge	1
Lijevi proksimalni rub / Left proximal edge	0
Svi rubovi / All edges	1

Tablica / Table 7. Položaj obrade na oruđu / Retouch side on tools.

TEHNOLOGIJA / TECHNOLOGY		
KATEGORIJA / CATEGORIES	**LASINJA - N**	**POMIJEŠANO / MIXED -N**
Odbojci / Flakes	24	46
Sječiva / Blades	20	18
Jezgre / Cores	6	17
Krhotine / Chunks	22	110
UKUPNO / TOTAL	72	191
TIPOLOGIJA / TYPOLOGY		
Komad s obradom / Piece with retouch	14	15
Grebalo / Endscraper	5	12
Svrdlo / Drill	2	1
Udubak / Notch	0	5
Zarubak / Truncation	0	1
Kombnirano oruđe / Combined tool	2	2
Trokut / Triangle	0	1
UKUPNO / TOTAL	23	37

Tablica / Table 8. Odnos tipoloških i tehnoloških kategorija zastupljenih u lasinjskoj kulturi i općenito u eneolitiku na lokalitetu Crkvišće-Bukovlje / Typological and technological categories ratio represented in Lasinja culture and in copper age in general from Crkvišće-Bukovlje site.

ka (velika tvrdoća i relativna krhkost) koje pri udarcu uzrokuju školjkasti lom, rožnjak je vrlo često korišten za izradu lomljenih izrađevina.[30] Najbliža poznata nalazišta rožnjaka nalaze se na Samoborskom gorju[31] i od Crkvišća-Bukovlja su udaljena otprilike 50 km i u rijeci Kupi udaljenoj 20-ak km.[32]

Sirovinske kategorije određene su na temelju karakteristika koje se vide golim okom, poput boje, strukture, prozirnosti, sjaja površine, okorine te komparacije s objavljenim materijalom. Najveći dio izrađevina, 69,1%

very often used in production of chipped artifacts.[30] The nearest known chert sources are on the Samobor mountains,[31] approximately 50 km from Ckrvišće-Bukovlje site, and the Kupa river, approximately 20km away from the site.[32] Raw material categories are determined on the basis of characteristics that can be seen with the naked eye, such as color, structure, transparency, surface gloss, cortex and comparison with published material. Most of the artifacts (69,1%) macroscopically reminisce gray variety replacement chert,[33] originally created through

[30] Andrefsky, 1998, 51.

[31] Forenbaher 2003, 27.

[32] Vukosavljević, Perhoč, Karavanić 2015, 77.

[30] Andrefsky, 1998, 51.

[31] Forenbaher 2003, 27.

[32] Vukosavljević, Perhoč, Karavanić 2015, 77.

[33] Forenbaher, Perhoč 2015, 16.

makroskopski podsjeća na sivi varijetet zamjenskog rožnjaka,[33] nastao okremenjivanjem prvotno vapnenačkih stijena, a mogu se prepoznati na osnovi djelomice sačuvane strukture primarne stijene ili prema reliktima fosila.[34] U manjem broju zabilježeni su i radiolarijski rožnjaci (žućkastosmeđi crvenkastosmeđi varijeteti). Takvi rožnjaci većinom su bez sjaja, sa školjkastim ili ljuštastim lomom.[35] Na prostoru Hrvatske radiolarijski rožnjak moguće je pronaći na Banovini te u riječnim koritima, a u bližoj okolici prisutan je u centralnoj Bosni.[36] Prema dostupnim informacijama, lasinjska kultura koristi radiolarijske rožnjake iz jure i trijasa iz centralnog dinarskog ofiolitskog pojasa.[37] S obzirom na to da se lokalitet Crkvišće-Bukovlje nalazi u neposrednoj blizini rijeke Mrežnice, može se pretpostaviti da su radiolarijski rožnjaci skupljani u njezinu koritu. Radiolarijskih rožnjaka crvenkastosmeđih tonova, ali i valutičnih rožnjaka crvenkastih, žućkastih i tamnih tonova ima u rijeci Kupi.[38] Za tri izrađevine (2 grebala i svrdlo) pretpostavlja se da su izrađene od tzv. balkanskog rožnjaka, međutim tek detaljna petrografska analiza može sa sigurnošću odrediti sirovinu navedenog oruđa. Ova sirovina boje je meda s bijelim točkama te se dugo smatrala indikatorom razmjene na velikim udaljenostima što na temelju novijih analiza postaje upitno.[39,40] Sedam krhotina je od kvarcita, stijene nastale metamorfozom pod povišenim tlakom i temperaturom iz kvarcnoga pješčenjaka ili rožnjaka, izgrađene uglavnom od kvarca.[41]

[33] Forenbaher, Perhoč 2015, 16.
[34] Crnjaković 2009, 125.
[35] Crnjaković 2009, 126.
[36] Halamić, Šošić 2009, 21.
[37] Halamić, Šošić 2009. 21.
[38] Vukosavljević, Perhoč, Karavanić 2015, 77.
[39] Šošić Klindžić 2010, 50.
[40] Gurova 2008, 115.
[41] http://struna.ihjj.hr/naziv/kvarcit/31721/#naziv.

silicification of limestone rock, and can be recognized on the basis of primary structure in part preserved in rock or on the basis of remnants of fossils.[34] Radiolarian cherts (tan reddish varieties) are also present, albeit in smaller numbers. They are characterized by shell fractions and are mostly dull.[35] On the territory of today's Republic of Croatian, radiolarian chert can be found in the Banovina region and in river basins, and are commonly present in the nearby central Bosnia.[36] According to available information, Lasinja culture used radiolarian cherts from the Jurassic and Triassic, from the central Dinaric ophiolitic zone.[37] Given that the site Crkvišće-Bukovlje is located near the river Mrežnica, it can be assumed that the radiolarian chert was collected in the ricerbed of this river. Radiolarian chert with auburn tones, but also pebble type of chert that comes in reddish, yellowish and dark tones can be found in the Kupa river.[38] Three artifacts (two scrapers and a perforator) are likely made of the so-called Balkan chert, but only a detailed petrographic analysis can determine with certainty the raw materials used in their production. This type of raw material has a characteristic honey-colour with white spots, and has long been considered as an indicator of exchange over long distances. However, based on newer studies, this interpretation becomes questionable.[39,40] There are seven quartzite fragments rock formations made by metamorphosis under elevated pressure and temperature from quartz sandstone or chert.[41]

GLAČANO I ABRAZIVNO ORUĐE

Na lokalitetu Crkvišće – Bukovlje pronađeno je 79 nalaza glačanog (sjekire, tesle, dlijeta, klinovi, čekići) i oruđa grube površine (rastirači, brusevi, žrvnjevi).[42] Najzastupljeniji tip su glačalice (N = 19, 24%), i to ručne glačalice nepravilnog izduženog oblika bez jasno određene radne površine i ručne glačalice s jasno određenom ravnom radnom površinom. Jedna glačalica ima žljebove na radnoj površini (vjerojatno za obradu koštanih igala i šila).[43] Glačalice su oruđe koje je služilo za obrađivanje predmeta od čvrstih materijala (kamen ili kost) brušenjem ili glačanjem, stoga su trebale biti izrađene iz stijena s abrazivnim svojstvima, poput pješčenjaka ili magmatskih stijena koje sadrže kvarc.[44]

Na lokalitetu Crkvišće – Bukovlje većina glačalica izrađena je iz sitnozrnih kompaktnih pješčenjaka s tinjcem (16 nalaza), dok su od magmatskih stijena s kvarcom izrađene tri glačalice. Idući najzastupljeniji tip su žrnjevi (N = 17, 20,2%). To su masivni kameni predmeti s ravnom ili slabo udubljenom radnom površinom izrađeni najčešće od sitno do srednjozrnih magmatskih stijena ili sitnozrnih kompaktnih pješčenjaka.[45] Pretpostavlja se da su služile za mljevenje žitarica,[46] pigmenata i keramike, ali i za oblikovanje predmeta od tvrdih materijala.[47]

Žrvnjevi s lokaliteta Crkvišće - Bukovlje izrađeni su iz srednjozrnih magmatskih stijena s primjesama minerala (N = 10, 12,65%) i od sitnozrnog kompaktnog pješčenjaka s kvarcom i tinjcem (N = 7, 8,86%). Brusno kamenje vrlo je slično glačalicama od kojih se razlikuje samo po sirovini od koje je napravljeno[48] (N = 14, 17,72%). Za njihovu izradu korištene su mekane stijene

[42] Balen, Balen, Kurtanjek 2002, 20.
[43] Antonović 2003, 59.
[44] Antonović 2003, 59.
[45] Antonović 2003, 61.
[46] http://struna.ihjj.hr/naziv/zrvanj/30572/#naziv.
[47] Antonović 2003, 61.
[48] Antonović 2003, 60.

POLISHED AND ABRASIVE TOOLS

Excavations at Crkvišće-Bukovlje site yielded 79 polished tools (axes, adzes, chisels, wedges and hammers) and abrasive tool (handstones, grindstones, quern-stones).[42] The most common type is smoothing tool (N=19, 24%), represented by the hand type of smoothing tools without defined working surface, and hand type of smoothing tool with clearly defined working surface. On one otf the tools channels on working surface (probably for bone needle and awl processing) are clearly visible.[43] Smoothing tools were used for proceesing artifacts of solid materials (stone or bone) by grinding or polishing, and therefore are made of rock with abrasive properties, such as sandstone or igneous rocks containing quartz.[44]

At Crkvišće-Bukovlje site, most smoothing tools were made of fine-grained compact sandstone with micaceous (N=16), while three tools were made of igneous rocks with quartz. Next most common type is quern-stone (N=17, 20,2%). These are massive stone objects with flat or slightly concave worktop made mostly of small to medium-grained igneous rocks or small grained compact sandstone.[45] It is assumed that they were used for grinding grain,[46] pigments and ceramics, but also for the design of objects from hard materials.[47]

Quern-stones from Crkvišće-Bukovlje site are made of medium-grained igneous rocks with mineral compounds (N=10, 12,65%), and of fine-graines and compact sandstone with qurtz and mica (N=7, 8,86%). Grindstone is very similar to smoothing tool, but made of different raw material[48] (N=14, 17,72%), mostly of soft rocks, such as sandstone.[49] There are 13 such artifacts from Crkvišće-Bukovlje site, and the raw ma-

[42] Balen, Balen, Kurtanjek 2002, 20.
[43] Antonović 2003, 59.
[44] Antonović 2003, 59.
[45] Antonović 2003, 61.
[46] http://struna.ihjj.hr/naziv/zrvanj/30572/#naziv.
[47] Antonović 2003, 61.
[48] Antonović 2003, 60.
[49] Antonović 2003, 60.

Slika / Fig. 2. Glačano i abrazivno oruđe s lokaliteta Crkvišće-Bukovlje / Polished and abrasive tools from Crkvišće-Bukovlje site. Gornji red s lijeva na desno: žrvanj, brusni kamen, čekić. Donji red s lijeva na desno: glačalica, rastirač, polirana izrađevina, tesla (snimila A. Barbir, 2017). / Top row from left to right: quern-stone, grindstone, hammer. Bottom row from left to right: smoothing tool, handstone, polished tool, adze (photo by A. Barbir, 2017).

poput pješčenjaka,[49] a takvih je na Crkvišću 13 komada. Za jedan komad se ne može sa sigurnošću odrediti sirovina. Idući tip koji je prisutan na ovom lokalitetu su rastirači (N = 7, 8,8%), oruđe[50] okrugla ili gotovo četvrtasta oblika koje se upotrebljavalo kao gornji, pokretni dio žrvnja.[51] Najviše ih se može pripisati tipu 1, odnosno rastiračima bez jasno definirane radne površine kod kojih su sve strane služile za rad.[52] Dva primjerka bi odgovarala tipu 3, odnosno kuglastim rastiračima bez jasno formirane radne površine zbog kratkog korištenja.[53]

Rastirači s Crkvišća-Bukovlja su od magmatskih stijena s kvarcom (3 komada), sitno-srednjozrnog kompaktnog pješčenjaka s kvarcom, tinjcem i feldspatom (3 komada) te vapnenca (1 komad). U materijalu su prisutne i dvije tesle (slika 2), odnosno

terial used for making one of them is undetermined. Handstones are also present at the site (N = 7, 8.8%). Morphologically, this is a round, or almost rectanguar tool[50] which is used as the upper, movable part of the grindstone.[51] Most of them can be attributed to the type 1, or handstone without clearly defined desktop where all sides are used for work.[52] Two handstones are of type 3, or spherical handstones with no clearly visible worktop because of short use.[53]

Handstones from the site are mostly made of igneous rocks with quartz (3 pieces), small-medium-grained compact sandstone with qurtz, mica and feldspar (3 pieces), and limestone (1 piece). There are two adzes, tools with cutting edges parallel to the axis of symmetry used in felling and processing of wood.[54] One has a

[49] Antonović 2003, 60.

[50] Rastirači nisu u punom smislu oruđe jer svoj oblik nisu dobili ljudskom intervencijom. Antonović 2003, 60.

[51] http://struna.ihjj.hr/naziv/rastirac/30570/#naziv.

[52] Antonović 2003, 60.

[53] Antonović 2003, 60.

[50] Handstones are not tools in the full sense, since their shape has not been given through human intervention. Antonović 2003, 60.

[51] http://struna.ihjj.hr/naziv/rastirac/30570/#naziv.

[52] Antonović 2003, 60.

[53] Antonović 2003, 60.

[54] http://struna.ihjj.hr/naziv/tesla/30569/#naziv.

lomljeno ili glačano oruđe sa sječivom usporednim s osi simetrije upotrebljavano pri sječi i obradi drva.[54] Jedan primjerak ima širi distalni kraj (tip 1),[55] a drugi ima širi distalni kraj s lučnim sječivom (tip 2).[56] Oba su izrađena iz metamornih stijena.

Pronađena su i dva kamena čekića, oba s paralelnim bočnim rubovima i krajevima iste debljine (tip 3).[57] Jedan je od magmatske stijene, a drugi od sitnozrnog kompaktnog pješčenjaka.

Pronađena je i jedna glačana izrađevina, duguljasta i asimetrična oblika, izrađena od metamorfne stijene. Vrlo fragmentirani nalazi određeni su kao neodredivi (N = 16, 21,5%). Izrađeni su od različitih vrsta stijena, magmatskih, metamorfnih i sedimentnih (sitnozrni kompaktni pješčenjak s tinjcem, kvarcom i biotitom). Jedna od najzastupljenijih sirovina među glačanim oruđem i predmetima abrazivne površine na lokalitetu Crkvišće-Bukovlje je pješčenjak koji se može naći u planinama panonskog dijela Banovine (Zrinska i Trgovska gora), Korduna (Petrova gora), u Samoborskome gorju, u Gorskome kotaru (Gerovo, Crni Lug, Mrzla Vodica)[58] te je tako bio široko dostupan eneolitičkim stanovnicima na ovom lokalitetu.

RASPRAVA I ZAKLJUČAK

Nažalost, u domaćoj znanstvenoj literaturi dosad su analize litičkog materijala iz neolitika, eneolitika, brončanog i željeznog doba relativno rijetko objavljivane i tek je u posljednjih nekoliko godina tome posvećeno više pažnje.[59] Na litičkom materijalu s lokaliteta Crkvišće – Bukovlje napravljena je tipološko-tehnološka analiza s utvrđenim faza-

[54] http://struna.ihjj.hr/naziv/tesla/30569/#naziv.

[55] Antonović 2003, 55.

[56] Antonović 2003, 55.

[57] Antonović 2003, 56.

[58] http://www.enciklopedija.hr/natuknica.aspx?id=48536.

[59] Bunčić 2009; Bunčić 2011a; Šošić Klindžić 2010; Forenbaher, Kaiser 2005; Karavnić, Šošić Klindžić, Bunčić, Kurtanjek 2009; Komšo 2004; Rajković 2011; Šošić, Karavanić 2004; Komšo 2006; Komšo 2006a;Šošić Klindžić 2007; Komšo 2008; Komšo 2009; Špoljar 2011.

wider distal end (type 1)[55], while the other has a wider distal end of the arched blade (type 2).[56] Both are made from metamorfic rocks.

Two hammers were found, both with parallel sides and the edges with same thickness (type 3).[57] One was made on igneous rock, and the other on compact grained sandstone.

An elonged, asymetrical polished artifact made of metamorphic rock was also found at the site. Highly fragmented pieces are defined as indeterminate (N=16, 21,5%). They are made of different kinds of rocks, including igneous, metamorphic, and sedimentary (fine-grained compact sandstone with mica, quartz and biotite). One of the most abudant raw material among polished and abrasive tools on Crkvišće-Bukovlje is sandstone that can be found in the mountains of Pannonian part of Banovina (Zrin and Trgov hill), Kordun (Petar hill), the Samobor hills, in Gorski Kotar (Gerovo, Crni Lug, Mrzla Vodica)[58] and was thus widely available to Copper Age residents of this site.

DISCUSSION AND CONCLUSION

Unfortunately, scientific publications dealing with analyses of lithic material from Neolithic Age, Copper Age, Bronze and Iron Ages from Croatian sites are relatively rare, although this has soewhat changed in the last few years.[59] Typological and technological analyses, including phases of production process and functional analysis based on the macroscopically visible

[55] Antonović 2003, 55.

[56] Antonović 2003, 55.

[57] Antonović 2003, 56.

[58] http://www.enciklopedija.hr/natuknica.aspx?id=48536.

[59] Bunčić 2009; Bunčić 2011a; Šošić Klindžić 2010; Forenbaher, Kaiser 2005; Karavnić, Šošić Klindžić, Bunčić, Kurtanjek 2009; Komšo 2004; Rajković 2011; Šošić, Karavanić 2004; Komšo 2006; Komšo 2006a;Šošić Klindžić 2007; Komšo 2008; Komšo 2009; Špoljar 2011.

ma proizvodnog postupka te funkcionalna analiza na temelju makroskopski vidljivih tragova upotrebe (sjaj srpa, gorenje, oštećenje rubova). Rezultati su prikazani općenito za eneolitik, a potom je izdvojen materijal iz lasinjske kulture i sagledan kroz kronokulturološku sliku. S obzirom na građevine iz kasne antike koje su nasjele na prapovijesne slojeve, dio stratigrafskih jedinica iz kojih dolazi litički materijal ispremiješan je s mlađim razdobljima – kasnim brončanim i starijim željeznim dobom te kasnom antikom.[60] S obzirom na to da tehnološka analiza rekonstruira proizvodni postupak, preko čega je moguće sagledati društvene odnose prapovijesnih populacija ili skupina,[61] važno je naglasiti da lasinjska kultura svoje gospodarstvo zasniva na stočarstvu, ali i na poljodjelstvu.[62] Tehnološka analiza pokazala je najviše odbojaka na lokalitetu, a slijede krhotine pa sječiva. Jezgara je najmanje (6), ali su dobar indikator proizvodnje artefakata na lokalitetu. Što se tiče finalne obrade artefakata u oruđe, najviše je komada s obradom (14), a slijede grebala (5), svrdla (2) i višestruko oruđe (2).

Ako se materijal iz lasinjskih slojeva s lokaliteta Crkvišće-Bukovlje usporedi s litičkim materijalom s drugih lasinjskih lokaliteta (Tomašanci-Palača,[63] Slavča-Nova Gradiška,[64] Kuševac-Topolina) uočavaju se sličnosti u tehnološkim kategorijama. Naime, kod sva četiri navedena lokaliteta najzastupljenije tehnološke kategorije su odbojci i sječiva (osim krhotina), s tim da samo na lokalitetu Tomašanci-Palača[65] prevladava kategorija sječiva, dok na ostalim nalazištima dominaniraju odbojci. Jezgre su prisutne u sličnim postotcima. Jezgre su pokazatelj proizvodnje litičkog oruđa *in situ*, na što upućuje i visok udio krhotina na eneolitičkim lokalitetima,[66] kao i na lokalitetu Crkvišće – Bukovlje. Tipološka analiza

[60] Azinović Bebek, Sekulić 2016.

[61] Blaser, Videka-Blaser, Karavanić 1999-2000.

[62] Dimitrijević, Težak – Gregl, Majnarić – Pandžić 1998, 115.

[63] Špoljar 2011.

[64] Šošić, Karavanić 2004.

[65] Špoljar 2011, 27.

[66] Šošić, Karavanić 2004.

traces of use (sickle gloss, burningm edge damages) were done ont he material from Crkvišće-Bukovlje site. First, results are reported for the whole Copper Age sequence, and then for the Lasinja Culture, which is considered in its chronological and cultural aspects. The remnants of architecture and other archaeological material dating from Late Antiquity overlie prehistoric layers of the site, resulting in mixing of some of the material.[60] Given that the technological analysis aims to reconstruc the manufacturing process, thus providing an insight into certain aspects of social relations of prehistoric populations or groups,[61] it is important to emphasize that the Lasinja culture economy is based on livestock, but also on agriculture.[62] Technological analysis showed that flakes are most abundant product in the assemblage, followed by debris and blades. Cores are much less frequent (N=6), but they are a good indicator of *in situ* production. Most common tools are pieces with retouch (N=14), followed by endsrapers (5), perforators (N=2), and a combined tools (N=2).

When the material from Lasinja layers at Crkvišće-Bukovlje site is compared to that from other Lasinja sites (Tomašanci-Palača,[63] Slavča-Nova Gradiška,[64] Kuševac-Topolina), similarities are visible in technological categories. In fact, the most common technological category among all four sites are blades and flakes (except chunks). At Tomašanci-Palača site[65] blades are more common than flakes, while at other sites flakes are more common. Cores are present in similar percentages, and they are good indicator of *in situ* production of artifacts. This is also supported by a high proportion of chunks at Copper Age sites,[66] as well as on Crkvišće-Bukovlje. Typological analysis showed major presence of pieces with retouch and endscrapers at all comparative Lasinja sites. Raw material mostly comes from surrounding sources and areas (riverbed and the nearby mountains), although some of the material was processed be-

[60] Azinović Bebek, Sekulić 2016.

[61] Blaser, Videka-Blaser, Karavanić 1999-2000.

[62] Dimitrijević, Težak – Gregl, Majnarić – Pandžić 1998, 115.

[63] Špoljar 2011.

[64] Šošić, Karavanić 2004.

[65] Špoljar 2011, 27.

[66] Šošić, Karavanić 2004.

KATEGORIJA / CATEGORIES	CRKVIŠĆE-BUKOVLJE	TOMAŠANCI-PALAČA	KUŠEVAC-TOPOLINA	SLAVČA-NOVA GRADIŠKA
TEHNOLOGIJA / TECHNOLOGY				
Odbojci / Flakes	24	139	90	128
Sječiva – pločice / Blades - bladelets	20	153	71	64
Jezgre / Cores	6	33	26	2
Krhotine / Chunks	22	49	42	0
UKUPNO / TOTAL	72	374	230	194
TIPOLOGIJA / TYPOLOGY				
Komad s obradom / Piece with retouch	14	61	31	25
Grebalo / Endscraper	5	12	12	3
Svrdlo / Drill	2	9	0	0
Udubak / Notch	0	3	3	0
Zarubak / Truncation	0	7	2	0
Kombinirano oruđe / Combined tool	2	13	0	0
Trokut / Triangle/ Geom.oblik	0	4	0	0
Projektil / Projectil	0	0	3	0
Lunarni segment / Lunar segment	0	1	0	0
Razno / Other	0	3	0	5
UKUPNO / TOTAL	23	113	51	33

Tablica / Table 9. Usporedba tipoloških i tehnoloških kategorija na lokalitetima lasinjske kulture / Typological and technological categories comparison from Lasinja culture sites.

pokazala je najveću zastupljenost komada s obradom i grebala na svim komparativnim lasinjskim lokalitetima. Sirovinu su nabavljali u okolici (korita rijeka, obližnja gorja), a dio materijala su obrađivali (pripremali jezgre, skidali okorinu) već na mjestu prikupljanja sirovine.

Funkcionalna analiza pokazala je osam sječiva koja imaju sjaj srpa. Sjaj srpa, odnosno trajni sjaj na kamenome oruđu koji nastaje

fore it was brought to the sites (e.g. core preparation and decortication). A total of eight blades from Crikvišće-Bukovlje site show sickle gloss. Sickle gloss or lasing glow appears on tools after intensive cutting of plants,[67] and is commonly found on Neolithic and Copper Age lithics.[68] Such blades rarely have treatment, and they are more often dulled by intensive use. Blades are

[67] http://struna.ihjj.hr/naziv/sjaj-srpa/30285/#naziv.
[68] Odell 2004, 176.

intenzivnim rezanjem bilja[67] karakterističan je za litički materijal iz razdoblja neolitika i eneolitika.[68] Takva sječiva rijetko imaju obradu, a češće su otupljena od intenzivne upotrebe. Sječiva su najčešće bila uglavljivana u srp jer su manjih dimenzija te ih je teško držati u rukama i na taj način koristiti. Deset sječiva i dva odbojka imaju oštećenja rubova, odnosno iskrzanost nastalu intenzivnim korištenjem. Potvrda za intenzivno rezanje i upotrebu bilja nalazi se u pronađenim žrvnjevima i rastiračima koji su služili za mljevenje, među ostalim, i sjemenki.

Na temelju analize skupa litičkih nalaza lasinjske kulture moguće je zaključiti da su stanovnici lasinjskog naselja na lokalitetu Crkvišće-Bukovlje samostalno proizvodili manji broj artefakta, dok su jezgre uglavnom pripremali na mjestima sabiranja i onda ih u potpunosti iskorištavali na lokalitetu. Na takve zaključke upućuje niska prisutnost, odnosno odsutnost okorine na većini materijala, male dimenzije jezgara i ukupan pregled faza proizvodnje na lokalitetu. Lokaliteti uspoređivani u ovom radu u mnogočemu su slični, no postoje razlike u načinu dopremanja i pripremanja sirovine te proizvodnje oruđa. Stanovnici lokaliteta Tomašanci – Palača proizvodili su većinu artefakta na nalazištu,[69] dok je na Slavči[70] i Kuševcu – Topolini situacija slična kao na Crkvišću-Bukovlju. Dio materijala se uvozio, dopremao i pripremao na drugim lokacijama, dok se dio oruđa izrađivao na lokalitetu. Male prosječne dimenzije jezgara govore u prilog štedljivom odnosu prema sirovini i potpunom iskorištavanju. Prisutnost dvaju čekića s oštećenjima na krajevima govori o proizvodnji *in situ* na lokalitetu.

Prema ukupnim podacima može se zaključiti da je Crkvišće-Bukovlje djelomično proizvodno naselje[71] jer nema predjezgri, niti

often set in the sickle because they are smaller and they are difficult to hold in hands during use. Ten blades and two flakes exhibit damaged or splintered edges caused by intensive use. Confirmation of intensive cutting and the use of herbs is found in the quern-stones and handstones used to grind seeds. Based on the analysis of a set of lithic finds of the Lasinja culture, it is possible to conclude that that the inhabitants of Lasinja settlement at Crkvišće-Bukovlje site independently produced a small number of artifacts, while cores are generally prepared in places of gathering and then fully exploited on the site. Indications for such conclusions are low cortex presence on most finds, small size cores, and overall view of the production stages at the site. The material from the comparative sites is similar in many ways, although there are differences in delivering and preparing of raw material, and in tool production. Population of Tomašanci-Palača produced most of the artifacts *in situ*,[69] while population on Slavča[70] and Kuševac – Topolina sites are more similar in this respect to Crkvišće-Bukovlje site. Part of the material was brought from the outside sources already partially processed and prepared, while other part was processed on sites. Small average dimensions of cores speak in favor of saving, economizing and full exploitation of raw material. The presence of two defected hammer favors *in situ* production on Crkvišće-Bukovlje site. According to the total data, and based on the absence of precores and primary decortication flakes and blades, we can conclude that the Crkvišće-Bukovlje site is partially a site where production of lithic took place.[71] Flakes, blades and cores are present. Cores are of smaller size and used very economically. Generally speaking, Copper Age shows greater organization of exploitation, distribution and manufacture of stone tools in comparison to earlier Neolithic period in the region.[72] Raw materials are becoming more diverse, and the distance prospecting is growing, which is associated with obtaining

[67] http://struna.ihjj.hr/naziv/sjaj-srpa/30285/#naziv.
[68] Odell 2004, 176.
[69] Špoljar 2011, 55.
[70] Šošić, Karavanić 2004, 35.
[71] Šošić 2010, 188.
[72] Bunčić 2010.

prvotnih odbojaka i sječiva. Neobrađeni odbojci, sječiva i jezgre su prisutni. Jezgre su malih veličina te su korištene vrlo štedljivo. Općenito govoreći, eneolitik pokazuje veću organiziranost u eksploataciji, distribuciji i proizvodnji kamenih alatki u odnosu na razdoblje neolitika.[72] Sirovina postaje raznovrsnija, a udaljenost ležišta sve veća, što se dovodi u vezu s pribavljanjem metalnih ruda.[73] Zbog toga, u ovom dinamičnom razdoblju prapovijesti, litička produkcija na lasinjskim, i uopće eneolitičkim lokalitetima ne može se promatrati samo kroz kronološku i kulturološku odrednicu, već treba uzeti u obzir položaj lokaliteta te vrstu i dostupnost pogodne sirovine.

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[72] Bunčić 2010.

[73] Kaczanowska, Kozlowski 1997.

metal ores.[73] Therefore, in this dynamic period of prehistory, lithic production of Lasinja, and even Copper Age sites can not be viewed only through a chronological and cultural reference, but should take into account the position of the site and the type and availability of suitable raw materials.

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[73] Kaczanowska, Kozlowski 1997.

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The stone implements and wrist-guards of the Bell Beaker cemetery of Budakalász (M0/12 Site)

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In this article I investigate the stone finds of the Bell Beaker cemetery of Budakalász from archaeological and petrographic points of view. For the first time in Hungary I describe the finds in the terms of international typology, and compare the inventory with other published Hungarian and European Bell Beaker sites.

Keywords: *Early Bronze Age, Bell Beaker Culture, Budapest-Csepel group, stone implements, biritual cemetery.*

1. INTRODUCTION

In this article[1] I investigate the stone implements of the Bell Beaker site of Budakalász.[2] The site consists of two parts: a cemetery with 1070 graves (biritual inhumations, urngraves and scattered urngraves, empty gravepits / symbolic burials or cenotaphs), and the settlement part.[3] I describe and evaluate the stone finds of the cemetery from archaeological and macroscopic petrographic points of view. Because of the large distribution area of the Bell Beaker Culture, I have made my analyses at the levels of the site, the region (Budapest-Csepel group / Budapest district) and the country (Hungary) and also considered the whole distribution area (northern Africa and Europe) of the Bell Beaker and compared the results with each other (analysed the results at micro- and macroscopic levels).[4]

[1] The article was supported by the Lise Meitner fellowship (project M 2003-G25 / AM 0200321) of FWF (*Fonds zur Förderung der wissenschaftlichen Forschung*).

[2] Site no. 12 of the M0 motorway excavation, excavation campaign: 2005; excavator: Katalin Ottományi; excavated territory: 40000 m2. The topographical name of the site is Budakalász–Csajerszke.

[3] Czene 2008; Horváth 2013. I would like to thank András Czene, who assessed the site and allowed me to work on this assemblage and provided me with useful information on the site.

[4] See a similar comparison for the Late Copper Age: Horváth 2012.

The structure of the article follows the typological groups of the finds:

1. Grinding equipment; 2. Pebbles (polishing pebbles, choppers / hard hammers, hand stones, anvils, whetstones made of pebbles with minimal or no shaping); 3. Axes and celts; 4. Polishers/Moulds; 5. Wrist-guards; 6. Chipped stones; 7. Amber.

After their description I summarize and evaluate them, compare them with other published finds from the region and the finds of Hungary, and also with finds, publications and methodologies in Europe.

2. SHORT DESCRIPTION OF THE BELL BEAKER CULTURE

The Bell Beaker Culture spread on the coastal parts of northern Africa, in maritime Europe (its Atlantic and Mediterranean parts) and along larger rivers in Europe (Danube, Elbe, Oder, Vistula, Morava) – in general on lowlands, but in certain cases in mountainous regions as well (northern Italy, Switzerland, Sardinia) (see Fig. 1 after Care 2004).

Looking at this map we can see that, as in the cases of the Boleráz and Baden Cultures of the Late Copper Age, this distribution is not even: smaller and larger occupational areas were separated, and are situated far away from each other.[5] The easternmost, larger occupation area is situated along the River Vistula, in the Polish Lowlands,[6] but sporadic occupations appear towards the upper part of the Dnieper and the catchment basin of the Dvina.[7] Most researchers agree that the Bell Beaker Culture emerged in the Iberian Peninsula and spread from this area.[8] Investigating the whole distribution area from typological and chronological points of view, researchers have introduced several subdivisions: Marc van der Linden created five so-called polythetic groups;[9] Marie Besse distinguished eastern, southern, northern and western Bell Beaker domains.[10]

The Bell Beaker Culture is considered to be a Late Neolithic culture – or, in another international terminology, a Late Copper Age culture – that survived in the transitional phase of the Early Bronze Age.[11] Studies often emphasize the role of several local/native elements, the continuity of former and distinct Eneolithic traditions, which affected the formation of the Bell Beaker.[12] The various local former traditions, their influence on the emerging Bell Beaker, the possible continuity of indigenous cultures and their interactions with Bell Beaker communities and other neighbouring cultures resulted in differences among the regional groups of the Bell Beaker.[13] On the Atlantic and Mediterranean seacoasts Megalithic traditions survived; on the eastern and the Mediterranean borderline Bell Beakers adopted some steppean traditions.[14]

Looking at the spread of the Bell Beaker Culture in Hungary, its occupation along two riverlines is certain: Danube and Rába (Fig. 2). Thanks to older and more recent research along the Rába River we have knowledge of more and more sites belonging to the Bell Beaker.[15] Following the flow of the Danube we can find some very sporadic sites between Almásfüzitő and Pilismarót, unfortunately as stray finds, connecting the

[5] Horváth 2009. It is possible that, if we are able to separate the early and the late sites from each other in the whole distribution area of the Bell Beaker, we could observe further differences and could understand the Bell Beaker better. This was the case with the Baden Culture, formerly assumed to be unified.

[6] Czebreszuk, Szmyt 2003.

[7] Czebreszuk 2003, 175.

[8] Care 2004.

[9] Van der Linden 2004, Fig. 6.

[10] Besse 2004, Fig. 8.

[11] On the basis of its metallurgy: Bertemes, Heyd 2002: copper tools from *Fahlerz*, Reinecke A0 horizon, see also Reményi et al. 2006 for the Hungarian finds.

[12] Besse 2004; Strahm 2008.

[13] E.g. with Corded Ware Culture, Wien–Essling: Zimmermann 2003; Egeln–Bleckendorf: Müller 1999.

[14] Especially in the burial rites: e.g. tumulus/kurgan, frog position of the body, stele erection: see Turek 2006, Turek 2006a, Harrison, Heyd 2007; Dimitriadis 2008; Włodarczak 2008; Robb 2009.

[15] In the vicinity of Szombathely: Károlyi 1972, 172-185; Ilon 2004, 42; Reményi, Dobozi 2012; in the vicinity of Győr: Patay 1960.

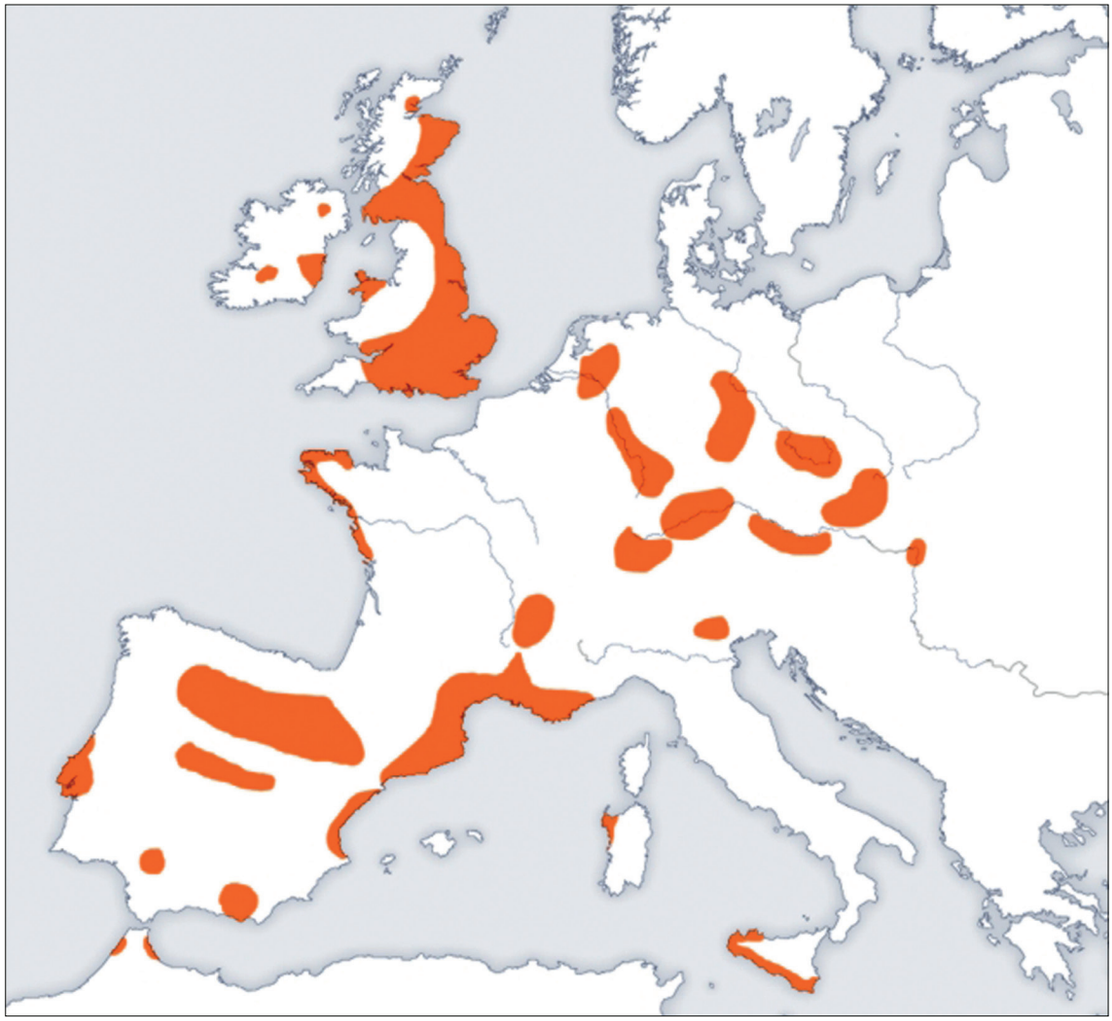


Fig. 1. The distribution of the Bell Beaker Culture (after Care 2004, source: https://www.google.at/search?q=Bell+Beaker+culture+map&safe=active&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwiQjIjw27PWAhXlJ8AKHaLqC6QQsAQIQw&biw=1024&bih=473#imgrc=PViyA5K3VExIoM).

Rába region to the Csepel region with short-lived occupational areas.[16] The second-largest settled area is the Budapest–Csepel region.[17] According to new research, even though based on scattered urn-grave Bell Beaker-like import or imitation vessel finds from Panyola–Vásármező-domb (excavated by Katalin Almássy and Eszter Istvánovits in 2003), a possible distribution or contact along the River Tisza can also be assumed.[18]

The Hungarian material grouped into two parts: NW-Hungary along the River Rába was mainly influenced by the western Bell Beaker, while the central part of Hungary along the Danube (Budapest–Csepel) was mainly influenced by southern cultures (esp. Makó, Somogyvár–Vinkovci and early Nagyrév Cultures, since these overlapped each other in space and time). In a European perspective, the Hungarian Bell Beaker shows tighter bonds with Lower-Austrian and Moravian Bell Beaker groups.[19] The Hungarian Bell Beaker is an

[16] Patay 1960.

[17] The southern part of Szentendre Island, Gázgyár and Hajógyár Islands, the northern part of Csepel Island: Kalicz, Schreiber 1997; Kalicz-Schreiber, Kalicz 2001; Endrődi 2003.

[18] Dani, Tóth 2014.

[19] Kalicz-Schreiber, Kalicz 1999, Kalicz-Schreiber, Kalicz 1998–2000, 45, 47; Kalicz-Schreiber, Kalicz 2001.

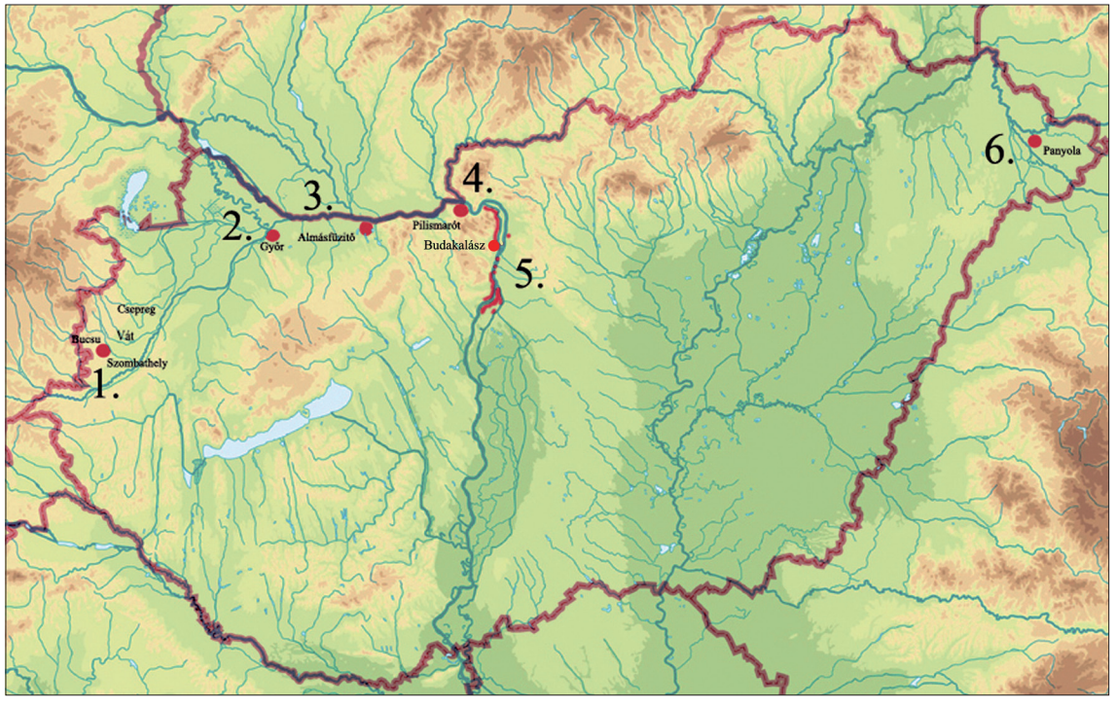


Fig. 2. The local distribution of the Bell Beaker Culture in Hungary with the main sites. 1. Environment of Szombathely along the River Rába, 2. Győr in the confluence of three rivers: the Danube, Rába and Rábca, 3. Almásfüzitő, 4. Pilismarót, 5. Budakalász, and 6. Panyola along the river Tisza.

Early Bronze Age culture in the Hungarian terminology.[20] The Austrian Bell Beaker sites were listed in three chronological phases without sharp boundaries.[21] Synchronized with the Hungarian terminology: the Austrian I phase is the classic Bell Beaker; second phase: Common Ware/ Accompaniment pottery (EBA IIa phase in Hungary); third phase: so-called Oggau–Wipfing–Ragelsdorf–Oberbierbaum group in the Reinecke Bronze Age A1, which was contemporary with the Hungarian EBA IIb phase.[22] The elements of the classic Beaker Package and Beaker Set by this final phase had disappeared, and the Common Ware became dissolved in the local Early Bronze cultures.

The recently discovered large cemeteries in the Budapest region are dated 2500–1900 BC (Budakalász–Csajerszke, M0 / Site 12), Szigetszentmiklós 2500–2200 BC.[23] In the cemetery of Szigetszentmiklós there is a chronological gap between the Bell Beaker and the Early Nagyrév graves: Nagyrév is a little later. This is the first scientific evidence on the chronological situation of the Bell Beaker and Early Nagyrév at a common site without overlapping! Another date from this region is a radiocarbon date of Dunakeszi–Székes-dűlő from a proto-Nagyrév grave.[24] The Proto-Nagyrév horizon should be contemporary with the Bell Beaker Culture according to relative chronology; however, this date is much later in absolute chronology.

Another older radiocarbon date is available from Budapest–Farkas-rét (B-4709: 3470 BP ± 80, recalibrated: 1890–1690 calBC, 1 σ),

[20] EBA phase II: Bóna 1994; Harangedény–Csepel group, EBA IIa: Kalicz-Schreiber, Kalicz 1999, 86 and Fig. 20; EBA IIa, IIb: Reményi 2009.

[21] Neugebauer, Neugebauer-Maresch 2001; Heyd 2000, 358-388.

[22] Reményi, Dobozi 2012, 123.

[23] Budakalász–M0 / Site 12: Czene 2008; Szigetszentmiklós–Felső Ürge-hegyi dűlő: Patay 2008; Patay 2009, 224 and footnote 42.

[24] 2010–1910 calBC, 1 σ, Grave 391: Endrődi, Pásztor 2006, 16.

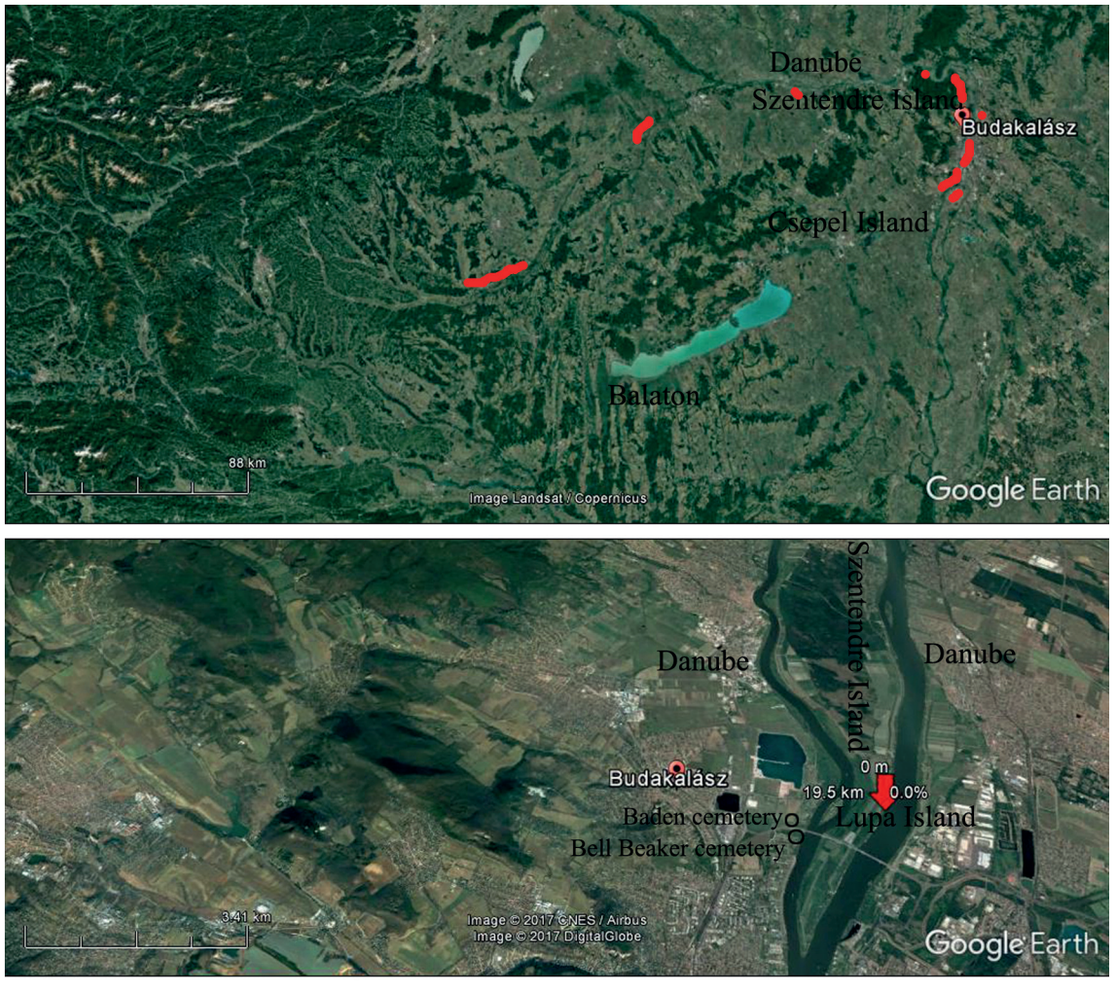


Fig. 3. Budakalász: the site in several map-types:

1. The Danube on the GoogleEarth map with greater perspective. Distribution of Bell Beaker along the Rába and Danube rivers in Hungary is red colored.

2. On a GoogleEarth map with the two sites from the Late Copper Age and Early Bronze Age.

3. Budakalász on the First Military Map, 1763-1787, signed the both (LCA and EBA) sites.

which was formerly connected with Bell Beaker hornstone mining at the site: it is also later; therefore it cannot be associated with Bell Beaker mining.[25]

New dates are later, suggesting an earlier appearance of the Bell Beaker in the central region of the country than has previously been assumed. The earliest date, 2500

[25] T. Biró 2002, 131.

calBC, represents the transitional period of the EBA I/II phases in Hungary. The appearance of the earliest or so-called Makó 1 Culture in this central region is doubtful both typologically and chronologically. We do not know Makó dates earlier than 2600 BC from Hungary.[26] Therefore, it is justifiable to consider a transitional phase between the Copper and Bronze Ages between 2800 and 2600 BC, and start the Bronze Age at 2600 BC.[27] The former date for the 1st phase of the Early Bronze Age[28] would imply that the Baden Culture survived in this region,[29] therefore the beginning of the Early Makó 1 Culture cannot be placed in this period in this region. However, the assumed contemporaneity of the surviving Baden Culture after the Late Copper Age and the appearance of the Bell Beaker is not supported by new radiocarbon dates. There is a gap of more than a hundred years between the end of the surviving Baden in the Budapest region[30] and the earliest date of the Bell Beaker.[31] The two cemeteries are 500 m apart from each other (Fig. 3).[32]

3. DESCRIPTION AND EVALUATION OF THE SITE

3.1. Grinding equipment

There are very few stone implements connected with grain grinding that could possibly be explained by the site's character (as it is a cemetery). One fragment from a grinding slab was in Pit 151, and two handstones came to light from urn graves (multiple tools for grain grinding and pounding, chopping, Fig. 4: 3–4). One was secondarily used and remade from an original axe or weight. The geological source of the pebbles was potentially the Danube and its tributaries, while the sandstone came from the Hárshegy Sandstone Formation in the central-southern part of the Buda Mountains. Both are local or regional quarries.

3.2. Pebbles: choppers, polishing pebbles, handstones, anvils on natural pebble forms

The four unworked natural pebbles without shaping show use-wear (Features 135, 683 and 1219: 2 pcs). They could have served as ad-hoc sharpeners, grinders, polishers of ceramic vessels, stone and metal tools. They could also serve as anvils, choppers/hammers and as multiple ad-hoc tools (Fig. 4: 1, 5–6).

3.3. Axes and celts

There were three axes/celts in the inventory. Two were celts from one feature (Grave 1118), with similar function but different in size (Fig. 4: 11–12). The function of the third could not be determined; perhaps it was a fragment from a shaft-hole axe (Fig. 4: 14). Two other fragments were possibly also axes/celts. In Grave 1118 there may have been three celts originally. (In the diary of János Kalmár there were three.) Grave 1118 is a child's urngrave with chipped stones, a polisher and a wrist-guard near the celts. Features 249 and 1118 are graves; other finds came to light from round ditches. The raw materials of the celts suggest far-distance exchange (greenschist or blueschist and serpentinite from the Carpathians), but their exact source is yet to be clarified: we should use more complex investigation alongside microscopic analyses to clarify this.

In Bell Beaker cemeteries the axes/celts are very rare grave goods. Jerzy Kopacz and his colleagues investigated Central European finds, and from 31 cases they found only one such find.[33] On the basis of their research

[26] Horváth 2012.

[27] Dani, Horváth 2012.

[28] After Reményi 2009: 2800/2700–2500 BC.

[29] Budakalász–Luppa-csárda, Baden cemetery, located now at Budakalász–Dunai-Kis földek: Siklósi 2009; Horváth 2012, 2013.

[30] The latest date from the cemetery of Budakalász–Luppa-csárda Baden cemetery is VERA-3544: Grave 158, 2820–2740 calBC, 1 σ, 2890–2620 calBC, 2 σ: Siklósi 2009, 462.

[31] Budakalász M0 / Site 12 located now at Budakalász–Csajerszke. The earliest dates are: Deb-13930, Feature 303, human bone, 3945 BP ±50, 2551–2350 calBC, 1 σ; and VERA-4724, human bone, 3940 BP ±35, 2500–2300 calBC, 1 σ.

[32] For the complex relation between the Late Copper Age Baden and the Early Bronze Age Bell Beaker cemetery see also Horváth 2013, Figs 1-2.

[33] Kopacz, Přichystal, Šebela 2009, 105.

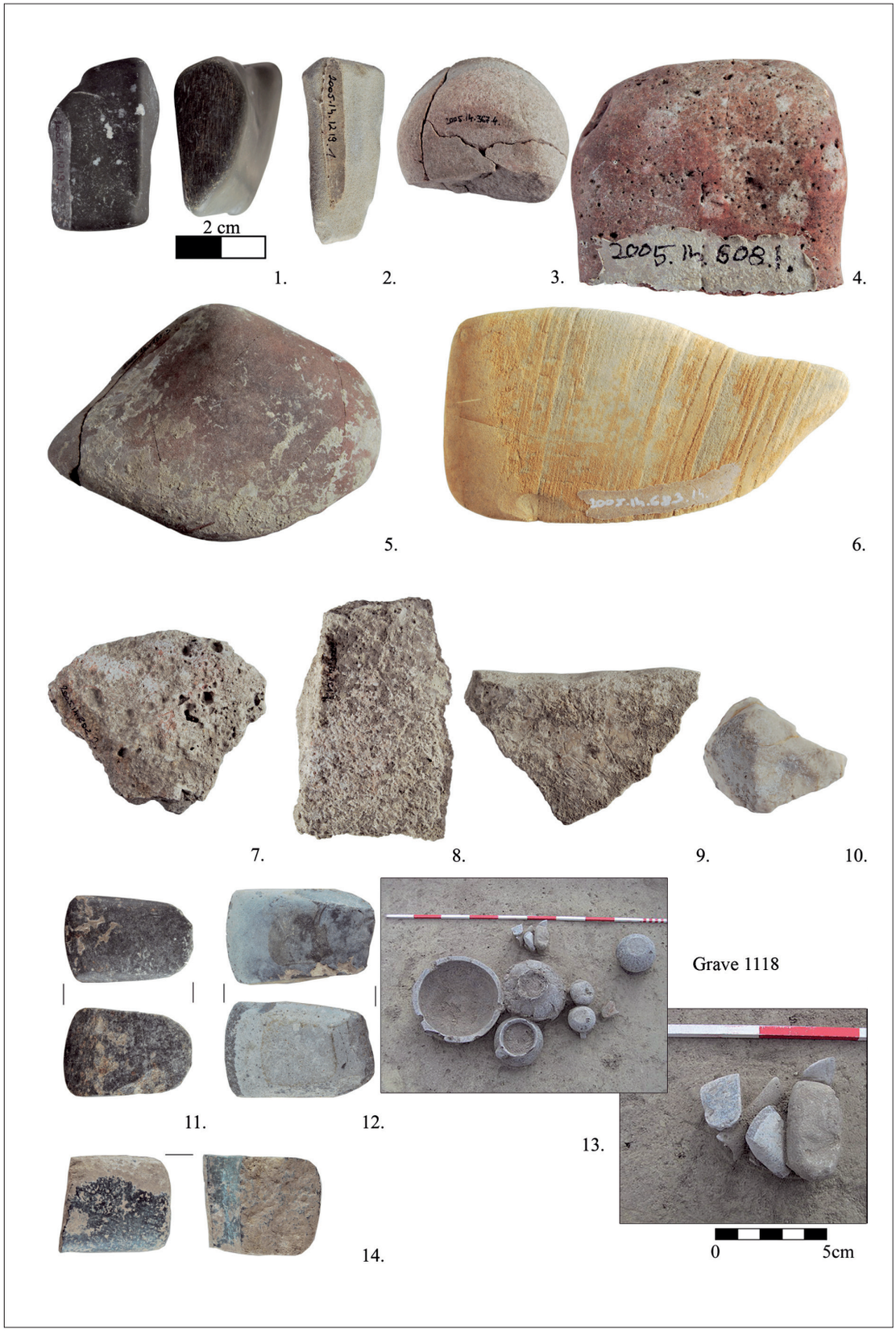


Fig. 4. Stone tools from the site: polishers, handstones, anvils and celts.

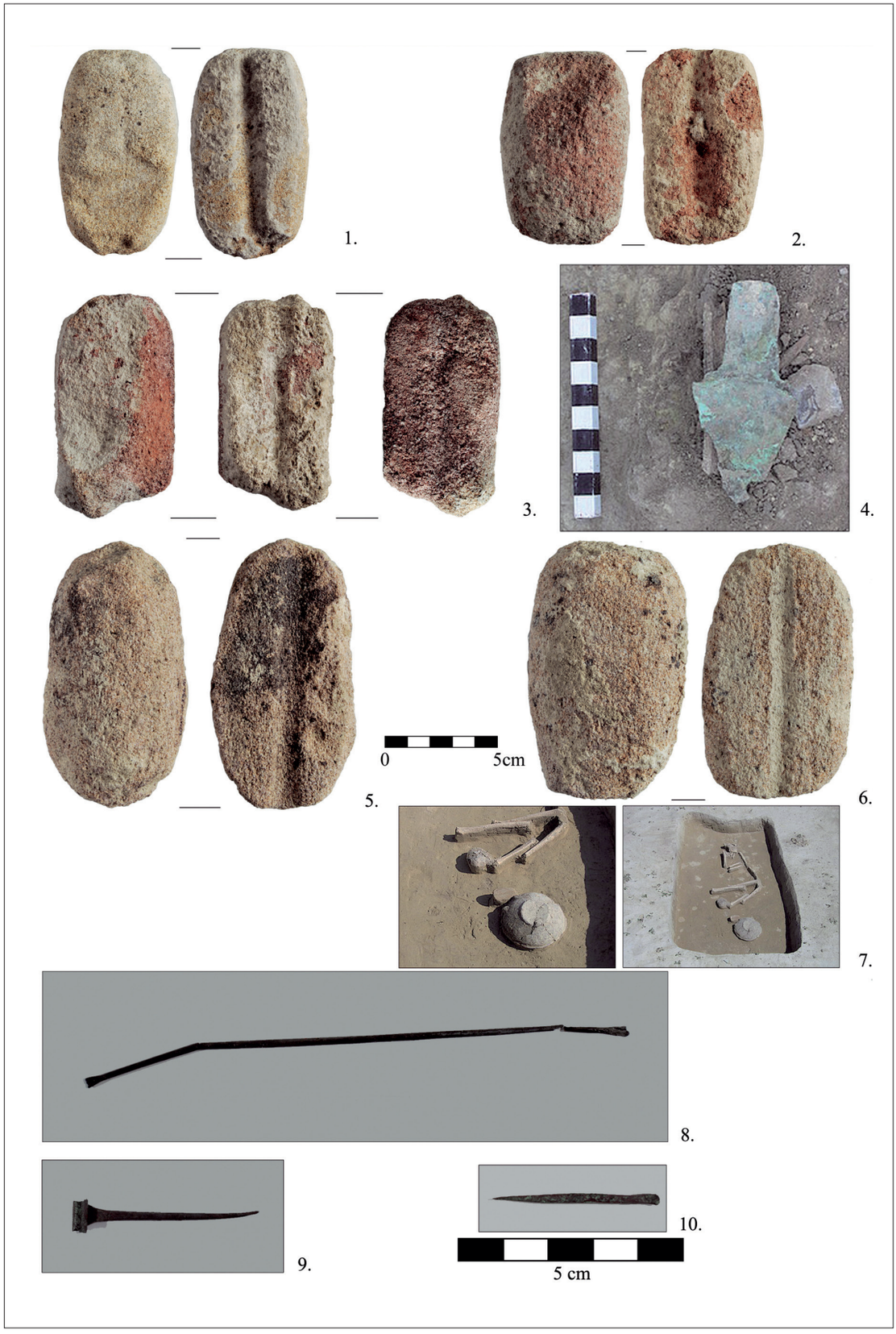


Fig. 5. Stone cold moulds and their possible products from copper at the site.

the most frequent raw material type of this central European region is amphibole and amphibole-type rocks (e.g. metabasites, diorite, porphyry). The finds at Bell Beaker sites have wholly polished bodies; they are oval in cross-section and have chisel-edges. The authors suggested that they could have been prestige or symbolic objects rather than real tools.

3.4. Polishers (Moulds?)

The uniform tool type (5 pcs), appearing in similar sizes and form, and with similar use-wear, and also with incisions of metal finds, could be a multiple tool type and used for purposes other than polishing (Fig. 5: 1–3, 5–6). Perhaps it was suitable to shape wrist-guards (see the half-made product from Feature 1192, Fig. 8: 11), or moulding/smithing in cold or hot fashion, shaping, sharpening and resharpening metal products. The needle-head incision in the one from Feature 702 is similar to that of the copper needle from Grave 467 (2005.14.467.13) (Fig. 5: 10); the incision in the tool from Feature 1118 is similar to the shape of the copper needle from Feature 1034 (2005.14.1034.3) (Fig. 5: 9). The size of the copper needle from Grave 1034 is identical to the size of the incision in the tool from Grave 1118. The latter, however, could be misleading, because metal products changed their original size during hot or cold shaping, hammering and use. Thus, for example, the size of the mould from Grave 467 is smaller than the metal product from Grave 1082 (2005.14.1082.4) (Fig. 5: 8), but on the use surface of the mould, only the head of the needle was observable. The incision in a tool from Feature 105 was not from a needle: rather it forms a dagger; its size is quite similar to the copper dagger from Grave 847 (Fig. 5: 4).

The metal products (copper and bronze) of the Bell Beaker Culture found in Hungary were made similarly to the Spanish Bell Beaker metal finds, but Hungarian metal finds were made by the long process (casting + cold working + annealing + cold working: a long *chaîne opératoire*).[34] The so-called polishers were used as moulds in cold working/hammering processes, and perhaps in the following, tempering/heating process. 'Cold' moulds with the hammered metal products were put into the fire/furnace to facilitate easier forming. The black coating on the surface of the find from Feature 276 suggests a similar procedure. (This technical process, among others, was also used in the Middle Bronze Age.[35])

The raw material of the stone finds is red or grey sandstone. Their possible source is the Buda Mountains, their central-southern part (Hárshegy Sandstone Formation). Their bases are flat and worn, suggesting that they were used as hand tools, and on a flat surface as well. The sandstones have 1–2 hardness on the Mohs scale. There were two pieces in Grave 276: they were placed in the southern part of the gravepit with pots, near a bowl. Grave 276 was an inhumation of a 23–40-year-old man. Grave 1118 was a scattered urngrave of a 1–7-year-old child. One piece was excavated in a round ditch.

3.5. Wrist-guards

The description of the wrist-guards (1 part-finished, Fig. 8: 11, and 34 finished pieces or fragmented ones, Figs. 6–9) is based on the papers of Woodward, Kuijpers and Turek. I also used the petrographic determination of geologist János Kalmár, from 2006, although his study contained only very few Bell Beaker finds.[36]

[34] Reményi *et al.* 2006.

[35] See Horváth 2004, Figs. 3: 3, 4: 2, Figs 7-12, Fig. 14: 2, Figs 15-16; Horváth 2012a, Figs. 6, 7: 2, 8: 1, 9: 1, Figs 14-15.

[36] András Czene did not support the further destructive petrographic investigations of the lithic finds after their initial description made by J. Kalmár (which was part of the regulated preliminary excavation report of the site). After all, in the case of world-wide stone raw materials (like clay, aleurolite/siltstone, sandstone, schist, quartzite etc., not quarry- or mine-specific raw materials) occurring on this site, these methods can not apply successfully and efficiently. In generally their potential geological sources are close to the archaeological site.

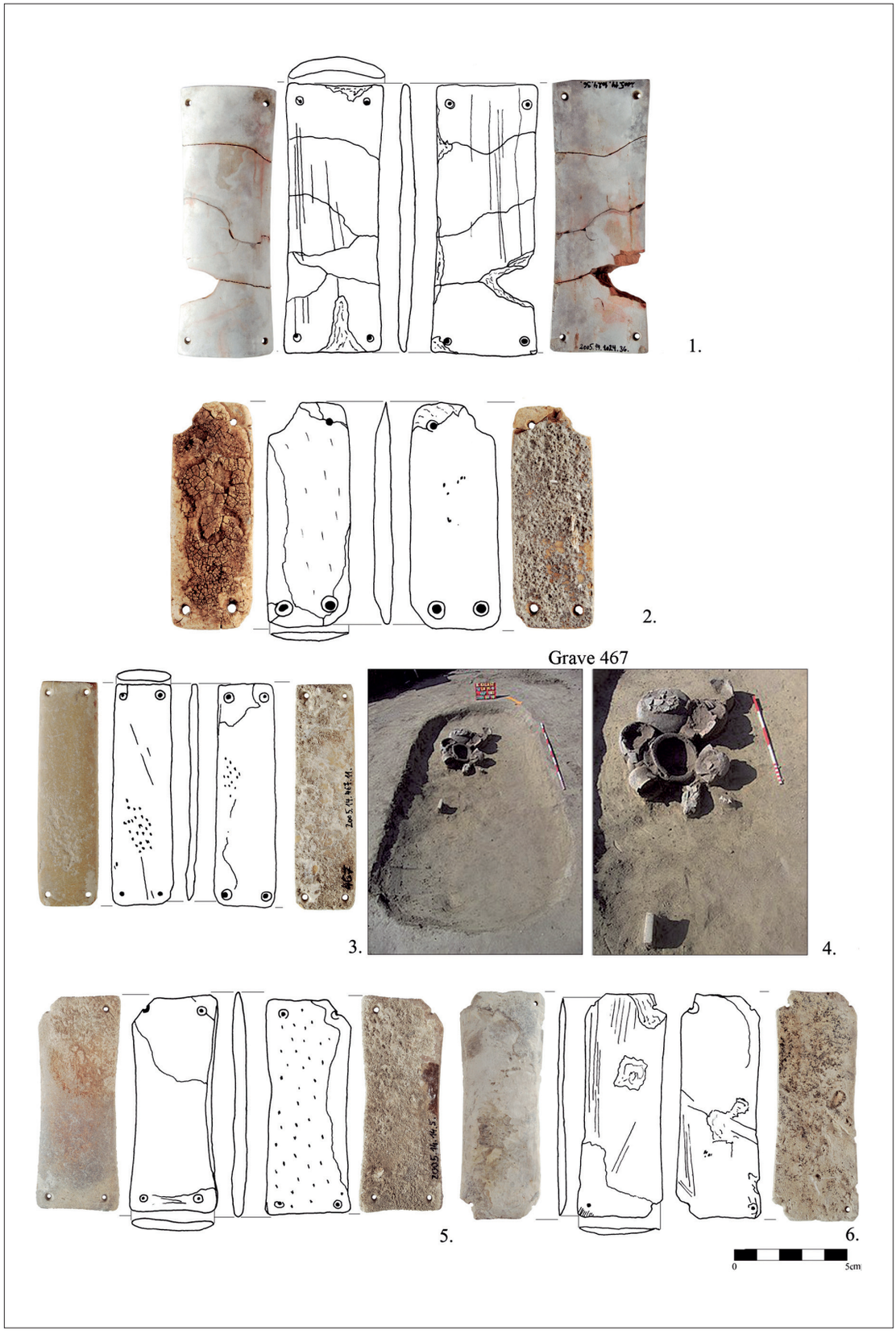


Fig. 6. Wrist-guards.

Fig. 7. Wrist-guards.

Fig. 8. Wrist-guards.

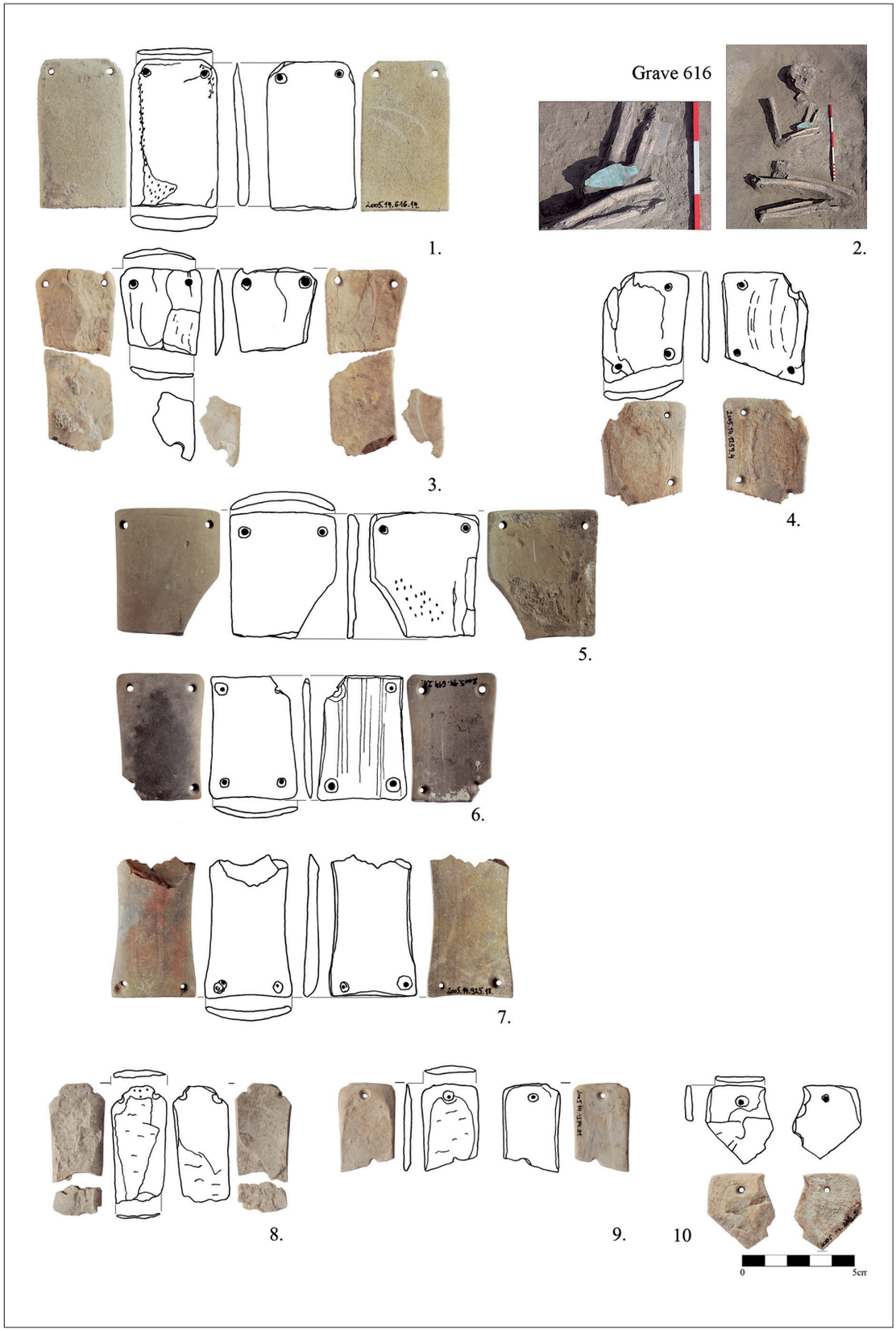


Fig. 9. Wrist-guards.

I have grouped and classified the finds according to the following aspects:

3.5.1. Form:

– Trapezoid: Features 14, 106, 107, 157, 185, 196, 285, 347, 467, 530, 551, 847, 884, 901, 936, 979, 990, 1024, 1082, 1118, 1118/10;
– Rectangular: Features 278, 1265/2;
– Square: Features 614, 1259, 1274, 1288?;
– Narrow: Features 467, 1265/2, 1265/3;
– Uncertain fragment: Features 171, 203, 484, 616, 925, 945, 1265/3.

3.5.2. Cross-section:

– Rectilinear (flat-flat/'pp'): Features 157, 203, 467, 616, 936, 1265/2;
– Bi-convex ('bc'): Feature 936;
– Flat-convex ('pc'): Features 157, 285, 467, 901, 1118/10, 1274;
– Concavo-convex ('cc'): Features 14, 106, 107, 171, 185, 196, 278, 347, 484, 530, 551, 614, 616, 847, 884, 925, 945, 979, 990, 1024, 1082, 1118, 1259, 1265/2, 1265/3, 1288.

3.5.3. Size:

– Small (less than 60 mm): Features 614, 945, 1259.4, 1288;
– Small-medium (60–70 mm): Feature 884;
– Medium (70–80 mm): Features 106, 171, 196, 278, 347, 530, 936, 1118/29, 1118, 1265;
– Medium-large (80–100 mm): Features 14, 107, 157, 185, 285, 467, 551, 616, 847, 925, 990, 1082;
– Large (100–120 mm): Features 901, 1024.

The largest find was in Feature 1024 (119 mm, grave of an adult man, Fig. 6: 1); the smallest was in Feature 614 (54 mm, adult's urn grave, Fig. 9: 6). There is no visible relationship between the size of the wrist-guard and the deceased's age or gender or the height of its former owner.

3.5.4. Number of fixing holes:

– Two, in the middle on the upper and the lower part: Features 203, 1274, 1288?
– Four: Features 14, 107, 157, 171?, 185, 196, 278, 285, 347, 467, 484, 551, 614, 616?, 847, 901, 936, 945?, 979, 990, 1024, 1082, 1118, 1118/10, 1259, 1265/2, 1265/3, 1288?
– Five: Feature 106;
– Six: Features 530, 884.

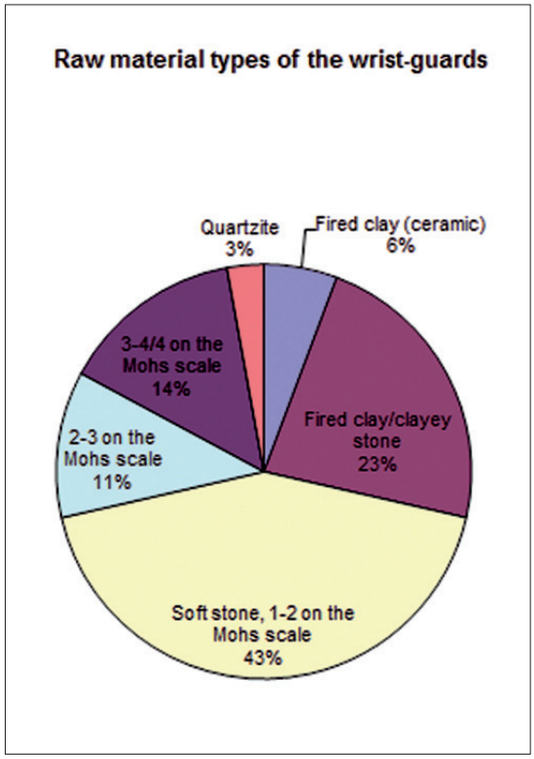


Fig. 10. Raw-material types of the wrist-guards: 35 pieces.

3.5.5. Raw material:

– Fired clay/ceramic, hardness 1–4 on the Mohs scale: 2 pieces: Features 185, 990;
– Fired clay/ceramic or natural clayey stone (cremated?): 8 pieces: Features 107, 347, 551, 925, 936, 1024, 1082, 1118.29;
– Soft stones, hardness 1–2 on the Mohs scale (e.g. sandstone, aleurolite): 15 pieces: Features 285, 847, 945: schist; 196, 203, 278, 484, 530, 616, 979, 1259, 1265, 1274, 1288: aleurolite; 901: not amber;
– Stones, hardness 2–3 on the Mohs scale: 4 pieces: Features 14, 106, 614, 1118.10;
– Stones, hardness 3–4 or 4 on the Mohs scale: 5 pieces: Features 171, 157, 467, 884, 1265.
– Quartzite (hardness 6–7 on the Mohs scale): 1 piece: Feature 1192.

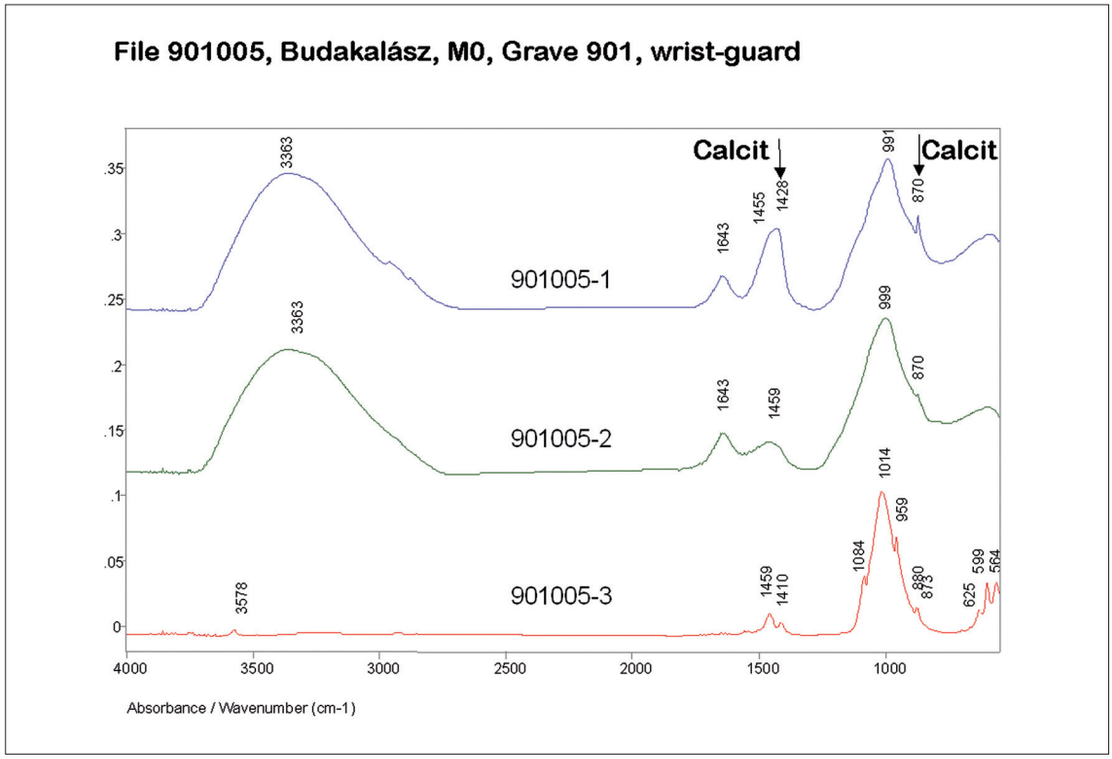


Fig. 11. Wrist-guard of Grave 901. ATR FTIR spectra. 901005-1: outer decoration; 901005-2: raw material of the find; 901005-3: greyish-white layer on the body.

Owing to the fact that holes needed to be drilled in the wrist-guards, their makers generally used soft materials (stones, fired clay) up to hardness 3–4 on the Mohs scale. In this site these are local raw materials, except the part-finished piece from Feature 1192 (Fig. 8: 11). This long, narrow quartzite pebble was sawn along its long axis, but it broke. Quartzite is harder (6–7), and perhaps it was too hard to be finished: in this material, hole drilling is very labour-intensive.

According to the available literature, the majority of wrist-guards were made from non-local raw materials.[37] In the case of Budakalász such a statement cannot be made without special provenance studies of raw materials. Macroscopic analysis is not enough to distinguish between local and non-local raw materials, because the shaping (grinding, polishing of the surface, secondary burning during the cremation, etc.) caused radical changes to the finds' surfaces; therefore petrographic observations are often difficult to make. In many cases, it was even difficult to distinguish natural and artificial materials from each other, that is to distinguish stones from ceramics or clayey materials. (I have tried to use a simple hardness scale to do this). Furthermore, we have to say that, in the case of pebbles, we were not able to distinguish between local and non-local materials either, because both types are present in the sediments of the Danube and its tributaries.

In the case of find 2005.14.901.5 the question was whether it was lightly cremated amber (Fig. 6: 2).[38] FTIR spectra of the find show that it was made of non-organic materials (calcite and carbonated silicate); thus, the amber hypothesis was excluded (Fig. 11).[39] We sampled the burnt inlay, supposedly amber, from the outer layer of the outer face and compared it with the calcined

[37] Kuijpers, Fokkens, Achterkamp 2008, 124; Woodward *et al.* 2006.

[38] Similar to finds from 2900–2700 BC in the Globular Amphorae, Corded Ware, Funnel Beaker and Złota Cultures; see: Czebreszuk 2003, Fig. 10; Furholt 2008.

[39] Special thanks to Judith Mihály for the analysis.

inner face. The latter was bone, and the amber-like material of the outer face was probably a heavily transformed (during cremation) substance of the original stone.

3.5.6. Fire traces:

It was interesting that fire traces occurred not only on the finds from urn graves or scattered urn graves: Feature 616, for example, was an inhumation, and fire traces and calcined bone layers are clearly visible on the finds. Of course, most finds were in cremated graves, and fire traces were caused by the cremation process. This secondary transformation in the raw materials' structure in many cases hindered the determination of the raw materials: it could not be determined whether they were originally fired clays (ceramics) which were fired again, or they were some kind of natural clayey stone that was exposed to high temperature during the cremation.

3.5.7. Repairing, use-wear:

The most vulnerable parts of the wrist-guards are their corners, where the fixing holes are situated. When the corners were damaged or broken [it happened frequently because this part is often in contact with other things (dressing, skin, weapon etc.)], they tried to drill a new hole near the damaged one (e.g. Feature 925, Fig. 9: 7) if there was a place for a new hole. If not, the hole was drilled in the middle (e.g. Feature 106, Fig. 8: 4; Feature 278, Fig. 8: 2; Feature 530, Fig. 7: 10; Feature 936, Fig. 8: 9), or the wrist-guard was reshaped into a smaller one and new holes were drilled in its corners (Features 945, Fig. 8: 7; 1259/4, Fig. 9: 4; 1288/5, Fig. 9: 5) or in the middle (Feature 1274, Fig. 9: 9).

– Secondary shaping: Features 106, 614, 925, 945, 1259, 1274. Part-finished pieces: Features 925, 1265/2. Without holes: Feature 1265/2 (Fig. 8: 8). Secondarily-drilled/repaired: Feature 925 (Fig. 9: 7). Holes in the corners and in the middle: Features 106 (Fig. 8: 4), 530 (Fig. 7: 10), 884 (Fig. 8: 10). Holes only in the middle: Features 203 (Fig. 9: 10), 1274 (Fig. 9: 9).
– Fixing, wearing traces: on the inner face: Feature 196, with reconstruction of the straps (Fig. 8: 3); Features 106, 847, 884, 1082.2; on the outer face: Features 467, 1118.10, 1259.4.

3.5.8. Point decorations:

– Feature 979 (Fig. 8: 5).
– In a line, on the upper part of the outer face: in the middle: Feature 936 (Fig. 8: 9), in composition: Feature 157 (Fig. 7: 5), fragmented: Feature 1265/3 (Fig. 9: 8).
– In a curved line, on the upper and lower parts of the outer face: Features 185 (Fig. 7: 2), 979 (Fig. 8: 5), in the middle: Feature 278 (Fig. 8: 2).
– Green patina/copper trace on the surface: Feature 157 (Fig. 7: 5); on the outer face: Feature 936 (Fig. 8: 9); neither grave contained metal finds!

3.5.9. Wrist-guard with metal finds or other associated finds in the grave:

– With dagger: Features 14, 107, 278?, 285, 616, 847, 1108?, 1288?;
– With metal sheet (from a dagger or from other finds): Features 278, 1108, 1288;
– With needle: Features 467, 1082;
– With points or arrowheads (lithic): Features 285, 467, 616, 945, 1082.

3.5.10. In-situ observation of wrist-guards in inhumations:

– Feature 616: on the left radius with dagger;
– Feature 847: on the outer side of the arm approximately at its middle, above the wrist; under it there were chipped stones and a dagger;
– Feature 1082: on the left arm turned from its original position by 90°, not in in-situ position.

3.5.11. Two pieces in one grave:

– Features 1024, 1118, 1265. The anthropological description indicates the remains of only one person in the features.

3.5.12. With chipped stone:

– Features 284/285: urn graves; Feature 467: empty grave/cenotaph: artisan's grave(?); Feature 616: inhumation, adult woman; Feature 847: inhumation, adult man; Features 884, 945: urn grave of an adult man; Feature 1082: inhumation, adult; Feature 1118: scattered urn grave of a child; Features 1274, 1288: empty graves.

In 25 cases, wrist-guards were found in cremations (scattered or simple urn graves), in 3 cases they occurred in inhumations, and in 2 cases in other feature types. In 6 cases the anthropologist determined women (Features 14, 196, 484, 530, 616, 990), in 1 case a child (Feature 1118), in 9 cases men, in 4 cases the graves were empty (or symbolic/cenotaph), and in 12 cases the sex of the deceased could not be determined.

On the basis of some in-situ inhumations at the site, the wrist-guards could have been functional and/or decorative parts of clothing.[40] Unfortunately, from the Bell Beaker occupational area we do not know unambiguous finds referring to the way costumes were worn. The only representation appears on the steles of Sion:[41] on four or five steles, decorations made of points are observed on people's wrist, which can be interpreted as wrist-guards or tattoos. In the in-situ cases of the site of Budakalász (five and three observations), in most cases we found copper daggers near the wrist-guards. Perhaps the wrist-guards were also used to sharpen the daggers (the copper's hardness is 2.5–3 on the Mohs scale: since wrist-guards are harder, they could have been used for this purpose). There were only five cases where the wrist-guards were excavated with chipped stones, esp. arrowheads or points, indicating that wrist-guards may have been part of the archer's equipment. Since wrist-guards are more commonly associated with daggers than with arrowheads/points, it is suggested that their function is related to that of daggers: they could have been parts of warrior sets.

[40] Kuijpers, Fokkens, Achterkamp 2008, 2008.

[41] Harrison, Heyd 2007, 152-159.

WRIST-GUARDS IN HUNGARY, ESPECIALLY IN THE BUDAPEST REGION

Published finds:

– Tököl;[42] Békásmegyer;[43] Szigetszentmiklós.[44]

We know many more finds, but they are unpublished. The published finds were discussed only as culture-specific finds, not as individual finds or graves with individual descriptions and documentation. The publications focused on the ceramics and funerary rites. This is the first Hungarian publication where I try to group the Hungarian finds typologically by applying international methodology, and describe their primary geological and archaeological data.

WRIST-GUARDS IN THE GLOBAL DISTRIBUTION AREA

This special find type in the Hungarian nomenclature is called wrist-guard, similar to the English, German, French, Spanish and Italian Bell Beaker terminologies (wrist-guard/wrist-protector/wristlet/bracer). In the international terminology wrist-guards are also called arm-guards/armlets, wrist-bands, bracelets/gauntlets, archer's guard / bow guards).[45]

The classification of the finds is based on their form, cross-section and number of fixing holes. The combinations of these three parameters are used in international coding and classification of the finds.[46] The classification of their form distinguishes three major categories: 'W' (waisted), 'S' (straight), 'T' (tapered). I have supplemented these categories with a narrow and a secondarily reshaped rectangular/square form.

[42] Tompa 1942, Pl. 3: 2; Schreiber 1975, Fig. 14: 9: Grave 70 and Fig. 15: 4: stray find.

[43] Kalicz-Schreiber 1981, Abb. 13: 1: Grave 128 and Abb. 18: Grave 128; Kalicz-Schreiber, Kalicz 2001, Fig. 5: 4: Grave 471; Fig. 6: 2: Grave 471; Fig. 10: 3: Grave 128; Fig. 11: 2: Grave 471.

[44] Kalicz-Schreiber 1981, Abb. 16: 2.

[45] Kuijpers, Fokkens, Achterkamp 2008,, 110.

[46] Kuijpers, Fokkens, Achterkamp 2008,, 112.

Their cross-section is described by four categories: biconvex ('bc'), plano-plano or flat-flat ('pp'), plano-convex ('pc') and concavo-convex ('cc'). The number of fixing holes does not depend exclusively on the function of the wrist-guard. There were specimens with two or four holes even within one site, near each other, but the two-hole version is more common in the Mediterranean-Atlantic Region.

The broad ones more often occur in the central European Region (Bohemia, Moravia, Hungary); the narrow ones mainly appear in other European regions.[47] In considering their cross-sections, the three frequent basic versions are the 'pp', 'pc' and 'cc', which may be related to the way they were worn and to craftsmen's traditions: the 'cc' version is easier to wear but harder to make. In Britain there is a correlation: the more fixing holes they have, the higher their manufacturing standard is.[48] The straight forms with two holes occur only in central Europe, and the ones with four holes are also most common in this region. In England and Scotland 'Wcc' types are the most common, while in Ireland the Atlantic types with two holes.

The exact position of the finds is rarely known: in most cases we have to rely on inappropriate documentation and memories of excavators, which influence new interpretations. The excavators of Amesbury in their first publication, for example, reconsidered their own detailed documentation so as to fit in accepted trends about the use of these objects.[49] On the basis of authentic observations we can say that wrist-guards were not only on the inner side of the arm, but most frequently appear on the outer side of the arm;[50] the most frequent is the B3-position (in 11 graves on the outer side of the arm but under the bone).

The position of the wrist-guards could be functional or decorative; the latter seems more possible. There were only 31 cases where their position could be determined, and only the British and Scottish finds were classified on the basis of their positions.[51] The position of the finds could also be secondary, since their position may have been changed after the burial. Many researchers exclude this possibility. They argue that Bell Beaker graves are narrow and closed places where this could not happen. However, this type of funeral rite (cist grave or wood-frame construction) is not present in Hungary. In most cases wrist-guards were fixed on the lower left arms, on their outer side.[52] Most finds were fixed to the wrist most probably with leather or sinew straps.[53] Most finds have two holes: we do not know how they were fixed properly. It is very interesting that in Moravia there are wrist-guards without holes.[54] The most possible reconstruction for these is that they were fixed on a larger leather bracelet.[55]

In our site, in the cases of the three inhumation graves, the finds were on the left lower arms (they were left-handed archers or they used their left hand to stabilize the bow that they held in their right hand). In one case the find touched the radius, in another case the middle of the arm, and in one case it unfortunately moved after the burial. In the first and second cases the wrist-guard appeared with a copper dagger; in Grave 847, with arrowheads and a copper dagger. It is also important that, in three cases (Features 1024, 1118, 1265), there were two wrist-guards in one feature. It must be noted that it was only Feature 1265 where clearly there were two urn graves inside the feature; thus, the two wrist-guards could have belonged to two people. In the other two features, each person could have worn two wrist-guards. In these cases it is very unfortunate that these are cremations, so

[47] Kuijpers, Fokkens, Achterkamp 2008, 2008, 110; Turek 2015.

[48] Kuijpers, Fokkens, Achterkamp 2008, 2008, 112.

[49] Kuijpers, Fokkens, Achterkamp 2008, 114.

[50] Kuijpers, Fokkens, Achterkamp 2008, 112. Reconstruction: Kuijpers et al. 2008, 113 and Fig. 2.

[51] Woodward *et al* 2006; Kuijpers, Fokkens, Achterkamp 2008, 115.

[52] Kuijpers, Fokkens, Achterkamp 2008,116.

[53] Kuijpers, Fokkens, Achterkamp 2008, 118.

[54] Kuijpers *et al.* 2009, 105.

[55] Kuijpers, Fokkens, Achterkamp 2008, 118.

we have no information on the in-situ positions of the wrist-guards, and anthropological data are also poorer than in the case of inhumation graves. Former finds made from gold, copper and bronze, considered to be wrist-guards, are now viewed as other object types, and not wrist-guards.[56]

Ethnographic literature also mentions many examples of wrist-guards, but not for archers.[57] Therefore, modern archaeological articles suggest that Bell Beaker wrist-guards could have had symbolic meaning, and they may not have been connected with archery at all.

The question is who wore wrist-guards: hunters, warriors, or both? Anthropological data indicate that wrist-guards also occurred in the graves of women and children. Bow, arrow and archery in the Neolithic, Copper and Bronze Ages were part of a masculine character and ideology, in contrast to hoes and plough marks, which were female characteristics. Kuijpers and his colleagues consider that wrist-guards were functional, but at the same time they had cosmological and ideological connotations, and may have marked higher rank in the society, similar to swords in the Late Bronze Age. They had a functional role on the inner side of the arm, but on the outer side it was decoration and had a masculine aspect perhaps connected to archery, and in this regard it protected the arm. But as grave goods they could have held further meanings: offering or gift for the ancestors, token, elite or chieftain symbol, symbol of archery and its associated values, exchange of object between people and the supernatural, etc.[58]

Who were the people with wrist-guards? Were they hunters or warriors, chiefs or ancestors? There is standardisation in the funerary rites and grave goods of the Bell Beaker culture: the wrist-guards are on the wrist with a dagger, or on the chest showing a standard position and status/prestige of the objects.[59] Whatever social status these objects may signify, it seems to be a standardised status. Such similarity in positioning these items is difficult to explain from a prestige-good perspective alone. It would imply that elites dressed more or less similarly all over Europe. It is beyond the scope of the present article to elaborate on this point, but we suggest that the grave goods that accompany Beaker people, both men and women, may have been used to construct representations of an ideal person or people, or indeed ancestors.[60]

The ancestors of the wrist-guards can probably be found in a pre-Beaker Eneolithic culture in Portugal: especially in the Lisbon region, in the Alentejo culture, stone sheets appeared in several shapes and with decorations, which could have inspired later Bell Beaker wrist-guards.[61] The so-called classic group of these hanging objects is similar to the Bell Beaker finds. The function of the finds is also questionable; there are many interpretations similar to what we find in recent publications about the Bell Beaker wrist-guards.[62]

Wrist-guards, with their undetermined function, are the most characteristic find types of the Bell Beaker Culture and part of the BB-set.[63] Although it is a characteristic culture-specific find, there are rare examples that it occurred in other Early Bronze Age cultures as well.[64] These finds could be indicative of interactions between overlapping/neighbouring cultures or Bell Beaker

[56] Kuijpers, Fokkens, Achterkamp 2008, 117-118.

[57] Kuijpers, Fokkens, Achterkamp 2008, 119-123.

[58] Kuijpers, Fokkens, Achterkamp 2008, 123-124.

[59] Cf. Anthony 2007, 137-38, 378-379; in the Late Copper Age: Dani, Horváth 2012, 96 and footnote 139.

[60] Kuijpers, Fokkens, Achterkamp 2008, 125.

[61] Care 2004, 26-28.

[62] Thomas 2011, 47-52.

[63] Heyd 2007.

[64] Novotná, Novotný 1984, Pl. LXXXI: 11: Chl'opice–Veselé Culture; P. Fischl, Kulcsár 2011, 64 and footnote 16: Kiskundorozsma–Hosszúhát-halom, Grave 66, early Maros Culture; Soltvadkert–Felső-csobor, Tiszainoka Grave I, Tószeg–Lapos-halom: Nagyrév Culture; and finally a modified piece, a secondarily reshaped find from Kakucs–Balla-domb, and from the Middle Bronze Age, Vatya-Koszider Phase: Horváth 2004, footnote 75; Horváth 2012, Fig. 10: 7.

immigrants, people who moved into a foreign culture/society, or craftsmen's tradition that survived in the subsequent cultures.

3.6. Chipped stones

Chipped-stone finds (52 tools, 34 debitage flakes: sum 86 finds, Fig. 12) occurred in the following features:

– Feature 177: adult's urn grave; Feature 213: adult's urn grave; Feature 271: adult's urn grave; Feature 233: adult's urn grave; Features 284–285: adult's urn grave + wrist-guard + another BB-set; Feature 467: empty gravepit (cenotaph?) + wrist-guard + another BB-set; Feature 525: adult man's urn grave; Feature 532: adult man's urn grave; Feature 616: adult's (female?) inhumation grave + wrist-guard + another BB-set; Feature 655: adult's urn grave; Feature 668: urn grave; Feature 801: adult man's urn grave; Feature 847: adult's inhumation grave + wrist-guard + another BB-set; Feature 945: adult's urn grave + wrist-guard; Feature 1076: adult female's urn grave; Feature 1082: adult's urn grave + wrist-guard; Feature 1118: child's urn grave + 2 wrist-guards + polisher; Feature 1274: empty gravepit (cenotaph?) + wrist-guard; Feature 1318: adult man's urn grave.

3.6.1. Raw materials

Among the finds, Buda hornstone dominates, but in several colours, indicating several types and sources/quarries in the Buda Mountains. Further raw materials were possibly acquired from the pebble wash of the Danube: lydite (1), radiolarite (1), limnoquartzite (4 pieces). Only further scientific studies would shed light on their provenance.

3.6.2. Size and classification

The size classification follows the work of Jerzy Kopacz and his colleagues (2009): medium-long (ML), 23–27.5 mm; long (L), 27.5–32 mm; very long (VL), over 32 mm. Further new categories for the site examined have also been introduced: short (S), 20–23 mm; and very short (VS), under 20 mm. Three are very short, 10 are short, 14 are medium-long, 10 are long and 2 are very long. The description of the arrowheads and points is based on the work of Robin Furestier (2004, 2008) and Maxence Bailly (2014).

Arrowheads:

– Tanged and barbed, triangular-shaped: 467.42 (Fig. 12: 38) and 467.36 (Fig. 12: 35) – part-finished pieces(?).

– Triangular with concave or very concave base: in general, the ventral surface of the find is flat or not accurately retouched; the dorsal surface is concave with accurate retouching. In most cases the right barbs of the arrowheads are damaged or broken (except 285/9 (Fig. 12: 7) and 467/52-53 (Fig. 12: 28–29): these are damaged on their left barb – perhaps left-handed people used them). When we find more pieces in one feature, their size and type differ, and in many cases their raw materials are also different (Features 285, 945, 1076, 1082, 616, 467). There was one piece in Features 177, 217, 532, 655, two finds in Features 285 and 945, four in Feature 1076, five in Feature 1082, seven in Feature 616 and eight in Feature 467. Tanged types occurred only in a part-finished state on the site.

– Triangular with flat base: 467.48 (Fig. 12: 27).

Points:

– Triangular, slim with oblique base: 467.46 (Fig. 12: 33), 467.47 (Fig. 12: 34).

– Triangular, slim with hollow base: 467.45 (Fig. 12: 32).

– Flat, geometric with transversal shear: 467.39 (Fig. 12: 37), 467.51 (Fig. 12: 31), 467.49 (Fig. 12: 40); part-finished: 467.38 (Fig. 12: 36).

Fig. 12. Chipped stones from the site.

TYPE	TRIANGULAR ARROWHEAD WITH CONCAVE BASE	TRIANGULAR ARROWHEAD WITH FLAT BASE	TRIANGULAR ARROWHEAD, TANGED	FLAT GEOMETRIC POINT WITH TRANSVERSAL SHEAR	TRIANGULAR ARROWHEAD WITH TRANSVERSAL BASE	TRIANGULAR ARROWHEAD, SLIM	ATYPICAL BORER	SAW
PIECES SUM: 86	30	1	2	4	2	1	2	3
% SUM: 100	34.8	1.16	2.32	4.64	2.32	1.16	2.32	3.48

Table 1. Chipped stone tool types on the site

3.6.3. Type list (Table 1)

There were 29 triangular arrowheads and points with concave base (1 part-finished); four were flat, geometric with transversal shear (two among them were part-finished), two slim, and one slim with a hollow base. Borers: two pcs (467.43, Fig. 12: 42; and 1318/4). Saws/cutting edges: two pcs (467.34, Fig. 12: 43; 1118, Fig. 12: 48) and a part-finished piece (467.40, Fig. 12: 45). Fragment from a blade: one piece (Feature 1082). Flakes: seven pieces (Features 213, 467, 616, 847, 1082, 1118). Segment: one piece. Thirty-four debitage flakes, atypical flakes, chips (39.44%). Sum: 86 pieces (100%).

In general, the finds were in the urns or near the urn; in inhumation graves they were situated around the hand or the pelvis, and in empty graves in the southern part of the gravepit with other finds. Grave 467 is an exception.

– Grave 467: 'artisan's grave'. It was an empty pit (without human bones) described by the excavator as a symbolic grave or cenotaph. Near the chipped stones there was a Bell Beaker, two needles and a wrist-guard. Among the chipped stones we found some part-finished pieces. This is the only grave where we identified raw materials not locally available, and this is also the earliest grave in the cemetery (phase IIa, on the basis of the types of the chipped stones). The closest analogy to the grave is the artisan's grave from the Late Copper Age Baden cemetery at Budakalász–Luppa-csárda (Grave 91).[65] On the basis of a recent assessment in 2009, the authors described it to be a boneworker's grave rather than that of a knapper. The tool-kit included ad-hoc and part-finished tools as well as finished tools. This was the reason why Éva Cs. Balogh initially considered that the person was a knapping master, but the quality and number of stone tools in the grave forced her to reconsider this and regard the grave to be that of a bonemaster. Among the bone tools, no. 1 and no. 23 were retouchers (soft hammer/percussion for knapping); the others were antler tusks used as jewellery (9–25), and not bone tools.

The technology and the raw materials of stone tools were very similar in the Late Copper and Early Bronze Ages in the district of Budapest.[66] The local, but very low-quality, Buda hornstone was used in both periods, and pebble raw materials were shaped by splinter technology. This method often resulted in ad-hoc or atypical basic forms made on regular nodules and cores instead of regular flakes and blades.[67] In this regard both graves could belong to flint-knapping artisans.[68]

[65] Korek 1986; Cs. Balogh 2009, 399-400. Description of the grave: Bondár 2009, 68-70 and Pl. XLI.

[66] Horváth 2004a; Horváth 2009; Zandler, Horváth 2010; Horváth 2012b; Zandler, Horváth, 2014.

[67] Kopacz, Přichystal, Šebela 2008.

[68] Horváth 2013.

BELL BEAKER FINDS IN HUNGARY

Szigetszentmiklós–Felső Ürgehegyi-dűlő[69]

– Settlement: sum 65 pieces: raw materials: Szentgál, Hárskút and Gerecse radiolarite types, Buda hornstone, lydite, limnoquartzite (Szurdokpüspöki/Püspökhatvan type), obsidian (Carpathian 1 type). Among the finds there were only six tools: one retouched blade, one end-scraper, one truncated flake, 27 unretouched flakes, four blades and debitage flakes.

– Cemetery: sum 354 pieces, among them 50 tools (34 arrowheads, 10 bifacial retouched saws and blades with saw-like edge with sickle shine, 251 flakes, ten blades – one retouched and one truncated – scrapers and end-scrapers). Similar raw materials occurred in the cemetery and settlement, but in the cemetery new types also appeared: northern flint and Carpathian 2 obsidian (Tolcsva type). The lithic finds in general were placed under the skull, near the skull, near the arms, legs and spine in the inhumation graves. In the urn graves they were near the urn, and in scattered urn graves they were in vessels or among the bones. In symbolic graves they were by the vessels or near the wrist-guard.

– Szigetszentmiklós–Üdülő-sor:[70] sum 66 pieces, 37.9% are Buda hornstone; unretouched flakes and a point. Among the raw materials andesite, obsidian (Carpathian 1), a Cracowian Jura flint saw and an arrowhead from the Gerecse Mountains or Carpathian radiolarite also occurred.

Other Bell Beaker lithic finds in Hungary: depot finds in pots, from settlement pits at Albertfalva: 81% were Buda hornstone, with heating treatment on some finds, Feature 1014: 22 flakes and blades in a jug.[71] Other depot finds: Csepel–Hollandi út, Csepel–Rákóczi út, Feature 12.[72]

[69] Zandler 2012.

[70] Cs. Balogh 1992.

[71] T. Biró 2002.

[72] Cs. Balogh 1993.

CHIPPED STONES IN THE WHOLE DISTRIBUTION AREA OF THE BELL BEAKER CULTURE

On the bases of some larger, regional summaries, we can say that the lithic finds of the Bell Beaker Culture can be classified in some way (as opposed to other opinions), but these finds are not unified: there are considerable regional, spatial and temporal differences.[73]

Analyses in the territory of Southern France have shown that the main types are: hollow-based arrowhead, tanged arrowhead, triangular-shaped flat geometric point with transversal shear, bifacial flat retouched tool, geometric tool, and former types which were used in the Eneolithic (e.g. *Grand Pressigny*).

The summary of the Moravian finds shows that the main type is the segment, but, as with pottery types, there is also syncretism among the lithic finds.[74] Artisans used local raw materials without standardised technical and typological forms mainly based on Eneolithic traditions, generally focusing on the practical usability of the tools. Among several knapping technological methods, the Moravian, Bohemian, Slovakian, Polish and Hungarian Bell Beakers used splintering technology and block-reduction technology.[75] In the region of Budapest, its special local raw material, the Buda hornstone, was used, and it broke into slices. The most general types were the arrowheads, segments, end-scrapers, scrapers, knife-like tools, retouched blades, truncated blades, borers, saws and burins. Regarding the bases of the arrowheads and points, they can be classified into several types (concave, trapezoid, tanged, double tang, oblique/convex). The most important and most frequently used raw materials were local, easily quarried stones, which were sometimes very unsuitable for knapping (general sources: Moravian Gate, Little Poland,

[73] Furestier 2004; Bailly 2014.

[74] Kopacz, Přichystal, Šebela 2008.

[75] Kopacz, Přichystal, Šebela 2009.

Moravian-Slovakian border, Transdanubian radiolarites). Far-distance imported stones occur rarely.

Possible far-distance imported stones occurred among the arrowheads and points; these are characteristic of the early phase of the Bell Beaker. More recently, in the later phases, mainly local stones were used. The assumed imports were not really imported in the early phase – these were non-local materials at a new place where a Bell Beaker community had settled. In these new places, far from their former settlement, many raw materials seem to be imports, but were originally local. Grave 467 then belongs to the IIa early phase, and could have been a flint-knapper's grave.

3.7. Amber

– 1025. (Fig. 12: 46).
Flat, slightly asymmetric disc with a hole in its middle; its surface is eroded; d=9 mm, d of the hole 3 mm.

Feature 1025: adult's urn grave; the bead was at the bottom of the urn. The amber find is reddish-brown, fragmented, not restored. Burnt(?).

Infrared spectra have been recorded, applying attenuated total reflection (ATR) technique (Fig. 13). A Varian Scimitar 2000 Fourier-transform infrared spectrometer equipped with an MCT (Mercury-Cadmium-Telluride) detector and a single reflection 'Golden Gate' ATR accessory (with diamond ATR element) was used. The ATR method allows fast investigation of very small samples (500–1000 micrograms) without any further sample preparation. Perfect contact between the sample and the ATR optical element was assured by a sapphire anvil with a constant 60cNm torque. The investigated wavenumber region was 4000–550 cm^{-1}. Due to the absorption of the diamond ATR element, the region between 2300 and 1900 cm^{-1} is very noisy; this spectral region, however, does not contain significant bands, so the evaluation of the IR spectra

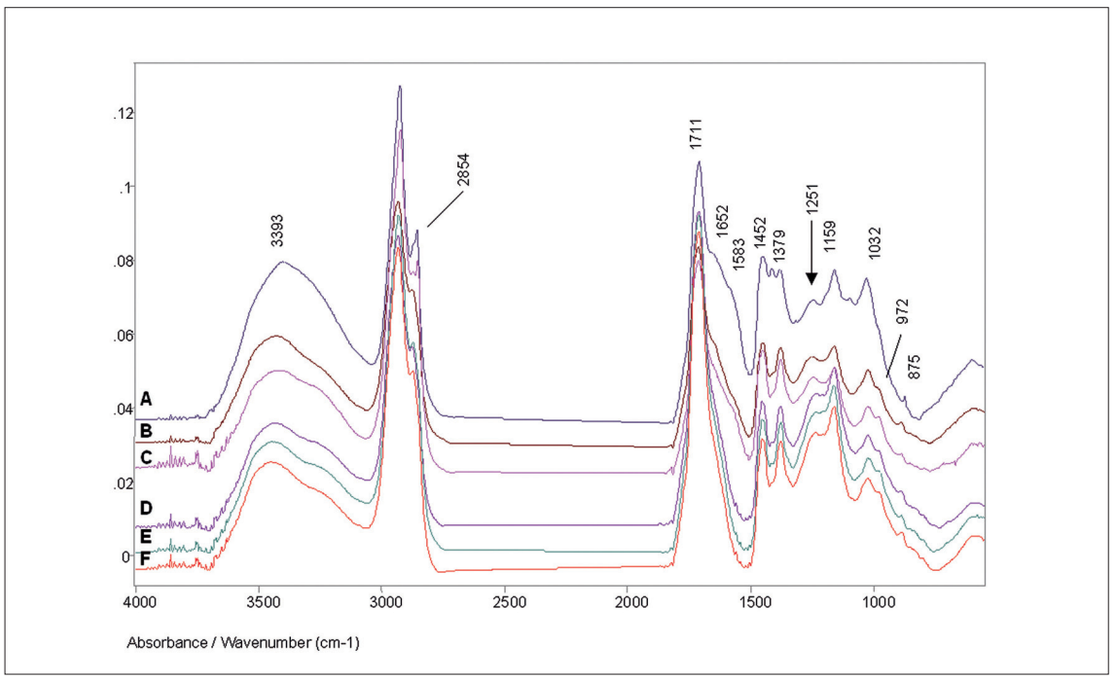


Fig. 13. Amber finds from the Hungarian Bronze Age: ATR FTIR spectra. A-653211 (Kötegyán, depot find, bead); B-1025 (Budakalász M0/S-12, Grave 1025, bead); C-46194868 (Füzesabony–Öreg-domb, settlement layer, bead); D-3195232 (Hernádkak, gravegood, bead); E-11952188 (Megyaszó, Grave 121, bead); F-11952152 (Megyaszó, Grave 95, bead).

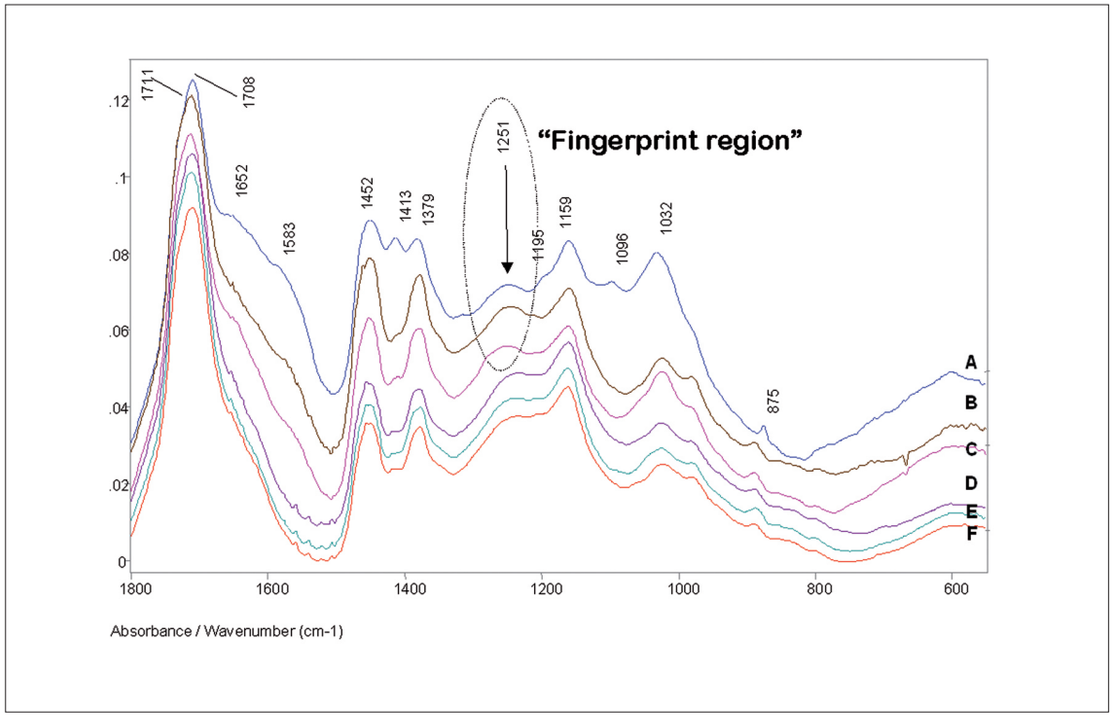


Fig. 14. ATR FTIR spectra of amber finds found in Hungary with the so-called Baltic shoulder around the 1200 cm-1 region ('fingerprint region'). A-653211 (Kötegyán); B-1025 (Budakalász M0/S-12, Grave 1025); C-46194868 (Füzesabony–Öreg-domb); D-3195232 (Hernádkak); E-11952188 (Megyaszó, Grave 121); F-11952152 (Megyaszó, Grave 95).

is not affected. In all cases, the spectra are ATR-corrected, so comparison with reference transmission spectra is also possible (Figs 13–14).[76]

While the group frequency region (4000–1300 cm^{-1}) is very similar for all amber samples, the so-called 'fingerprint region' of the spectra between 1300 and 700 cm^{-1} shows some differences. Several studies have used FTIR spectroscopy to analyse ambers found in archaeological sites, in particular to distinguish Baltic ambers from ambers with other origins. Curt W. Beck and co-workers (1964) showed that Baltic amber has a characteristic "Baltic shoulder" in the IR spectrum: a horizontal shoulder between 1250 and 1110 cm^{-1} is followed by a well defined band at 1159 cm^{-1}. This band at 1159 cm^{-1} can be related to C-O stretching bands of ester groups (likely succinic acid diesters). Bands at 1032 and 972 cm^{-1} also belong to different C-O stretching vibrations.

The IR spectra of the samples analysed show the characteristic bands of amber. The amber sample from Kötegyán (File 653211, sample from the depot find of Gyulavarsánd/Otomani Culture, bead) shows a slightly different spectrum. The additional spectral bands may originate from conservation and/or degradation products from the sample surface. However, a difference in its chemical composition due to its possible Transylvanian origin may also be reasonable. (This sample has the easternmost provenance.)

The magnified fingerprint spectral regions of samples from Megyaszó and Hernádkak (cemeteries of Füzesabony Culture, grave goods, beads) unambiguously show the so-called 'Baltic shoulder' between 1250 and 1110 cm^{-1}. In the spectra of samples from Füzesabony–Öreg-domb (settlement of Füzesabony Culture, bead in the settlement layer) and Kötegyán, the 'Baltic shoulder' is not obvious: the plateau between

[76] See Horváth *et al.* 2015.

1250 and 1110 cm^{-1} is not horizontal, but a new, moderately intense band around 1252 cm^{-1} appears, likely assigned to aromatic ether groups. The shoulders at 1652 and 1583 cm^{-1} in the Kötegyán, Budakalász and Füzesabony–Öreg-domb amber spectra can be related to C=C stretching.

In summary, we can state that, by comparing the ATR-FTIR spectra of amber samples from different sites and cultures of the Hungarian Early Bronze Age, the samples from Megyaszó and Hernádkak are unambiguously Baltic ambers. Samples from Kötegyán, Füzesabony–Öreg-domb and Budakalász show slightly different spectral features (additional C=C and aromatic C-O vibrational bands). Precise resolution of this difference (differences in conservation methods, in natural decomposition products and/or geographic provenance, in this case perhaps from Transylvania) needs further investigation.

4. EVALUATION AND SUMMARY

Evaluating and summarising all lithic finds from the site, classifying them on the bases of feature types, archaeological and anthropological descriptions of the graves, they occurred in the following features:

– Scattered urn-graves: Features 157, 185, 213, 233, 278, 484, 655, 683, 789, 979, 1118, 1216, 1259: 13 cases;

– Urn-graves: Features 14, 107, 171, 177, 196, 217, 249, 284-285, 347, 367, 525, 530, 532, 551, 614, 668, 789, 801, 884, 901, 925, 936, 945, 990, 1024, 1025, 1076, 1108, 1263-1264, 1318: 30 cases;

– Uncertain graves: Features 105, 203: two cases;

– Empty gravepits / symbolic graves or cenotaphs: Features 106, 467, 608, 1219, 1274, 1288: six cases;

– Inhumation graves: Feature 42, child; Feature 276, adult man; Feature 616, adult woman(?); Feature 847, adult man; Feature 1080, adult man; Feature 1082, adult: six cases;

– Children's graves: Features 42, 367, 1118: three cases;

– Men's graves: Features 171, 233, 276, 347, 525, 532, 551, 801, 884, 901, 925, 936, 1024, 1025, 1080, 1318: 16 cases;

– Women's graves: Features 14, 196, 484, 530, 616, 683, 990, 1076: eight cases;

– Other feature types: Features 151, 203, 402, 1039, 1192: five cases.

In the site's assemblage we find characteristic Bell Beaker finds, which are very typical grave goods: most of the stone finds were chipped stones (mainly arrowheads and points) and wrist-guards. Axes or adzes were very rare, just as grinding stones, natural hammers and special stones for metalwork (cold moulds?). Comparing our data with data available from the whole distribution area of the Bell Beaker Culture, the number of stone types and the number of tools from our site is quite similar to other regions. Unfortunately, the comparison of our site with other Hungarian sites is the poorest, because the majority of Hungarian sites are unpublished.

Without financial support I was not able to use special provenance studies and petrographic analyses to characterise the raw materials more precisely. My assessment is based on macroscopic descriptions supplemented by the assessment given by geologist János Kalmár. Distinguishing between natural and artificial raw materials (e.g. artificial clay/ceramic and natural clayey stones, e.g. aleurolite) was very problematic, because most of the stone finds occurred in urn-graves, and these finds were in the pyre and went through drastic heat treatment.

The general view suggests that on Bell Beaker sites there are many imported raw materials, but in the case of our site it is difficult to decide which raw materials may have been imported. There are a few finds which could be far-distance imports, but it is also a possibility that these are alluvial deposits of the Danube that came from distant lands (lydite, schists, quartzites) and were de-

posited by the river in the Budapest region. Because we lack thin-section petrographic or geochemical data it is also possible that the assumed imports were local or regional raw materials (e.g. Gerecse or Carpathian radiolarite). The third possibility is that far-distance raw materials became local when their users settled in the region under examination. The first and earliest Hungarian amber finds (after the Palaeolithic) from the Bronze Age (Reinecke Bz, A0 horizon), from this cemetery, are not typical Baltic ambers, according to FTIR analyses.

It is not evident whether the wrist-guards were part of the archers' equipment or not. The finds from our site occurred most frequently with copper daggers, chipped points or arrowheads, implying that they were part of something else (e.g. polisher of copper dagger?). This is the first site where it has been proved that wrist-guards were also made from fired clay. These new types offer different explanations: clay wrist-guards are imitations of stone objects, and the former substitutes the latter in the graves. It is also possible that clay objects were used in everyday life instead of stone ones. Investigating the hardness of the finds, I found many ceramic wrist-guards which are harder than those made from soft stones. Therefore, we can assume that ceramic wrist-guards were able to serve the same function as stone ones. Artificial materials were perhaps easier to remake, reuse or repair than stones. The problem with interpreting these ceramic finds lies in that they suffered a secondary heat treatment during the cremation (secondarily fired), which probably changed their hardness. Therefore, their original quality cannot be assessed. In many cases, wrist-guards also appeared in females' and children's graves. This fact shades further our assumptions that wrist-guards were part of the hunter/warrior archer's set. Nevertheless, there could also have been children and women hunters and/or warriors who used these objects, mainly if we consider that in prehistory children became 'adults' sooner, and we should also bear in mind the accounts of amazons.[77] It is a fact that wrist-guards associated not only with men and adults. Neither does their size show any kind of correlation with the size of their wearer: the largest finds do not only appear in adult graves. These new observations strengthen the symbolic or decorative functions of wrist-guards.

Among the points and arrowheads there were some new, western-European variants/types, which did not occur in the Hungarian prehistoric material prior to Bell Beakers (e.g. the tanged and barbed ones and the flat, geometric with transversal shear).[78] In general, Central European types dominate in the assemblage: the typical raw materials are local, low quality stones were used, tools were made by splintering and with bifacial retouch, and there are common main types in the Moravian, Polish, Slovakian and Hungarian materials. I registered a certain kind of continuity between the Late Copper Age Baden and Early and Middle Bronze Age cultures (Nagyrév, Vatya) and the Bell Beaker in the Budapest region in terms of technology, types and raw materials. It is very interesting that symbolic Grave 467 contained many part-finished finds; therefore it is considered to be an artisan's grave, but no human remains were found in the grave.

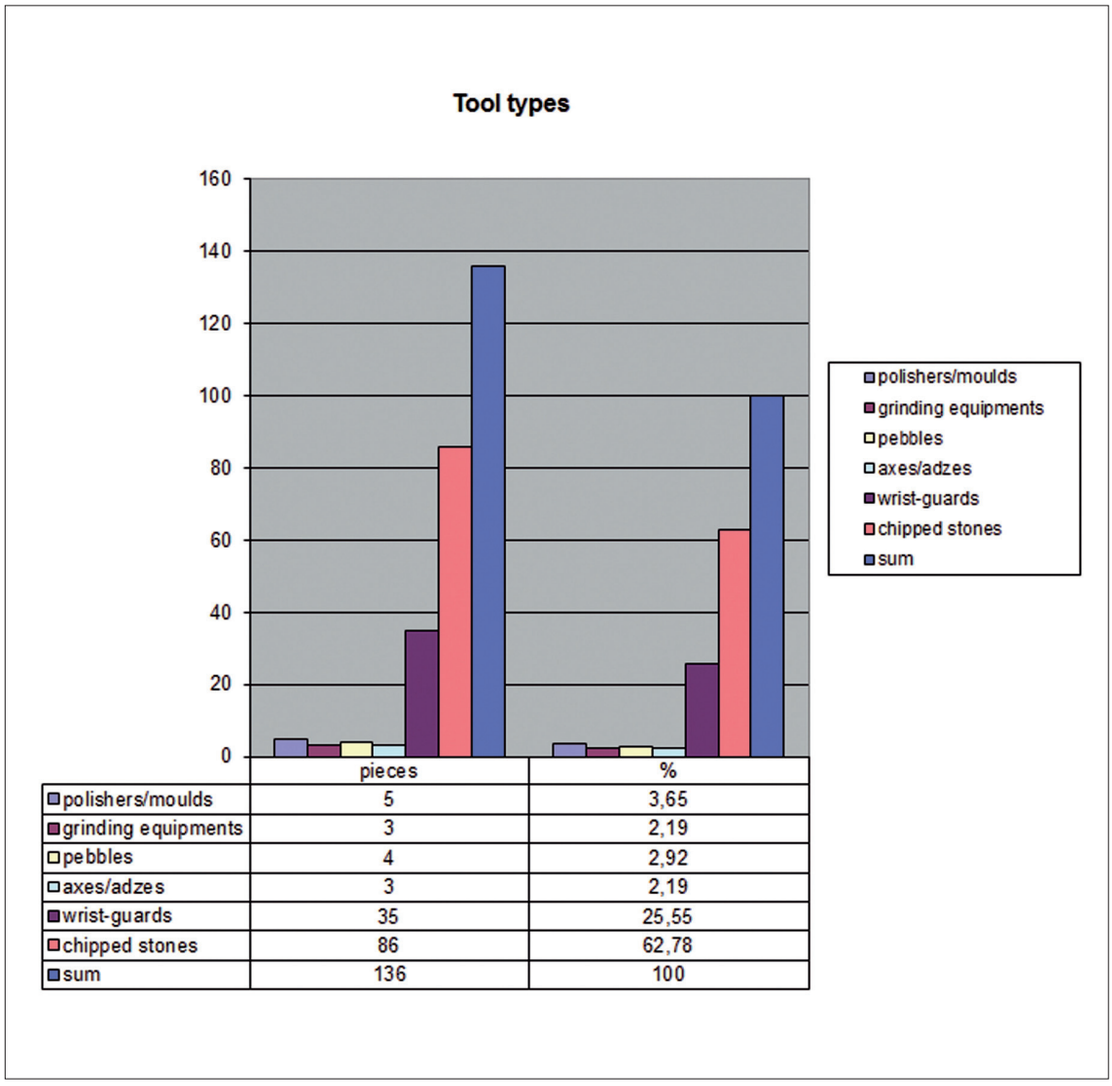
It is also a new observation that sandstone polishers/moulds are connected with special metalworking practices of the Bell Beaker.

[77] Turek 2015, 38.

[78] Bailly 2014: "*This division, however, actually hides an ever-increasing number of paradoxes and contradictions. By investigating the geographical spread of arrowhead types in Bell Beaker contexts, several observations emerge, namely: 1) there is not a single Beaker arrowhead type (or a pair of types), but instead several types across Europe; 2) one of these is probably the Palmela point, made of copper; 3) these arrowhead types belong to several long-standing traditions of arrowhead manufacture in Neolithic Europe; 4) the origins of the barbed-and-tanged and the triangular hollow-based traditions are not to be found neither in the Mediterranean, nor in the putative area of origin for the Bell Beaker phenomenon as a whole – an area that has been sought, over several decades, in various parts of Europe (i.e. the Iberian Peninsula, the Netherlands, and the Corded Ware area).*"

Very few finds can be connected with grain grinding and food preparation, but this perhaps should not come as a surprise, since we were assessing cemetery material: such finds are more frequent on settlements. Nevertheless, the small number of such finds may imply that the economy depended less on plants and more on animal husbandry.

The spatial distribution of lithic finds within the cemetery shows some kind of pattern, but at present this pattern cannot be interpreted.



	pieces	%
polishers/moulds	5	3,65
grinding equipments	3	2,19
pebbles	4	2,92
axes/adzes	3	2,19
wrist-guards	35	25,55
chipped stones	86	62,78
sum	136	100

Fig. 15. Stone-tool types of the site.

Table 2. Described stone implements correlated with the features

FEATURE NUMBER	DESCRIPTION	CHIPPED	GRINDER	POLISHER	PEBBLE	WRIST-GUARD	AXE/ ADZE	OTHER BB-SET
14	Urn grave, ♀, 23-x yr					×		Dagger
42	Inhumation, child,							Stone fragment
105	Urn grave?			×				
106	Empty gravepit with pots: cenotaph?					×		
107	Urn grave, 23-x yr					×		Beaker Dagger
151	Pit/Posthole?		×					
157	Scattered urn grave					×		
171	Urn grave, ♂, 23-x yr					×		
177	Urn grave, 23-x yr	×						
185	Scattered urn grave				×	×		
196	Urn grave, ♀, 23-x yr					×		
203	Grave? Pots in round ditch No. 183					×		
213	Scattered urn grave, 23-x yr	×						
217	Urn grave, 23-x yr	×						
233	Scattered urn grave, ♂, 23-x yr	×						
249	Urn grave						×?	
276	Skeleton, ♂, 23-40 yr			××				
278	Scattered urn grave					×		Bronze fragments
284–285	Urn grave	××				×		4 Beakers
347	Urn grave, ♂, 30-50 yr					×		
367	Urn grave, child?		×					
402–380	Round ditch						402: ×	
467	Empty gravepit: cenotaph?	31×				×		2 Beakers, 2 bronze needles
484	Scattered urn grave, ♀, 23-59 yr					×		
525	Urn grave, ♂, 23-x yr	×						
530	Urn grave, ♀?, 23-39 yr					×		
532	Urn grave, ♂, 23-x yr	×						
551	Urn grave, ♂, 23-x yr					×		
608	Empty gravepit?		×					
614	Urn grave, 23-x yr					×		
616	Inhumation, ♀?, 23-59 yr	10×				×		Dagger

FEATURE NUMBER	DESCRIPTION	CHIPPED	GRINDER	POLISHER	PEBBLE	WRIST-GUARD	AXE/ ADZE	OTHER BB-SET
655/4	Scattered urn grave, 23-x yr	×						
668	Urn grave	××						
683	Scattered urn grave, ♀, 23-x yr				×			Beaker
702–712	712: round ditch, stone packing on its end: 702			702: ×				
788/1–789–791–792	Scattered urn grave and urn grave 788–792: round ditches 789: double grave, 791: animal bones, skull						788: ×	
801	Urn grave, ♂, 23-39 yr	×	×?					
847	Inhumation, ♂, 23-x yr	×××				×		Dagger
884	Urn grave, ♂, 23-x yr	×				×		
901	Urn grave, ♂, 23-x yr					×		
925	Urn grave, ♂, 23-x yr					×		
936	Urn grave, ♂, 23-x yr					×		
945	Urn grave, 23-x yr	××				×		
979	Scattered urn grave					×		2 Beakers
990	Urn grave, ♀, 23-x yr					×		
1024	Urn grave, ♂, 23-59 yr					×		
1025	Urn grave, ♂, 23-30 yr							Amber
1039	Pit		×					
1076	Urn grave, ♀, 23-x yr	××××						
1080	Inhumation, ♂, 23-x yr			×?				
1082	Inhumation, adult	9×				×		2 Bronze needles
1108	Urn grave					×?		Dagger
1118	Scattered urn grave, 1-7 yr	7×		×		××	×××	
1192–(1080)	Round ditch		×			× half-ready		
1216	Scattered urn grave?						×	
1219	Empty gravepit: cenotaph?				××			
1259	Scattered urn grave, 23-x yr					×		
1265?	1265: Pit, 1263–1264 Urn graves					××		
1274	Empty gravepit: cenotaph?	6×				×		
1288	Empty gravepit: cenotaph?	×				×		Beaker, bronze sheet
1318	Urn grave, ♂, 23-x yr	×××						

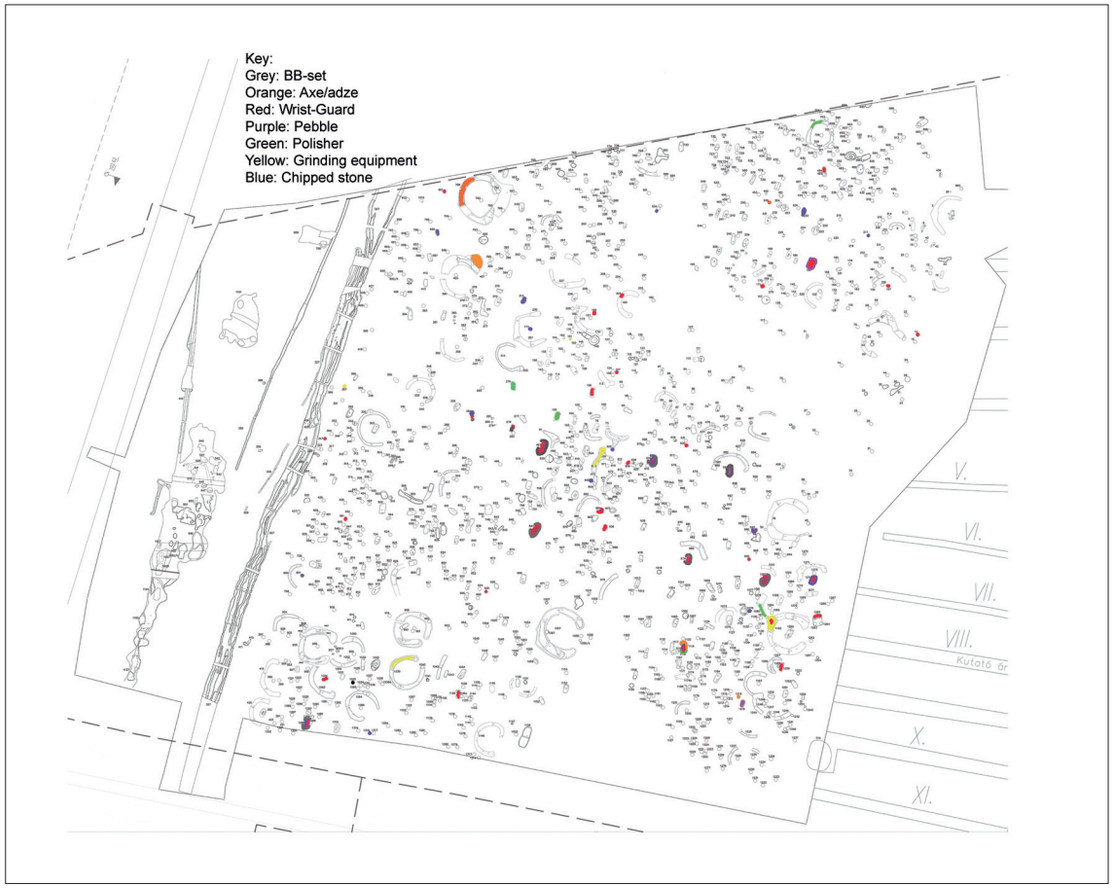


Fig. 16. Map of the site.

APPENDIX

1. Grinding equipment

Lower grinding slabs

- Inv. No. 2005.14.151.1. Middle fragment of a grinding slab with use surface.

Raw material: grey sandstone-pebble conglomerate with medium grainsize, on its base with larger pebbles, red iron-oxide grains are identified in the fabric.

Description: The base and the sides of the fragment are flaking; the tool was originally a saddle-shaped grinding slab or a slanting standing grinding slab with rectangular use surface. Its use surface is smooth, slightly oval in plan.

Size: use surface: 65×111, tool: 112×73×54 mm

Feature 151: pit or post-hole.

Upper grinding stones: handstones

- 2005.14.367.4. Discoidal handstone with cornered sides (Fig. 4: 3).

Quartzite pebble with patina on its side. Broken, 1/3 piece is missing, fire traces on its side, the use surface is smooth.

76×65×55 mm

Feature 367: urngrave of a 1–7-year-old child with stone packing above the urn.

- Feature 608: discoidal handstone with cornered sides, secondary product (Fig. 4: 4).

Quartzite pebble.

Broken, the upper part shows vertical cracks and pointed damage. The upper side is oval in plan and hollowed from the long use life (size: 62×55, 40×30 mm). Along the rup-

ture a drilling hole is clearly visible, which is unfinished: it was not drilled through to the opposite side. The initial product was a shaft-hole axe or a weight; after it had broken it was used secondarily as a handstone.
61×57×47 mm
Feature 608: fragment from a polisher.
Grey, fine-grained sandstone.
Worn, smooth use surface.
130×42×50 mm
Feature 608: empty grave with urn, without bones.

2. Pebbles: choppers, polishing pebbles, handstones, anvils on natural pebble forms

Feature 42: inhumation grave.
Micaceous, yellow sandstone nodule without shaping.
50×37×12 mm
- 2005.14.185.3. Multiple tool: chopper-hammer and polisher-sharpener anvil (Fig. 4: 5).
Quartzite pebble with black, burnt and smoky surface.
Heavy, handfit, broken on its end, on its side there is a black worn patch with thin stripes for sharpening.
145×103×51 mm
Feature 185: Scattered urngrave in a rectangular grave.
- 2005.14.638.14. Anvil(?) (Fig. 4: 6).
Limestone pebble, worn, soft; on the Mohs scale its hardness is 2.
Larger, natural form, handfit with one smoother side with use-wear.
168×90×33 mm
Feature 683: scattered urngrave in a rectangular gravepit with a 23–x-year-old woman with pots; the stone was among the calcined bones.
- 2005.14.1080.4. Two stone tools (Fig. 4: 9).
- 1. Flat stone, not a tool, 95×76×11 mm.
- 2. Perhaps a polisher with one smooth side and short, sharp scratches.
111×67×28 mm
Feature 1080: situated in round ditch No. 1192; the stones were at its end, Grave 1080: inhumation grave of a 23–x-year-old man(?).
- 2005.14.1216.4. (Fig. 4: 10).
White, flat limestone.
151×172×24 mm
Feature 1216: scattered urngrave.
- 2005.14.1219.2. Sharpener (Fig. 4: 1).
Soft (2 on Mohs scale), black lydite pebble, handfit with worn traces created by fingers on its side.
On one of its short sides there are thin, dense scratches: sharpening channels.
73×47×15 mm
- Feature 1219/1: polishing pebble.
Rough pebble with white cortex on its lower side.
Upper side is smooth, its surface worn, handfit with worn traces created by fingers: ceramic polisher(?).
75×35×29 mm
Feature 1219: urngrave without bones, with two pebble tools, which have natural forms; they were probably ad-hoc stone tools.

3. Axes and celts

- 2005.14.249.4. Fragment with a polished side from an axe/celt(?).
Greenschist(?).
54×34×18 mm
Feature 249: scattered urngrave.
- 2005.14.402.25. Fragment from an axe(?).
Grey, amorphous, unworked.
Limestone(?).
On its breaking line there seems to be the line of a possible shaft-hole, but its surface is rough, thus its function is uncertain.
37×44×23 mm
Feature 402 = round ditch No. 380.
- 788.4. Shaft-hole fragment from an axe with its side (Fig. 4: 14).
Greenschist(?).
Fragment from its butt, the side is nicely polished.
49×40×20 mm
Feature 788: round ditch.
- 2005. 14.1118/5. Trapezoid celt (Fig. 4: 12).
Blueschist(?). According to János Kalmár it is basalt.
Medium-sized, robust celt; its backpage is flat; the front is concave; its bit is a chisel-edge, more worn than its back; set use-wear

is visible on its front and back: in the middle of both sides traces of glue are visible; the front with the side is well polished from use; the butt is also worn.
60×40×23 mm
- 2005.14.1118/5. Trapezoid celt (Fig. 4: 11).
Dark grey with light-green patches: diorite(?). According to János Kalmár it is serpentinite.
There is a little cortex-patch on its front, towards the chisel-edge bit. Small, flat, its backpage and butt are damaged; it is a secondary product made from a larger celt that had broken previously; therefore it is thin in cross-section; its front is concave, the back flat, the chisel-edge intact and sharp; the body of the celt is nicely polished.
56×36×10 mm
Feature 1118: scattered urngrave of a 1–7-year-old child.

4. Polishers (Moulds?)

- 2005.14.105.4. Polisher/mould (Fig. 5: 2).
Reddish-grey, medium-grained sandstone with white cortex on its surface.
Its surfaces are polished; its base is worn as a result of long use life. The use surface shows an incised negative of a small dagger. Its width is 11–18 mm; its depth is 4 mm.
Feature 105: empty, rectangular gravepit.
- 2005.14.276.2. Polisher/mould (Fig. 5: 6).
Red, fine-grained, micaceous sandstone with white and black coating on its surface.
Small, semicircular tool; its front is flat; its use surface shows sharpening grooves in its middle; its sides and base are flat. The black coat on its use surface is perhaps a kind of organic (fatty) material used during the melting process.
The size of the stone: 95×56×34 mm, the size of the grooving: 8 mm wide and 2–3 mm deep.
- 2005.14.276.4. Polisher/mould (Fig. 5: 5).
Greyish-red micaceous sandstone.
There is a black coating (organic material?) on the use surface and the right side; on its front the use surface is cracked (as a result of fire?). On the use surface there is an incision of a needle with its head and leg.
The size of the stone: 105×55×30 mm; the size of the incision: 12–14 mm wide and 2–3 mm deep.
Feature 276: inhumation grave of a 23- to 40-year-old man; in the south corner of the gravepit there were ceramic vessels; the polisher was on a bowl.
- 2005.14.702.1. Polisher/mould (Fig. 5: 3).
Reddish-grey, medium-grained sandstone with a white patina on its surface.
Its base is damaged; its left side is worn from long use. On the use surface/front there is an incised form of two needle heads opposite each other.
The size of the stone is 83×45×35 mm; the incisions are 22 mm wide and 2–3 mm deep.
Feature 702: the stone was in round ditch No. 712.
- 2005.14.1118.28. Polisher/mould (Fig. 5: 1).
Grey, fine-grained sandstone.
Its base is worn, with fan-shaped striae on its sides; the upper left side is broken. The front/use surface shows the incised form of a needle: head and leg.
The size of the stone: 83×46×29 mm, the size of the incision: 10–12 mm wide and 3–4 mm deep.
Feature 1118: see the description of the feature above.

5. Wrist-guards[79]

Half-finished piece
- Feature 1192. (Fig. 8: 11).
Long, narrow quartzite pebble, half-broken in its cross-section; it was sawn along its long axis. It is a base form of a wrist-guard. Sawing was also initiated on the outer face, but the saw broke and stuck in the sawn line.
32×67×9 mm
Feature 1192: round ditch with Grave 1080.

Finished pieces

- 2005.14.14.5. (Fig. 6: 5).
Wrist-guard, one of its corners broken. 4Wcc/rectangular.

[79] Their descriptions are provided by increasing inventory numbers using the terms of Ann Woodward and her colleagues, Maikel Kuijpers and his colleagues, and Jan Turek (Woodward et al. 2006; Kuijper et al. 2008; Turek 2015). The illustrations are in increasing size.

Raw material: undetermined stone(?).

Reddish brown, it has hardness 2–3 on the Mohs scale, secondarily burnt during the cremation.

Medium-large-sized, rectangular, concavo-convex in cross-section. Remains of calcined bones appear on its inner face; the upper corner on the outer face is worn; the holes were drilled from both sides.

97×38×4 mm

Feature 14: urn grave of an adult woman (?) with a small mug at the bottom of the urn and with a wrist-guard and a copper dagger with two nails.

- 2005.14.106.1. (Fig. 8: 4).

Wrist-guard, the upper right and lower left corners broken. 4Scc/rectangular.

Raw material: reddish-brown, micaceous stone.

Medium-sized, rectangular with straight sides; the cross-section is concavo-convex; on its upper side there is a hole just as in its middle; the holes were drilled from both sides; on the backpage it is burnt; there are visible traces of use-wear (impression of fitting belts).

76×32×7 mm

Feature 106: scattered urn grave in a gravepit; the wrist-guard was among the burnt bones.

- 2005.14.107.4. (Fig. 8: 1).

Wrist-guard, one of its corners damaged. 4Wcc/trapezoid.

Raw material: greenish-grey, micaceous, hardness 1 on the Mohs scale; it could not be determined whether it is stone or ceramic.

Medium-sized, trapezoid with waisted sides, concavo-convex in cross-section; the inner face is rough; the holes were drilled from both faces; the outer face is oval; the inner face is worn along its long axis from long use life.

84 × 36–31 × 3 mm

Feature 107: urngrave of an adult with copper dagger; the finds were in the urn(?).

- 2005.14.157.3. (Fig. 7: 5).

Wrist-guard, intact. 4Wpc/rectangular.

Raw material: stone, hardness 4 on the Mohs scale.

Medium-large-sized, rectangular with waisted sides, plano-plano in cross-section; there are incised decorations on its outer face among the holes: 3 points in groups opposite each other. There is green copper patina on the outer face; the left holes were drilled from both sides.

93×32×5 mm

Feature: 157: urngrave; the wrist-guard was outside the urn on its east side, near Feature 158. In the grave there were no metal finds.

- 2005.14.171.6. (Fig. 8: 12).

Wrist-guard, broken in its lower part. Originally it was 4Wcc(?).

Raw material: grey stone, hardness 4 on the Mohs scale; there is rough, white cortex on its outer face.

Medium-sized, strongly concavo-convex in cross-section; on the inner face it is cracked (fire trace?); the upper holes were drilled from the inner face. The outer face shows marks of post-excavation cleaning.

66×33×6 mm

Feature 171: urn grave of an adult man; the wrist-guard was near mug no. 3.

- 2005.14.185.2. (Fig. 7: 2).

Wrist-guard in two pieces (broken during cremation); a small part of it is missing. 4Scc/trapezoid.

Raw material: reddish-grey fired clay, hardness 2 on the Mohs scale.

Medium-large-sized, trapezoid with straight sides, strongly concavo-convex in cross-section; it shows pointed decoration on its outer face among the holes on both sides; the holes were drilled from both sides, but mainly from the inner face.

93 × 42–40 × 3 mm

Feature 185: scattered urn grave in a rectangular gravepit; ceramic and stone finds were in the southern part of the pit.

- 2005.14.196.3. (Fig. 8: 3).

Wrist-guard, intact; there are wear traces on its inner face. 4Wcc/rectangular.

Raw material: greenish-brown, hardness 2 on the Mohs scale; it could not be determined whether it is stone or ceramic.

Medium-sized, rectangular with waisted sides, concavo-convex in cross-section;

the holes were drilled from both sides, but mainly from the inner face. From the wear traces it could be reconstructed how it was fitted by belts.
81×35×3 mm
Feature 196: urn grave of an adult woman; the wrist-guard was outside the urn, at its western side.
- 2005.14.203.2. (Fig. 9: 10).
Raw material: yellowish-pink, it could not be determined whether it is stone or ceramic.
Broken, original form was 2pc/(?).
It is an upper part of a wrist-guard. It is uncertain whether it was a wrist-guard or it was reshaped secondarily from a larger wrist-guard into a smaller one: the hole is in the middle, drilled from the outer face.
34×31×3 mm
Feature 203: there were some pots together; it is not a real feature or grave.
- 2005.14.278.1. (Fig. 8: 2.)
Wrist-guard, intact, its upper left corner damaged, 4Wcc/rectangular.
Medium-sized, rectangular with waisted sides, strongly concavo-convex in cross-section, decorated among the holes with 1–1 hole-like points on the upper and lower parts; the holes were drilled from both sides, but mainly from the inner face.
81×35×4 mm
Feature 278: scattered urn grave in a gravepit without bones; the grave was in superposition with another feature. Metal plates and the wrist-guard were on top of pots.
- 285/10. (Fig. 6: 6).
Wrist-guard, broken at its three corners. 4Wpc/trapezoid.
Raw material: grey, it could not be determined whether it is stone or ceramic. It has hardness 1 on the Mohs scale.
Medium-large-sized, slightly trapezoid with waisted sides, plano-convex in cross-section; the inner face is flat with black organic material; the outer face is shiny and worn. On both pages there are thin, vertical and, on the outer face, slanting use-wear lines from long use life. The holes were drilled from the inner face.
98 × 37–35 × 4 mm
Feature 285: Feature No. 284 was an empty gravepit, with pit No. 285: these two were probably one archaeological feature. The wrist-guard was in pit No. 284 while two arrowheads were in feature No. 285.
- 2005.14.347.4. (Fig. 7: 9).
Wrist-guard, one of its corners damaged, restored. 4Wcc/rectangular.
Raw material: it could not be determined whether it is stone or ceramic. It is greyish with red patches; on the inner face there is a strongly burnt thick bone layer.
Medium-sized, rectangular with waisted sides, its cross-section is concavo-convex; the holes were drilled from both sides.
79×38×6 mm
Feature 347: urn grave of a 23- to 50-year-old man; the wrist-guard was inside the urn among the bones and was cremated together with the dead.
- 2005.14.467.11. (Fig. 6: 3–4).
Wrist-guard, intact, 4Spc/trapezoid, narrow.
Raw material: stone(?). Brown; it has hardness 3–4 on the Mohs scale.
Medium-large-sized, slightly trapezoid, long and narrow form with straight sides; its cross-section is plano-convex; the holes were drilled from both sides; the inner face is flat with a calcined bone layer; the lower side of the outer face is worn from long use life.
98 × 27–25 × 5 mm
Feature 467: empty gravepit with 31 pieces of chipped stones and a wrist-guard: 'artisan's grave'.
- 484.5. (Fig. 9: 3).
Upper fragment of a wrist-guard in three separate pieces. Broken, its original form was 4Wcc/trapezoid(?).
Raw material: yellowish-pink, very light, stone(?), fired(?). It has hardness 2 on the Mohs scale.
The two remaining holes on the upper side were drilled from the inner face.
33×33×5, 42×28×4, 33×18×3 mm
Feature 484: scattered urn grave of a 23- to 59-year-old woman with some pots; the wrist-guard was among the bones.

- 2005.14.530.56. (Fig. 7: 10).
Wrist-guard, broken at its three corners, 6Wcc/trapezoid.
Raw material: brownish-grey, stone(?). It has hardness 4 on the Mohs scale.
Medium-sized, slightly trapezoid with waisted sides, concavo-convex in cross-section; there are holes for fixing in the corners and in the middle part of the upper and lower sides; they were drilled from the inner face. The holes in the middle were drilled secondarily after the ones in the corners were damaged. The inner face is burnt from the cremation.
78 × 34–32 × 3 mm
Feature 530: urn grave of a 23- to 39-year-old woman; the wrist-guard was in the urn.
- 2005.14.551.56. (Fig. 7: 6).
Wrist-guard, damaged at its three corners, broken in half, restored; the upper, smaller part is more damaged and burnt. 4Wcc/trapezoid.
Raw material: reddish-grey natural or processed clay, secondarily burnt during the cremation. The white, probably calcareous, inclusions and micaceous sand in its fabric could be naturally present or added as tempering materials.
Medium-large-sized, slightly trapezoid with waisted sides, strongly concavo-convex in cross-section; the holes were drilled from both pages.
90×38×4 mm
Feature 551: urn grave of an adult man; the wrist-guard was at the bottom of the urn, underneath the burnt bones.
- 2005.14.614.21. (Fig. 9: 6).
Wrist-guard, broken at its upper left corner. Secondarily shaped 4Wcc/trapezoid/square.
Raw material: micaceous greyish-brown stone, hardness 1–2 on the Mohs scale.
Small-sized, slightly trapezoid / almost square with waisted sides, strongly concavo-convex in cross-section, secondarily shaped from a broken, larger wrist-guard. On the inner face there are thin, horizontal use-wear striae; the holes were drilled from both sides.
54×38×4 mm
Feature 614: adult's urn grave.
- 612/2: 2005.14.616.14. (Fig. 9: 1.)
Wrist-guard upper fragment, half-broken. Its original form was 4Spp/rectangular(?).
Raw material: yellowish-brown, stone(?). It has hardness 1 on the Mohs scale.
Large-sized, rectangular with straight sides; the outer face is concave, the inner face is flat; plano-plano in cross-section, there is a calcined bone layer on its edge.
67×39×5 mm
Feature 616: inhumation grave of a 23- to 59-year-old woman (?) in contracted position; there was a copper dagger on her left hand; the wrist-guard was on her left arm; 7 chipped arrowheads and 3 blades were near the pots. The wrist-guard was in situ on the radius.
- 847/3: 2005.847.7. (Fig. 7: 1).
Wrist-guard, intact, 4Scc/rectangular.
Raw material: grey, micaceous stone. It has hardness 1 on the Mohs scale. According to János Kalmár it is a Danube pebble, sericite-chlorite schist.
It is rectangular with straight sides, strongly concavo-convex in cross-section; on the outer face there are slanting striae from use wear, while on the inner face the striae are horizontal and thin; the holes were drilled from both sides.
94×34×3 mm
Feature 847: inhumation grave of a 23–x-year-old man in contracted position; there were pots on his legs; the wrist-guard was on his left side on a copper dagger; the dagger was under his left arm; under them there were stones. The wrist-guard was in situ on the outer side of his arm, in the middle, a bit higher than his wrist.
- 2005.14.884.77. (Fig. 8: 10).
Wrist-guard, intact, broken at its lower left corner, 6Scc/trapezoid.
Raw material: greenish-grey stone.
Small-medium-sized, slightly trapezoid with straight sides, slightly concavo-convex in cross-section; the fixing holes are in its four corners and in the middle on the upper and lower parts; the holes were drilled from both sides; there is a red spot and use-wear signs of fixing belts on the inner face.
65 × 26–23 × 4 mm

Feature 884: urn grave of an adult man; an arrowhead and the wrist-guard were at the bottom of the urn.
- 2005.14.901.5. (Fig. 6: 2).
Wrist-guard, damaged at its upper-left and lower-right corners, 4Spc/trapezoid.
Raw material: corroded/decomposed or burnt material: stone(?). Its raw material could not be specified, but FTIR-spectra show that it is not amber (Fig. 11).
Large-sized, slightly trapezoid with straight sides, plano-convex in cross-section; the holes were drilled from both sides; the upper ones were mainly drilled from the inner face; on the inner face there is a calcined bone layer.
100 × 37–39 × 6 mm
Feature 901: urn grave of an adult man; the wrist-guard was in the urn.
- 2005.14.925.18. (Fig. 9: 7).
Wrist-guard, half-broken, lower fragment. It was 4Wcc(?) originally.
Raw material: reddish-grey fired clay, hardness 2 on the Mohs scale; it shows schist-like layered texture caused by the cremation; the inner face shows wood-texture resulting from the long-lasting high temperature.
It was originally medium-large-sized, concavo-convex in cross-section, repaired: the lower, left hole was drilled again secondarily; it was drilled from both sides, but the repairing hole was drilled from the outer face.
Feature 925: urn grave of an adult man.
- 2005.14.936.56. (Fig. 8: 9).
Wrist-guard, damaged in its lower part, burnt: on its inner face there is a grey, burnt layer; 4Wbc/trapezoid.
Raw material: fired clay(?). White, layered and worn texture (3 layers are visible in cross-section, possibly as a result of cremation); it has hardness 1 on the Mohs scale.
Medium-sized, slightly trapezoid with waisted sides, bi-convex in cross-section, decorated on its outer face(?). Among the fitted holes there is another point-like hole, which seems to be a decoration; the holes were drilled from both sides; the outer face is slightly concave, the inner face is flat; in the middle of the outer face there is a greenish patch; horizontal thin striae also appear on the outer face; the inner face is worn from long use-life.
68×29×6 mm
Feature 936: urn grave of an adult man.
- 2005.14.945.36. (Fig. 8: 7).
Wrist-guard, half-broken into two pieces, but there are missing parts. Secondarily shaped, the original form was 4Wcc/trapezoid, now it is a half-finished product: 2/trapezoid or 4/square.
Raw material: yellowish-grey sandstone(?). It is trapezoid in shape(?), concavo-convex in cross-section, the original surface remaining only at the upper left corner; the other parts are damaged. The upper holes were drilled from both sides, but mainly from the inner face; it was originally a large-medium-sized wrist-guard; the intact lower fragment was reshaped into a smaller wrist-guard, and its maker started to drill a hole in its upper corners, but the drill broke in the hole.
56×40×5, lower: 51×39×3 mm
Feature 945: urn grave of an adult; there was an arrowhead outside the urn; the wrist-guard pieces were at the bottom of the urn, placed opposite each other.
- 2005.14.979.6. (Fig. 8: 5).
Wrist-guard, intact, 4Wcc/trapezoid.
Raw material: brown, stone(?). It has hardness 1 on the Mohs scale.
Medium-sized, slightly trapezoid with waisted sides, strongly concavo-convex in cross-section; the outer face is shiny, worn; on the inner face there are thin, horizontal striae (use-wear); the outer face is decorated with points in line; the fitting holes were drilled from both faces.
75×36×3 mm
Feature 979: scattered urn grave in a pit with some pots; the wrist-guard was among the bones.
- 2005.14.990.3. (Fig. 7: 7).
Wrist-guard, broken at its upper-right and lower-left corners, half-broken, restored, 4Wcc/trapezoid.
Raw material: grey, fired clay, hardness 1 on the Mohs scale.

Large-medium-sized, slightly trapezoid with waisted sides, strongly concavo-convex in cross-section; the holes were drilled from both sides, but mainly from the inner face. The left side of the tool is more damaged/worn; perhaps it often slipped to this side when it was used.
90 × 34–36 × 4 mm
Feature 990: urn grave of an adult woman; the wrist-guard was among the bones at the bottom of the urn.
- 2005.14.1024.36. (Fig. 6: 1).
Wrist-guard, fragmented, restored from several pieces, but some pieces are still missing; it was burnt during the cremation; 4Scc/rectangular.
Raw material: fired clay, secondarily burnt(?). Its cross-section is red, the surface greyish-brown; no tempering could be identified. It has hardness 2 on the Mohs scale.
Large-sized, rectangular with straight sides, strongly concavo-convex in cross-section. The four holes were drilled from both pages; both ends are shiny from long use. On the outer face outer face there is use-wear of sharp horizontal striae. Its edge is chipped as a result of high temperature during the cremation.
119×42×6 mm
Feature 1024: urn grave of a 23–59-year-old man.
- 2005.14.1082.5. (Fig. 7: 3–4).
Wrist-guard, broken at its upper-left and lower-right corners, 4Scc/trapezoid.
Raw material: red, fired clay, hardness 1 on the Mohs scale.
Medium-large-sized, slightly trapezoid with straight sides, strongly concavo-convex in cross-section; the holes were drilled from the inner face; both pages are horizontal; both sides show sharp striae (use-wear).
91×39×3 mm
Feature 1082: inhumation, adult in contracted position in round ditch No. 1019; the wrist-guard was near the left arm, across the bone, not in in-situ position. There were arrowheads, copper needles and chipped stones just by the right pelvis. In the south corner of the gravepit there was a posthole with stones.
- 2005.14.1118/10. (Fig. 8: 6).
Wrist-guard; it is a whole piece, but damaged at its upper right corner, 4Wpc/trapezoid.
Raw material: yellowish-grey stone(?). Its hardness is between 1 and 3 on the Mohs scale; according to János Kalmár it is ceramic. On its outer face outer face there is a burnt bone layer, which cemented to the wrist-guard during the cremation.
Small-medium-sized, trapezoid with waisted sides, plano-convex in cross-section; the inner face is flat; the holes were drilled from both pages.
73 × 33–30 × 5 mm
- 2005.14.1118/29. (Fig. 7: 8).
Medium-sized, slightly trapezoid with waisted sides, concavo-convex in cross-section; the outer face is worn, the inner face is shiny from long use; it shows sharp horizontal striae; the fixing holes were drilled mainly from the inner face.
80 × 38–34 × 3 mm
Feature 1118: scattered urn grave of a child; the two wrist-guards were south of the pots, among stones such as chipped stones, polishers and celts: all stone implements were in one group.
- 1259/3: 2005.14.1259.4. (Fig. 9: 4).
Wrist-guard, half-broken, secondarily reshaped into a smaller one, 4Scc/trapezoid; the original was 4Wcc(?).
Raw material: micaceous stone, hardness 1–2 on the Mohs scale.
Small-sized, secondarily reshaped find; the original was much larger, concavo-convex in cross-section; the holes were drilled from both pages; the upper left corner is broken, the lower left corner is damaged; both pages are worn; the lower side is slanting; the wrist-guard is unfinished.
46×37×4 mm
Feature 1259: scattered urn grave of an adult in a gravepit with several pots; the wrist-guard was among the pots.
- 1265/3. (Fig. 9: 8).
Wrist-guard, broken; the original find was 4Scc/narrow, trapezoid(?).
Raw material: grey sandstone or aleurolite, hardness 2 on the Mohs scale, burnt(?).

Medium-sized, narrow, slightly trapezoid with straight sides; its outer face is fragmented, the inner face is concave; slightly concavo-convex in cross-section; the holes were drilled from both pages; on the upper side of the outer face there are point decorations between the fixing holes.
51×24×3 mm
- 1265/2. (Fig. 8: 8).
Wrist-guard, its upper left corner damaged, 4Wcc/rectangular, and narrow.
Raw material: greenish-grey stone: serpentinite or greenschist(?).
Medium-small-sized, long, narrow, rectangular with waisted sides, slightly concavo-convex in cross-section, it has cortex on its outer face; one of the fixing holes is not completely drilled: half-finished; the others were drilled from both pages.
73×23–20×3 mm
Feature 1265: gravepit with two graves but without bones; the two wrist-guards were in the eastern side, in the top layer.
- 1274/7: 2005.14.1274.21. (Fig. 9: 9).
Wrist-guard, half-broken, secondarily reshaped, S?pc/trapezoid-square, originally Wcc/trapezoid(?).
Raw material: grey, micaceous stone, hardness 1 on the Mohs scale.
After the original piece had broken, it was reshaped into a smaller one; the fixing holes are not in the corners, but in the middle of the upper and lower sides; they were drilled from both pages. The places of the original fixing holes – where it broke – were polished. The wrist-guard is plano-convex in cross-section, small-medium-sized; the outer face is damaged.
39×24×3 mm
Feature 1274: rectangular gravepit without bones; the wrist-guard was at the side of the pit where the arm would be if there was a skeleton in the grave.
- 1288/5. (Fig. 9: 5).
Wrist-guard, upper fragment, secondarily reshaped, now 2Scc/square.
Raw material: brownish-grey, hardness 2 on the Mohs scale.
After the original piece had broken, it was reshaped into a smaller one: the lower side is half-finished, not completely polished, strongly concavo-convex in cross-section; the two fixing holes were drilled from both pages; on the inner face there is a calcined bone layer.
57×47×5 mm
Feature 1288: empty gravepit without stones; there were two pots in the middle of the pit, under them an arrowhead, a metal plate and a wrist-guard. The excavation diary also mentions another arrowhead, but it is not in the inventory.

6. Chipped stones

Points and arrowheads

One piece in one feature
- 2005.14.177.4. (Fig.12: 1).
Buda hornstone with cortex.
Arrowhead: S/triangular. Broken at its distal end, the ventral surface is flat; the dorsal surface is convex with fine retouches, on its edge with bifacial retouches. Its base is strongly concave with use-wear shine. Size: 18×20×4 mm.
Feature 177: adult's urn grave; the finds were in the urn.
- 2005.14.217.4. (Fig. 12: 2).
Buda hornstone, burnt.
Small arrowhead: S/triangular. Its background is flat, its dorsal surface convex, its base strongly concave. Size: 18×18×4 mm.
Feature 217: adult's urn grave.
- 2005.14.525.10.
Buda hornstone.
Arrowhead: M-L/triangular. Both surfaces are concave; its form is slim, long, with concave base. At the base, at its right end, it is broken. Size: 24×14×5 mm.
Feature 525: adult's urn grave; the finds were outside the urn.
- 2005.14.532.1. (Fig. 12: 3).
Buda hornstone.
Arrowhead: S/triangular. Both surfaces are concave, small-sized; its base is rectangular, slightly concave. The right end of its base is broken. Size: 20×16×3 mm.
Feature 532: adult's urn grave.
- 2005.14.655.11. (Fig. 12: 4).
Buda hornstone, white version (porcelanite).

Arrowhead: L/triangular. Long, slim form with strongly concave base; its dorsal surface is concave, its ventral surface flat; the right end of its base is broken; slight use-wear shine is visible on its right edge on the dorsal surface and at its distal end. Size: 28×16×4 mm.
Feature 655: adult's scattered urn grave; the finds were among the stones.

Two pieces in one feature

- 285/8. (Fig. 12: 6).
Buda hornstone.
Arrowhead: M-L/triangular. Very slim, flat, but its ventral surface is quite convex; its base is concave, asymmetric; its right end is broken; there are use-wear traces on the right edge of its ventral surface. Size: 25×21×2 mm.
- 285/9. (Fig. 12: 7).
Buda hornstone.
Arrowhead: S/triangular. Small, its base is strongly concave, broken at its left barb (left-handed?); its dorsal surface is concave, its ventral surface flat. Size: 22×17×5 mm.
Feature 285: empty gravepit, together with Feature 284.
- 2005.14.945.36. (Fig. 12: 8).
Buda hornstone, greyish-white version.
Arrowhead: S/triangular. Small, its ventral surface flat; its distal end is blunt. There is use-wear shine on the right edge of its dorsal surface; its base is very concave, slightly asymmetric. Size: 17×18×3 mm.
- 2005.14.945.37. (Fig. 12: 9).
Buda hornstone.
Arrowhead: M-L/triangular. Longer, slim form with less-articulated concave base. Its ventral surface is flat, its dorsal surface shiny; use-wear is stronger on its right edge; the base is broken at its right barb; its distal end is slightly blunt, broken. Size: 27×17×4 mm.

Four pieces in one feature

- 2005.14.1076.25. (Fig. 12: 10).
Buda hornstone, light version.
Arrowhead: M-L/triangular, hollow-based. Its base is concave, asymmetric; its dorsal surface is concave, its ventral surface flat. Size: 27×20×3 mm.
- 2005.14.1076.26. (Fig. 12: 11).
Buda hornstone, dark version.
Arrowhead: S/triangular, hollow-based. Its dorsal surface is concave; its ventral surface is flat, smaller sized with slightly concave base. Size: 21×19×4 mm.
- 2005.14.1076.27. (Fig. 12: 12).
Buda hornstone.
Arrowhead: M-L/triangular, hollow-based. Its base is concave, asymmetric, broken at its right corner; its dorsal surface is concave, its ventral surface flat. Size: 25×17×3 mm.
- 2005.14.1076.28. (Fig. 12: 13).
Buda hornstone.
Arrowhead: L/triangular, hollow-based. Large, its base is slightly concave; its dorsal surface is concave, its ventral surface flat. Size: 28×20×5 mm.
Feature 1076: adult female's urngrave; the finds were among the bones.

Five pieces in one feature

- 2005.14.1082.5. (Fig. 12: 14).
Buda hornstone, white version.
Arrowhead: M-L/triangular, concave-based. Its dorsal surface is concave; its ventral surface is flat. Size: 24×17×6 mm.
- 2005.14.1082.6. (Fig. 12: 15).
Buda hornstone.
Arrowhead: M-L/triangular. Slim, long form with narrow, flat surfaces; its base is asymmetric and very strongly concave. Size: 23×15×2 mm.
- 2005.14.1082.7. (Fig. 12: 16).
Buda hornstone.
Arrowhead: L/triangular. Slim, longer form, large and narrow; its base is asymmetric and concave; both surfaces are flat. Size: 29×17×2 mm.
- 2005.14.1082.8. (Fig. 12: 17).
Buda hornstone.
Arrowhead: M-L/triangular. Slim, longer form, its base is concave, asymmetric; its dorsal surface is concave, its ventral surface flat. Size: 25×16×3 mm.
- 2005.14.1082.9. (Fig. 12: 18).
Buda hornstone with cortex on its dorsal surface.

Arrowhead: S. Its base is slightly concave, asymmetric; the dorsal surface is concave, the ventral surface flat. Size: 21×16×3 mm.
A further 4 chips (Fig. 12: 19):
- Buda hornstone, proximal fragment of a blade; its distal end was truncated in line; there is one ridge on its dorsal surface, no bulb; the platform is diedre with cortex; a soft hammer was used for hitting; 28×16×4 mm.
- Buda hornstone, blade-like atypical flake; there is one ridge on its dorsal surface; 31×17×9 mm.
- Buda hornstone, flake, unworked; the platform is diedre; the bulb is large; 22×30×3 mm.
- Buda hornstone, atypical flake, 30×29×7 mm.
Feature 1082: adult's inhumation grave.

Seven pieces in one feature
- 2005.14.616.15. (Fig. 12: 20).
Buda hornstone.
Arrowhead: L/triangular. Its dorsal surface is concave, its ventral surface flat; the base is concave and asymmetric. Size: 29×17×3 mm.
- 2005.14.616.16. (Fig. 12: 21).
Buda hornstone, white version.
Arrowhead: M-L/triangular. Its dorsal surface is concave, its ventral surface flat, its base slightly concave, asymmetric. Size: 25×18×6 mm
- 2005.14.616.17. (Fig. 12: 22).
Buda hornstone.
Arrowhead: VS/triangular. Small with a strongly concave base, its dorsal surface is concave; its ventral surface is flat. Size: 17×16×3 mm.
- 2005.14.616.18. (Fig. 12: 23).
Buda hornstone, purple version (burnt?)
Arrowhead: M-L/triangular, slightly concave-based. Small, robust, its ventral surface is flat; its dorsal surface is perhaps half-finished without retouches; only the edges are retouched. Size: 23×16×6 mm.
- 2005.14.616.19. (Fig. 12: 24).
Dull, red radiolarite with stripes: Carpathian, or from the Gerecse Mountains(?). Very light: burnt(?).
Arrowhead: M-L/triangular. The base is strongly concave; the dorsal surface is concave, the ventral surface flat. Size: 25×16×3 mm.
- 2005.14.616.20. (Fig. 12: 25).
Szentgál radiolarite.
Arrowhead: M-L/triangular. Slim, longer form, its ventral surface is flat; its base is strongly concave. Size: 23×14×3 mm.
- 2005.14.616.21. (Fig. 12: 26).
Black lydite pebble.
Arrowhead: S/triangular. The base is strongly concave; the dorsal surface is concave, the ventral surface flat. Size: 21×15×3 mm.
Further debitage, Buda hornstone (Fig. 12: 5):
- Two atypical flakes: 34×22×9 and 23×15×6 mm; one typical flake, the platform is diedre; the bulb is small, 27×23×6 mm.
Feature 616: 23–59-year-old female's(?) grave, inhumation, contracted; the arrowheads were near the pots; the wrist-guard was on the left arm.
Grave 467: The 'artisan's grave': 31 chipped stones (Fig. 12: 5).
Longer, slim bifacial points made from orange-white transparent pebble limnoquartzite:
- 2005.14.467.45. (Fig. 12: 32).
Intact point on blade: L/slim, triangular, hollow-based. On the dorsal surface there is one ridge; the edge was bifacially retouched; on the right edge there is bifacial use-wear shine. Size: 34×17×5 mm.
- 2005.14.467.46. (Fig. 12: 33).
Point: broken or truncated at its base: L/slim, triangular. Size: 31×14×6 mm.
- 2005.14.467.47. (Fig. 12: 34).
Point, broken at its distal and proximal ends: M-L/slim, triangular. Asymmetric with rough retouches, on its edge the retouch is a little finer. Size: 26×18×5 mm.
Chip from the same raw material with a hole in its middle (Fig. 12: 44). Size: 28×29×7 mm.

Bifacial, triangular arrowheads with concave base of Buda hornstone:
- 2005.14.467.36. (Fig. 12: 35).
Arrowhead pre-form, slim, atypical flake

with cortex on its dorsal surface: L/triangular, concave-based. Size: 28×23×3 mm.
- 2005.14.467.38. (Fig. 12: 36).
Arrowhead pre-form: VL/triangular. Flat, triangular, atypical flake with concave base and original pebble platform. Size: 42×35×6 mm.
- 2005.14.467.39. (Fig. 12: 37).
Arrowhead pre-form: L/triangular. Flat, geometric with transversal shear. Blade-like, slim, atypical flake segment. Size: 28×14×4 mm.
- 2005.14.467.41. (Fig. 12: 39).
Arrowhead pre-form, triangular with rectilinear base, atypical flake. Size: 48×36×14 mm.
- 2005.14.467.42. (Fig. 12: 38).
Arrowhead pre-form: VL/triangular. Robust, tanged arrowhead, pre-form on atypical flake with original pebble platform at its proximal end. Size: 40×28×8 mm.
- 2005.14.467.48. (Fig. 12: 27).
Arrowhead: M-L/triangular, flat-based. It has a flat ventral surface, does not have a concave base. Size: 25×19×6 mm.
- 2005.14.467.49. (Fig. 12: 40).
Half-finished arrowhead or saw: S/triangular, flat, geometric with transversal shear / denticulated edge(?). Crescent-shaped atypical flake with edge retouch on its left side on its dorsal surface. Size: 23×16×6 mm.
- 2005.14.467.50. (Fig. 12: 41).
Arrowhead pre-form(?). Blade-like flake fragment. Size: 16×14×2 mm.
- 2005.14.467.51. (Fig. 12: 31).
Arrowhead: L/triangular, flat, geometric with transversal shear. Triangular-shaped, atypical flake with one ridge on its dorsal surface, and original pebble platform on its base. Size: 30×20×7 mm.
- 2005.14.467.52. (Fig. 12: 28).
Arrowhead: VS/triangular. Very flat, the left barb is shorter; its base is asymmetric and very concave. Left-handed(?). Size: 20×16×3 mm.
- 2005.14.467.53. (Fig. 12: 29).
Arrowhead: S/triangular. Its dorsal surface is concave, its ventral surface flat, asymmetric; the left barb is shorter; it has a strongly concave base. Left-handed(?). Size: 23×16×4 mm.
- 2005.14.467.54. (Fig. 12: 30).
Arrowhead: VS/triangular. Its ventral surface is flat; the base is concave, symmetric. Size: 20×15×3 mm.

Chips, debitage of Buda hornstone:

- 2005.14.467.24. Atypical initial flake from the core with cortex on its dorsal surface, 41×28×11 mm.
- 2005.14.467.25. Atypical blade-like segment, 34×26×11 mm.
- 2005.14.467.26. Atypical flake, 33×45×7 mm.
- 2005.14.467.27. Atypical flake, 41×29×6 mm.
- 2005.14.467.28. Atypical flake, 35×21×7 mm.
- 2005.14.467.29. Pebble fragment, 46×27×12 mm.
- 2005.14.467.30. Atypical flake, initial from the core with cortex on its dorsal surface, 33×34×10 mm.
- 2005.14.467.31. Flake; its platform is smooth; the bulb is small; 26×22×4 mm.
- 2005.14.467.32. Blade-like atypical segment with cortex on its dorsal surface, 35×23×8 mm.
- 2005.14.467.33. Atypical segment with cortex on its dorsal surface, 27×18×7 mm.
- 2005.14.467.34. Blade-like atypical flake with retouches on its right-lower edge: saw, 24×17×6 mm.
- 2005.14.467.35. Atypical segment with pebble cortex on its dorsal surface, 32×30×7 mm.
- 2005.14.467.40. Blade-like flake; the bulb is in the middle; the platform is diedre; 22×21×4 mm.
- 2005.14.467.43. (Fig. 12: 42). Atypical borer on long, blade-like flake, 42×16×10 mm.

Feature 467: empty gravepit; the finds were in the south end of the pit with pots, a bronze needle and a wrist-guard.

Atypical finds, chips and debitage of Buda-type hornstone

- 213/3. Typical flake; the platform is diedre; the bulb is small, 44×32×6 mm.
Feature 213: scattered urn grave of an adult woman; the find was among the bones.
- 2005.14.233.2. Atypical flake, 32×25×8 mm.
Feature 233: scattered urn grave of an adult man.
- 668.2. 1. Atypical flake, 25×28×5 mm. 2. Atypical flake, 35×18×4 mm.
Feature 668: urn grave(?); the finds were near the pot.
- 801.5. (Fig. 12: 47). Atypical, D-shaped segment with cortex on its dorsal surface, 46×31×13 mm.
Feature 801: urngrave of a 23–39-year-old man; the finds were in the urn.
- 847/5. Flake; the platform is diedre; the bulb is large, 29×30×7 mm.
- 847/7. Blade-like atypical flake with cortex, 36×24×10 mm.
- 847/6. Atypical flake, 38×26×9 mm.
Feature 847: inhumation grave of a 23–x-year-old man with a wrist-guard.
- 1118. (Fig. 12: 48). Four atypical flakes of Buda hornstone: 30×28×8, 31×18×8, 30×17×7, 32×17×7 mm; 1 of limnoquartzite: 39×18×13 mm.
One saw on an atypical flake, Buda hornstone; broken at its ends, it has bifacial retouches on its edge; 33×18×6 mm.
Flake from a pebble; the bulb is large; the platform is smooth; 30×39×10 mm.
Feature 1118: There were two wrist-guards, a polisher and two axes in the grave.
- 1274. (Fig. 12: 50).
Six atypical flakes, burnt: 31×24×7, 30×20×12, 28×19×7, 28×18×8, 28×17×8, 24×20×7 mm.
Feature 1274: empty gravepit with a wrist-guard.
- 1318/4. Two atypical flakes: 37×42×6 and 36×40×13 mm. Atypical borer: 40×21×9 mm.
Feature 1318: urn grave of an adult man; the finds were under the urn.

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Karakterizacija lončarske smjese – makroskopska analiza keramike iz brončanog doba

Characterization of ceramic pastes – a macroanalysis of Bronze Age pottery

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U radu se predstavljaju metoda i postupak makroskopske analize, analiza digitalne makrofotografije svježega loma keramičkog uzorka i načela karakterizacije keramičkih struktura, odnosno lončarskih smjesa. Iznose se prednosti i nedostaci makorskopske metode i daju smjernice za njezinu praktičnu, ali i teorijsku primjenu. Metoda je primijenjena na uzorcima keramike iz brončanog doba s prostora sjeverne Hrvatske, a rezultati su dopunjeni prethodno provedenim mikroskopskim analizama. Utvrđeno je da se sirovinski materijal vjerojatno prikupljao u neposrednoj blizini pretpovijesnih naselja i da su lončari koristili različite vrste primjesa: mineralna zrna, litoklaste, grog, glinovite pelete i primjese organskog podrijetla. Analiza je makrofotografija pokazala varijabilnost u odabiru smjese koju je, prema preliminarnim rezultatima istraživanja, moguće povezati s kronološko-kulturološkim karakteristikama keramičkih posuda.

Ključne riječi: *keramika, tehnologija, metodologija, digitalni mikroskop, lončarska smjesa, glinoviti materijal, primjese, brončano doba*

The paper presents the methods and procedures of macroanalysis, the analysis of digital macrophotography of fresh breakage on pottery samples, and the principles of characterizing the ceramic fabric, that is, ceramic pastes. The advantages and disadvantages of the method were noted, and guidelines for its practical, as well as theoretical application are provided below. This method was applied to Bronze Age pottery samples from northern Croatia and the results are supplemented by previously conducted microscopic analyses. It was established that the raw materials were probably gathered in the immediate vicinity of prehistoric sites, and that potters used various temper materials: mineral inclusions, lithoclast, grog, clay pelets (argillaceous rock fragments) and organic material. The analysis of macrophotographs revealed variability in the potters recipe that, according to preliminary research results, can be associated with cultural and chronological features of ceramic vessels.

Key words: *pottery, technology, methodology, digital microscope, ceramic paste, clayey material, temper, Bronze Age*

1. UVOD

Keramika je jedan od najvažnijih izvora informacija za arheologe, poglavito zbog strukture materijala, što je čini gotovo neuništivom. Osim toga, ulomci su keramičkih posuda jedan od najbrojnijih i najučestalijih nalaza na arheološkim nalazištima u svim razdobljima ljudske prošlosti. Lončarija je nemjerljivo vrijedan kronološki indikator, a mnoge relativne kronologije zasnivaju se upravo na tipovima keramičkih posuda. Jedan od osnovnih i najčešćih ciljeva analize keramičkih ulomaka prisutan u domaćim publikacijama je morfološko klasificiranje posuda i njihovih dijelova, a njihova je konačna svrha tipološko-kronološka analiza nalaza i nalazišta te komparacija u odnosu na, prema istim kriterijima klasificirana, nalazišta iz bliže, odnosno dalje okolice. Ipak, u suvremenom razvoju arheološke znanosti brojnost dostupnih analitičkih metoda i tehnološko-društveni oblici interpretacija omogućavaju nemjerljivo složeniji i prije svega znanstveniji način razmatranja rezultata tako postavljene studije, što često podrazumijeva interdisciplinarnost. Posljednjih desetljeća publicirana su brojna monografska izdanja, stručni i znanstveni radovi na temu metodologije obrade arheoloških artefakata, posebice tehnologije proizvodnje keramičkih posuda.[1] Rani je interes za tehnologiju proizvodnje keramičkih posuda bio usmjeren na pitanje "Kako?", međutim, razvojem teorije i metoda iz prirodnih znanosti pitanja su usmjerena na podrijetlo materijala i njihov širi društveno-tehnološki kontekst, odnosno fokus istraživanja nije više samo predmet nego i onaj tko stoji iza njega. U posljednje je vrijeme naglasak stavljen na vezu između tehnologije i društva, odnosno tehnologija prije svega predstavlja integrirani dio kulturnih procesa.[2] Na taj način razmatra se veza između teh-

[1] Rye 1981; Shepard 1985; Rice 1987; Gibson, Woods 1990; Sinopoli 1991; Orton, Tyers, Vince 1993; Albero Santacreu 2014.

[2] Pfaffenberger 1992; Tite 1999; Gosselain 2011.

1. INTRODUCTION

Pottery is one of the most important sources of information for archaeologists, mostly due to its material structure, which makes it almost indestructible. Apart from that, fragments of pottery are one of the most numerous and frequent finds on archaeological sites dated to all periods of human history. Pottery is an immeasurably valuable indicator of chronology, and many relative chronologies are based on types of pottery vessels. One of the basic and most common goals of pottery analysis present in Croatian publications is the morphological classification of vessels and their fragments with the final aim of producing a typological-chronological analysis of both the finds and the site, as well as making comparisons with close-by and distant sites which have been classified according to the same criteria. However, following contemporary developments in archaeological science, the number of available analytical methods, as well as the technological and social modes of interpretations, allow for an immeasurably more complex and, primarily, a more scientific way of looking at the results of such studies, which often includes an interdisciplinary approach.

In the last few decades, many monographs, as well as expert and scientific papers were published on the methodology of processing archaeological artifacts, especially on the technology of pottery production.[1] Early interest in the technology of pottery production focused on the "how". However, following the development of theory and scientific methods applied in natural sciences, questions now focus on the origin of material and the wider socio-technological context, meaning that the focal point of research is no longer only the artifact, but also the person who made it. In recent years, emphasis is put on the link between technology and society, i.e. technology, above all, represents an integral part of cultural processes.[2] This way, we can study the link between the

[1] Rye 1981; Shepard 1985; Rice 1987; Gibson, Woods 1990; Sinopoli 1991; Orton, Tyers, Vince 1993; Albero Santacreu 2014.

[2] Pfaffenberger 1992; Tite 1999; Gosselain 2011.

nološkog odabira,[3] sirovine, okoliša, rituala i društvenih ideologija. Pojedine segmente takvoga složenog odnosa između tehnološkog odabira, lončara i zajednice moguće je identificirati u keramičkom materijalu, a kontinuitet, odnosno promjene u odabiru, mogu biti pokazatelj složenih društvenih odnosa i promjena u kulturnoj tradiciji.

Upravo bi ove smjernice trebale biti pozadina istraživanja keramike, neovisno o metodi analize koja se primjenjuje. Proučavanjem keramičkog materijala, a to se posebno odnosi na posude iz najstarijih razdoblja prošlosti (pretpovijest), promatraju se njihove fizičke karakteristike koje su značajan pokazatelj tehnoloških postupaka onih majstora koji su izrađivali takve uporabne predmete. Cilj je analize lončarske tehnologije identificirati segmente tehnološkog postupka u svrhu rekonstrukcije čitavog procesa stoga je od velikog značaja utvrditi vrstu, podrijetlo i način pripreme sirovinskog materijala (glinoviti materijal i primjese). Keramičke su posude napravljene od lončarske smjese, a zapisi u strukturi keramike sadrže informacije o postupku njezine pripreme koji je u izravnoj vezi s lončarevim odlukama o odabiru specifične sirovine za izradu određene vrste posuda. Stoga se u ovome radu predstavlja relativno jednostavna makroskopska metoda, a pomoću digitalnog mikroskopa sistematizirano se bilježe i prikupljaju podaci o sastavu lončarske smjese, zapisani u strukturi keramike. Rezultati karakterizacije i klasifikacije keramičkih struktura, dokumentirani pomoću digitalnog mikroskopa, mogu biti dobar temelj za odabir uzoraka koji će biti podvrgnuti mikroskopskoj analizi (npr. optičkoj mikroskopiji).[4]

Jedan je od ciljeva ovoga rada potaknuti one koji se bave, i one koji će se tek baviti nekom vrstom analize keramičkog materijala, na razmatranje mogućnosti i svrha njihove obrade. Cilj je također podsjetiti da bi pozadina svake analize morala imati unaprijed određene parametre, smjerni-

[3] Više u Gosselain, Livingstone Smith 1995; Silar, Tite 2000.

[4] Druc 2015.

technological choice,[3] raw materials, the environment, rituals, and social ideologies. Individual segments of the complex relations between the technological choice, the potter, and the community can be identified in the ceramic material, and the continuity and/or changes in these choices can serve as an indicator of social relations and changes in cultural traditions.

These guidelines should be in the background of studies on pottery, regardless of the applied analytical method. By studying pottery, and this especially refers to vessels from the earliest periods of the past (prehistory), we observe its physical characteristics, which are a significant indicator of techniques applied by the artisans who made such every-day objects. The aim of pottery technology analysis is to identify segments of the technological process with the purpose of reconstructing the entire process, so it is very important to determine the kind, origin, and mode in which the raw material was prepared (matrix / clayey material). Pottery vessels were made out of ceramic pastes, and records in the ceramic fabric contain data about the way they were prepared, which is directly connected to the potter's choice of specific raw materials used to produce a certain kind of vessel. Consequently, this paper brings a relatively simple macroscopic method, using a digital microscope to systematically record and collect data on the composition of ceramic pastes preserved in the ceramic structure. The results of characterization and classification of ceramic fabrics defined by using a digital microscope represent a good basis for the selection of samples that will be subjected to microscopic analysis (e.g. optical microscopy).[4]

One of the goals of this paper is to encourage those who currently apply, as well as those who will apply some type of pottery analysis in the future to consider the possibilities and the purpose of such studies. The aim is also to remind others that each analysis should have predetermined parameters and guidelines, i.e. purpose.

[3] For more, see Gosselain, Livingstone Smith 1995; Silar, Tite 2000.

[4] Druc 2015.

ce, odnosno svrhu. S obzirom na to da se u domaćim publikacijama,[5] znanstvenim i stručnim radovima do sada nije značajnije posvetila pozornost analizi tehnologije proizvodnje keramičkih posuda, a radovi se oslanjaju uglavnom na deskriptivnu metodu kojom su nesistematizirano prikupljene informacije o sastavu lončarske smjese, često prenesene s nerazumijevanjem, prepisanim, šturim i ponekad netočnim podacima o tome aspektu proizvodnje, u ovom će radu biti objašnjeno značenje lončarske smjese, istaknut će se svrha primjene ove metode i predstaviti postupak sistematizirane makroskopske analize keramičkih struktura na primjeru posuda iz brončanog doba s prostora sjeverne Hrvatske.

1.1. LONČARSKA SMJESA

Budući da je rad usmjeren na karakterizaciju sastava lončarske smjese, u ovome će se poglavlju pojasniti određeni pojmovi i termini vezani upravo uz taj segmet proizvodnje, odnosno uz njezinu pripremu. Jedan od najčešćih ciljeva provođenja znanstvenih analiza na keramici je utvrditi sastav i podrijetlo sirovine i primjesa kako bi se ustanovila i bolje razumijela njihova svojstva, što u konačnici omogućava rekonstrukciju dijela tehnološkog postupka proizvodnje. Relevantne informacije o podrijetlu i izvorištu sirovine proizlaze iz rezultata mineraloško-petrografskih i geokemijskih analiza, a interpretativno one mogu odgovoriti na pitanja vezana uz razinu ili stupanj organizacije proizvodnje, trgovine i razmjene gotovih predmeta. Određene pokazatelje podrijetla, odnosno izvorišta sirovinskog materijala moguće je djelomično identificirati makroskopski, uz

[5] U posljednjem desetljeću na temu brončanodobne lončarije napravljeno je nekoliko opsežnijih studija i analiza s nizom novih informacija dobivenih primjenom netradicionalnih analitičkih metoda (Michelaki 2006; Kreiter 2007; Sofaer, Budden 2012, 117–127). Na našem prostoru nije bilo tako opsežnih analiza i može se izdvojiti jedino rad S. Karavanić, koja je još devedestih godina primijenila analize na keramici (rendgenska difrakcija, petrografsko-mineraloška analiza, termalna analiza) u sklopu tipološke klasifikacije kasnobrončanodobne keramike s lokaliteta Kalnik-Igrišče, no analize su bile manjeg opsega (Vrdoljak 1995).

Seeing as Croatian publications,[5] scientific and expert papers have, so far, not focused on the analysis of pottery production technology and mostly rely on descriptive methods that contain non-systematically collected data about the composition of the ceramic pastes, which is presented with little to no understanding and often with copied, scant, and sometimes incorrect data about this aspect of production, this paper will explain the significance of ceramic pastes, point out the purpose of applying this method, and present the process of a systematic macroanalysis of Bronze Age ceramic fabrics from northern Croatia.

1.1. CERAMIC PASTE

Considering the fact that this paper focuses on the characterization of raw material composition, this chapter brings explanations of certain concepts and terms connected to that segment of production, i.e. ceramic paste preparation. One of the most common goals of conducting scientific analyses on pottery is to determine the composition and origin of both the raw material and the inclusions in order to establish and better understand their properties, which in turn allows for the reconstruction of a part of the technological production process. Relevant information about the origin and source of raw material is obtained from the results of mineralogical, petrographic, and chemical analyses, and, interpretation-wise, this can answer questions about the level or degree of production organization, as well as about the trade and exchange of finished products. Certain indicators of the origin, i.e. the source of raw material, can be partially identified mac-

[5] Several comprehensive studies and analyses of Bronze Age pottery were published in the last decade, providing a series of new information obtained by applying non-traditional research methods (Michelaki 2006; Kreiter 2007; Sofaer, Budden 2012, 117–127). In Croatia, there have been no such studies, with the exception of S. Karavanić, who conducted such pottery analyses during the 1990s (X-ray diffraction, petrographic-mineralogical analysis, thermal analysis) as part of the typological classification of Late Bronze Age pottery from the site of Kalnik-Igrišče. However, these were small-scale analyses (Vrdoljak 1995).

pomoć digitalnog mikroskopa pri manjim uvećanjima, a na isti način može se identificirati i sastav lončarske smjese.[6]

Lončarska smjesa je materijal za izradu posuda sastavljen od glinovitog materijala (engl. *matrix*) i raznih primjesa (engl. *temper*) koje lončar namjerno dodaje glini. Receptura lončarske smjese produkt je složenih mehanizama odabira i predstavlja jedinstven zapis o tehnologiji proizvodnje, funkciji posuda i njhovim kulturološko-ideološkim aspektima, stoga je njezino proučavanje od velikog značaja za bolje razumijevanje društva koje ih je proizvodilo i koristilo. Postupak pripreme smjese polazi od nabave gline odgovarajuće kvalitete. Takvoj smjesi lončari ponekad dodaju razne vrste primjesa koje također predstavljaju sirovinski materijal koji je potrebno nabaviti i pripremiti. Namjerno dodana primjesa (engl. *temper*) svaki je materijal koji se dodaje glini da bi se povećala viskoznost smjese. Najčešće se dodaju različiti neplastični materijali, kao što su pijesak, litoklasti (kvarcit, vapnenac, rožnjak itd.), grog (usitnjena keramika) ili primjese od organskog materijala (suha trava, pljeva, dlaka, suha kravlja balega, kosti, školjke i sl.). Dodavanjem primjesa u glinoviti materijal pospješuje se oblikovanje i pečenje keramike, pojačava čvrstoća i termička izdržljivost posude, a one utječu i na poroznost.[7] Stoga je odabir primjesa često povezan sa znanjima o njihovu utjecaju na tijek proizvodnje, a često je odabir podložan i tradiciji. Iz tih razloga jedan od osnovnih preduvjeta za kvalitetnu analizu lončarske tehnologije je bilježenje i analiza karakteristika lončarske smjese. Prije svega cilj je utvrditi vrstu i karakteristike neplastičnih materijala, odnosno primjesa koje je lončar dodao smjesi. Njihov je odabir uglavnom u izravnoj vezi s funkcijom posuda, ali odabir sirovine također ovisi o dostupnosti materijala i postojanosti tradicije kod odabira recepture.[8] Međutim, pretpovijesne zajednice iz različitih razdoblja, koje se koriste

[6] Druc 2015.

[7] Rice 1987, 408; Velde, Druc 1999.

[8] Shepard 1985, 163.

roscopically by using a digital microscope with smaller magnification, and the same method can be applied to identify the composition of the ceramic paste.[6]

Ceramic paste is the material used to make vessels, composed of a clayey material (*matrix*) and different kinds of temper material, which the potter intentionally adds to the clay. The recipe of the ceramic paste is a product of complex mechanisms and is a unique record of production technology, vessel function, and cultural and ideological aspects. Therefore, studying it is very significant for the better understanding of society that produced and used the vessels. The ceramic paste preparation procedure starts with obtaining clay of the right quality. Potters sometimes add different kinds of temper material to such a paste, which also represent raw materials that have to be obtained and prepared. Intentionally added inclusions (temper) are all materials that are added to the clay in order to increase the viscosity of the paste. Most commonly, these include nonplastic materials like sand, lithoclasts (quartz, limestone, and chert), grog (fragmented pottery), or organic material temper (dry grass, chaff, animal hair, dry dung, bones, shells and so forth). Adding temper to the clayey material enhances the forming and firing of pottery, increases its hardness and thermal shock resistance, and affects its porosity.[7] Therefore, the selection of temper material is often connected to knowing how it affects the final product, as well as to tradition. Hence, one of the main preconditions for study of pottery production technology is to record and analyze the characteristics of the ceramic pastes. The primary goal is to determine the type and characteristics of non-plastic materials, i.e. temper material that the potter added to the paste. This selection is directly connected to vessel functions, but the choice of raw material also depends on the availability of material and tradition when it comes to choosing the recipe.[8] However, prehistoric communities from different periods that settled the same area did not always use

[6] Druc 2015.

[7] Rice 1987, 408; Velde, Druc 1999.

[8] Shepard 1985, 163.

istim prostorom, ne koriste uvijek istu vrstu primjesa, bez obzira na njihovu, na primjer, laku dostupnost. Jedno od pitanja vezano uz primjese je i kolika je dosljednost lonačara pri uporabi određene vrste primjese. Kada ne bi postojala dosljednost u praksi ili odabiru primjesa, analiza lončarskih smjesa ne bi imala nikakav značaj, odnosno ne bi imalo smisla identificirati ih niti pokušati utvrditi njihovo podrijetlo. Ako pretpostavimo da dosljednost u odabiru postoji i da je ona povezana s funkcionalnim karakteristikama posude ili pak s tradicijom, primarna je zadaća utvrditi sličnosti, odnosno različitosti u lončarskim smjesama. Jednake ili slično pripremljene smjese pokazatelj su ustaljenih odabira lončara odnosno zajednice, a manje razlike u količini specifične primjese mogu biti posljedica individualnih razlika u mjerenju količine takvih primjesa. Veće razlike u recepturi, odnosno vrsti i količini primjesa, pokazatelji su različitih stilova, a kada se razlike mogu dovesti u korelaciju s različitim tipovima posuda, drugačijom obradom površine, različitim dekorativnim stilom, a u arheološkom smislu i drugačijom kulturom, govorimo o različitim praksama i tradicijama.[9] Izrazitiji je konzervativizam u odabiru primjesa zabilježen na mnogim etnografskim[10] i arheološkim[11] primjerima, što se uglavnom povezuje s tradicijom određene populacije, dok je povećana varijabilnost sastava lončarske smjese dobar indikator vanjskih utjecaja, promjena tradicije ili populacije.[12]

Mehanizmi odabira sirovina za izradu lončarske smjese pod utjecajem su različith faktora stoga za njihovo tumačenje valja zasebno i u međusobnoj korelaciji razmotriti prirodno-geološke, tehnološke, morfološke i društvene aspekte. Karakterizacija keramičkih struktura makroskopskom metodom dobar je početni korak na tome putu.

[9] Shepard 1985, 164.

[10] Shepard 1985, 164; Rice 1987, 118; Gosselain, Livingstone Smith 1995; 2005; Gosselain 2008.

[11] Shepard 1985; Michelaki, Minc, O'Shea 2002; Kreiter 2007; Albero Santacreu, García Rosselló, Calvo Trias 2014.

[12] Stark 1991; Stark, Longacre 1997.

the same kinds of temper regardless of, for example, its availability. One of the questions concerning inclusions pertains to the potter's consistency in selecting a certain kind of temper. If there was no consistency in practice or temper selection, the analysis of ceramic paste would be insignificant, i.e. it would be pointless to identify the temper or try to determine its origin. If we assume that there is a consistency in this selection, and that it is connected to the functional characteristics of vessels or tradition, the primary task is to determine similarities or differences in ceramic pastes. Equally or similarly prepared ceramic pastes are an indicator of established choices of the potter and/or the community, while minor differences in, for example, the amount of specific temper, can be a result of individual divergences in, for example, measuring the amount of such inclusions. Greater differences in recipes, that is, the kind and amount of temper, are indicators of different styles, and when these differences can be related to different types of vessels, surface treatment, decorative styles, and, in an archaeological sense, cultures, then we are dealing with different practices and traditions.[9] A more pronounced conservatism was noted in many ethnographic[10] and archaeological[11] examples, which is mostly connected with the tradition of a certain population, while greater variability in the composition of the ceramic structure is a good indicator of outside influences and changes in tradition or population.[12]

The mechanisms of selecting raw material for making pottery are affected by many different factors, so when interpreting them, one should consider natural and geological, technological, morphological, and social aspects individually, and in comparison to each other. Characterization of ceramic fabric using a macroscopic method is a good step in that direction.

[9] Shepard 1985, 164.

[10] Shepard 1985, 164; Rice 1987, 118; Gosselain, Livingstone Smith 1995; 2005; Gosselain 2008.

[11] Shepard 1985; Michelaki, Minc, O'Shea 2002; Kreiter 2007; Albero Santacreu, García Rosselló, Calvo Trias 2014.

[12] Stark 1991; Stark, Longacre 1997.

1.2. METODE I MOGUĆNOSTI KARAKTERIZACIJE STRUKTURE KERAMIKE

Da bismo prikupili podatke relevantne za proučavanje tehnologije proizvodnje posuda u prošlosti, potrebno je provesti karakterizaciju strukture keramike u svrhu identifikacije sastava lončarske smjese. Karakterizacija je keramike kvalitativna i kvantitativna deskripcija kompozicije, odnosno strukture keramike kako bi se vrednovala njezina svojstva. Za provođenje takvih analiza koristi se nekoliko metoda kojima se može pristupiti na dva načina: makroskopski i mikroskopski. Mikroskopska analiza provodi se promatranjem materijala pri znatnim uvećenjima i pomoću svjetlosnog (mikroskop s polarizacijskim svjetlom) i elektronskog mikroskopa. Takva analiza omogućuje promatranje fizičkih karakteristika materijala, posebice onih koji se odnose na njegovo podrijetlo. Takve petrografske i mineraloške analize dvije su osnovne arheometrijske metode analize keramike i glina.[13] Optička metoda na keramičkom izbrusku (engl. *thin section*) omogućava promatranje: prirode i karakteristika neplastičnih inkluzija (mineralni sastav i veličina, distribucija i orijentacija različitih čestica), teksture i optičkih karakteristika glinovitog materijala (dvolom i boja), oblika, količine i orijentacije šupljina i pora.[14] Jedan je od glavnih ciljeva petrologije utvrditi podrijetlo glinovitog materijala i primjesa koje su korištene u proizvodnji keramike.[15] Mineraloški sastav keramike i glina obično se analizira rendgenskom difrakcijom na prahu (XRPD) koja omogućava identifikaciju glavnih minerala u uzorku, kao i razinu njihove zastupljenosti. Metoda se koristi i za utvrđivanje kristalne faze minerala gline koje nije moguće zabilježiti pomoću petrografskog mikroskopa, a od iznimne su važnosti za interpretaciju metode pečenja posuda.[16]

[13] Shepard 1985, 138; Rice 1987, 375.

[14] Quinn 2013.

[15] Rice 1987; Quinn 2013.

[16] Shepard 1985, 93–98; Rice 1987, 382; Albero Santacreu 2014, 20.

1.2. METHODS AND POSSIBILITIES OF CERAMIC FABRIC CHARACTERIZATION

In order to collect data relevant for conducting study of pottery production technology, it is necessary to conduct the characterization of ceramic fabric with the purpose of identifying the composition of the ceramic paste. The characterization of pottery is the qualitative and quantitative description of the ceramic paste composition, i.e. ceramic fabric, done in order to assess its properties and methods of use. In order to carry out such analyses, several methods that can be approached in two ways are applicable: macroscopic and microscopic. Microscopic analysis is conducted by studying material under greater magnification by using a petrographic microscope (a microscope with polarized light) or electronic microscopes. This analysis enables studying numerous physical characteristics of the material, especially those related to its origin. Such petrographic and mineralogical analyses are the two basic archaeometric methods of analyzing pottery and clay.[13] The optical method, applied to ceramic thin sections, allows one to study: the nature and characteristics of non-plastic inclusions (mineral composition and size, the distribution and orientation of different particles), the texture and optical characteristics of the matrix (birefringence and color), and the shape, amount, and orientation of voids and pores.[14] One of the main objectives of petrography is to establish the origin of the clayey material and inclusions used in pottery production.[15] The mineral composition of pottery and clays is mostly determined through X-ray powder diffraction (XRPD), which enables the identification of the main minerals in a sample, as well as their respective quantity within the paste. The method is also used to define the phase of crystallization of the clay minerals that cannot be recorded by using a petrographic microscope, and which are of utmost importance for interpreting the firing techniques.[16]

[13] Shepard 1985, 138; Rice 1987, 375.

[14] Quinn 2013.

[15] Rice 1987; Quinn 2013.

[16] Shepard 1985, 93–98; Rice 1987, 382; Albero Santacreu 2014, 20.

Makroskopska metoda podrazumijeva analizu ulomka prostim okom i uvećanjem pomoću povećala, binokularnog ili digitalnog mikroskopa te analizu makrofotografije uzorka. Prednost je metode pristupačnost što nam omogućava istražiti veću količinu keramičkih uzoraka. Na taj način promatra se površina uzorka i keramička struktura te se karakterizira i sistematizirano bilježi sastav lončarske smjese. Tako provedenom klasifikacijom smjesa može se provesti analitički ispravan odabir uzoraka za buduće analize primjenom mikroskopskih metoda. Uz to, kod lončarskih smjesa izrazitijega heterogenog sastava te onih koje sadrže mnogo primjesa, kakve se često javljaju kod prapovijesne keramike, metoda omogućuje prikupljanje relevantnih podataka koji se mogu koristiti i neovisno o provedenim arheometrijskim analizama. Analizom makrofotografija, napravljenih digitalnim mikroskopom, omogućeno je promatranje fizičkih[17] te djelomično mineraloških[18] svojstava keramičkog materijala uz određena ograničenja.

Optimalni rezultati mogu se dobiti primjenom kombinirane makroskopske i mikroskopske analize. Tako prikupljeni podaci o tehnologiji neovisni su od ostalih uobičajenih kategorija kod arheološke analize keramike, poput stila ili klasifikacije oblika, premda se oni mogu koristiti i za usporedbu tih kategorija ili stvaranje novih.[19] Set prikupljenih podataka pruža dobar temelj za razumijevanje mnogih pitanja o tehnologiji proizvodnje, njezinoj organizaciji, vezi između specifičnih izvora, obrascima lo-

The macroscopic method includes the analysis of a fragment with the naked eye and by using a magnifying glass, a binocular or digital microscope, as well as the analysis of the sample's macrophotography. The advantage of such a method is its accessibility and the fact that it enables one to study a larger amount of pottery samples. In this way, sample surface and ceramic fabric can be observed which allows us to systematically characterize and document composition of ceramic paste. Such a classification can be the basis for an analytically accurate selection of samples for future analyses using microscopic methods. Additionally, for ceramic pastes with more pronounced heterogeneous compositions and ones that contain abundant temper material, which often occur in prehistoric ceramics, such a method allows us to collect relevant data that can be used independently of the conducted archaeometric analysis. The analysis of macrophotography made by a digital microscope allows us to study the physical[17] and, partially, mineralogical[18] properties of pottery with certain limitations.

Optimal results can be achieved by applying a combination of macroscopic and microscopic methods. Technological data gathered in this way is free from the usual categories applied in archaeological analyses of pottery such as style and form classification, although it can be used for comparing these categories or for creating new ones.[19] The set of obtained data provides one with a good foundation for understanding many issues with regard to production processes and their organization, the relation between specific sources, the patterns of local, regional and inter-regional pottery

[17] Fizička su svojstva vrlo značajna deskriptivna karakteristika glinovitog materijala, a uključuju: boju, teksturu, plasticitet, skupljanje i čvrstoću, dok fizičke krakteristike keramičkog materijala pružaju informacije o proizvodnom postupku (obrada površine, tehnika i režim pečenja i sl.) i funkcionalnim karakteristikama, što uključuje: poroznost, tvrdoću, strukturu, mikrostrukturu, čvrstoću i otpornost na termalni stres.

[18] Mineraloška svojstva podrazumijevaju analizu mineralnog sastava sirovine i pečenog proizvoda, odnosno keramike. Karakteristike minerala, poput vrste, oblika i veličine, značajni su zbog određivanja izvora produkcije i u izravnoj su vezi s fizičkim svojstvima, teksturom, poroznošću, tvrdoćom, bojom i čvrstoćom sirovinskog i pečenog materijala (Rice 1987, 313).

[19] Rice 1987, 308.

[17] Physical properties are a very important descriptive feature of clayey materials, and include: color, texture, plasticity, shrinkage, and firmness. The physical characteristics of ceramic materials provide information about the production process (surface processing, firing technique, firing conditions and so forth) and about functional characteristics, which include: porosity, hardness, structure, microstructure, firmness, and resistance to thermal stress.

[18] Mineralogical properties include the analysis of the mineral composition of raw material and the fired product, i.e. pottery. Characteristics of minerals, such as type, shape, and size are significant for determining the source of production and are directly related to physical properties, texture, porosity, hardness, color, and firmness of the raw and fired material (Rice 1987, 313).

[19] Rice 1987, 308.

kalne, regionalne i izvanregionalne distribucije keramike, pojedinačnim i društveno uvjetovanim odabirima, društvenim ideologijama, ritualu i sl., a ovo su samo neka od temeljnih istraživačkih pitanja prilikom proučavanja keramičke tehnologije.[20]

2. POSTUPAK MAKROSKOPSKE ANALIZE LONČARSKE SMJESE

Makroskopska analiza tehnologije proizvodnje keramike podrazumijeva identifikaciju i interpretaciju tragova izrade keramičkih posuda koji su zapisani na njihovoj površini (unutarnja i vanjska stijenka) i u keramičkoj strukturi. S obzirom na to da su gotovo sve metode karakterizacije keramike usmjerene prema analizi keramičke strukture, tj. lončarske smjese, u ovome će se poglavlju predstaviti analitički postupak na uzorcima keramike iz brončanog doba s prostora sjeverne Hrvatske.

Za makroskopsku analizu keramike, odnosno karakterizaciju smjesa, primjenjuje se metodologija koja se upotrebljava i u petrografiji keramike.[21] Međutim, makroskopska analiza sastava lončarske smjese provodi se s određenim ograničenjima, poput nemogućnosti identifikacije pojedinih vrsta mineralnih inkluzija ili identifikacije minerala glina, što je od velike važnosti pri interpretaciji podrijetla materijala. Analizom makrofotografija mogu se prikupiti podaci o veličini i obliku zrna, distribuciji i dimenzijama inkluzija i primjesa, boji i teksturi lončarske smjese te obliku, veličini i količini pora i šupljina u keramičkoj strukturi. Takve informacije pružaju dobru osnovu za sistematizirano prikupljanje podataka pomoću kojih će se karakterizirati uzorci. Cilj je identificirati pojedine minerale, osobine teksture i sastav lončarske smjese, što omogućava grupiranje keramike sličnih karakteristika i identificiranje atipičnih uzoraka. Na taj način radi se se-

[20] Rye 1981; Schiffer, Skibo 1987; Pfaffenberger 1992; Stark, Longacre 1997; Schiffer *et al.* 2001; Miller 2007; Schiffer 2010; Gosselain 2011.

[21] Shepard 1985; Quinn 2013; Druc 2015.

distribution, the individual and socially-conditioned choices, social ideologies, ritual and so forth. These are only some of the fundamental research issues when conducting an analysis of pottery production technology.[20]

2. THE PROCEDURE OF THE MACROANALYSIS OF CERAMIC PASTE

Macroanalysis of pottery production technology includes the identification and interpretation of traces pertaining to pottery production, which are preserved on its surface (inner and outer walls) and in the ceramic structure. Seeing as almost all methods of ceramic characterization focus on analyzing ceramic structure, i.e. ceramic pastes, this chapter presents the analytical procedure applied to samples of Bronze Age pottery from northern Croatia.

Macroanalysis regarding characterization of ceramic fabric uses the same methodology as petrographic studies of pottery.[21] However, the macroanalysis of ceramic paste composition is conducted with certain limitations, including the impossibility of identifying certain kinds of mineral inclusions or identifying clay minerals that are very important when interpreting the origin of the material. By analyzing macrophotographs, one can collect data on the size and shape of grains, the distribution and dimensions of inclusions and temper, the color and texture of the matrix, and the shape, size, and amount of pores and voids in the structure. Such information creates a good basis for the systematic collection of data, which can be used to characterize fabric groups. The goal is to identify specific minerals, features of texture, and the composition of the ceramic paste in order to group together pottery that has similar characteristics and to identify atypical samples. This is used to make a selection and to determine groups of ceramic fabrics from which samples can later be extracted for more precise petrographic, mineralogical, and

[20] Rye 1981; Schiffer, Skibo 1987; Pfaffenberger 1992; Stark, Longacre 1997; Schiffer *et al.* 2001; Miller 2007; Schiffer 2010; Gosselain 2011.

[21] Shepard 1985; Quinn 2013; Druc 2015.

lekcija i određuju grupe keramičkih struktura iz kojih se kasnije mogu izdvojiti uzorci za preciznije, petrografske i mineraloške te kemijske analize. U osnovi, cilj primjene ove metode je što bolje upoznati materijal koji se obrađuje i naučiti prepoznati i dokumentirati karakteristike lončarske smjese.

Da bi se takva analiza provela, keramički uzorak promatra se i dokumentira uz pomoć binokularnog ili digitalnog mikroskopa. Za potrebe ovog rada korišten je digitalni mikroskop *Dino Lite 2.0*, a uzorak je promatran na uvećanjima od 20 do 60 puta i uvećanjima od 200 do 250 puta (sl. 1). Mikroskop je povezan s računalom putem USB priključka, a pomoću softvera izrađuju se digitalne fotografije uzorka. Makrofotografije, napravljene pomoću mikroskopa, predstavljaju dokument svakoga pojedinog uzorka te se njihovom analizom stvara arhiva tzv. karakterističnih grupa keramičkih struktura. Treba naglasiti da digitalni mikroskop ne može zamijeniti specijalizirani petrografski mikroskop.

chemical analyses. Basically, the goal of using this method is to become more familiar with the pottery, as well as to learn to identify and document the characteristics of ceramic structure.

In order to conduct such an analysis, the sample is studied and documented by using a binocular or digital microscope. In this study, the *Dino Lite 2.0* digital microscope was used, and the sample was studied under a magnification between 20 – 60 and 200 – 250 (Fig. 1). The microscope was connected to a computer via USB port, and software was used to make digital photographs of the samples. Macrophotographs made using the microscope document each individual sample and their analysis produces an archive, the so-called characteristic group of ceramic structures. It should be pointed out that a digital microscope cannot replace a specialized petrographic microscope.

Slika / Figure 1. Digitalni mikroskop spojen s računalom i oprema potrebna za rad: kliješta, pomično mjerilo, zip-vrećice, otopina solne kiseline, keramički uzorci i sitni alat (snimila: A. Kudelić). / Digital microscope connected to a computer, and the equipment necessary for work: pliers, caliper, zip-lock bags, hydrochloric acid solution, pottery samples, and small tools (photo by: A. Kudelić).

2.1. ODABIR I PRIPREMA UZORAKA

Odabir uzoraka prije svega ovisi o pitanjima koja analitičar postavlja o materijalu tijekom ili prije istraživanja. Pretpostavlja se da je prije odabira uzoraka analitičar do neke mjere upoznat s materijalom i njegovim kronološkim te fizičkim karakteristikama (relativna / apsolutna datacija, tip posude, boja, debljina stijenke posude, obrada površine, tvrdoća i sl.). Stoga prije uzorkovanja analitičar treba provesti inicijalnu klasifikaciju keramičkih struktura na osnovi iskustva i preliminarnog pregleda materijala te na temelju vizualnog doživljaja i taktilnog osjeta zbog lakšeg snalaženja pri početnoj klasifikaciji. Na taj način materijal se može klasificirati na finu, prijelaznu ili srednje finu strukturu te na ulomke grube strukture. Na početku inicijalne klasifikacije struktura analitičar mora jasno odrediti kriterije prema kojima ih je definirao, na primjer količina primjesa vidljiva prostim okom, debljina stijenke i sl. Valja voditi računa da za svaku skupinu koja se definira treba izdvojiti jednaku količinu uzoraka radi kasnijih usporedbi i statističke analize. Nakon provedene makroskopske klasifikacije keramičkih struktura, njihova će varijabilnost vjerojatno biti mnogo složenija nego nakon rezultata inicijalne klasifikacije.

Također, poželjno je da su uzorci kronološki sigurno određeni, što omogućava pristup analizi keramičke proizvodnje u različitim razdobljima, bilježeći tako promjene i kontinuitet određenih aspekata proizvodnje kroz vrijeme. S tim u vezi je i usporedba tehnologije, ovisno o prostoru, odnosno regiji odakle materijal potječe. Keramički uzorci s različitih arheoloških nalazišta, smještenih na određenom području (mikroregija), odabiru se kako bi se odgovorilo na pitanja o načinu na koji je keramička proizvodnja povezana s različitim izvorima resursa u krajoliku tijekom vremena, ili u specifičnome vremenskom razdoblju. Jedan od osnovnih kriterija pri odabiru uzoraka u izravnoj je vezi s morfologijom posuda. Ako znamo kojem tipu posude uzorak

2.1. SAMPLE SELECTION & PREPARATION

The selection of samples primarily depends on the questions asked by the researcher about the material during and prior to research. The assumption is that the researcher is familiar with the material and its chronological and physical characteristics (relative/absolute dates, vessel type, color, wall thickness, surface treatment, hardness and so forth) to a certain extent before they make the selection. Hence, before selecting samples, the researcher must conduct an initial classification of ceramic structures based on experience and a preliminary overview of the material, as well as based on their visual impressions and touch, all in order to make it easier to keep track of the material during initial classification. Thus the material can be classified into fine, transitional or semi-fine, and fragments that have a coarse structure. At the beginning of the initial classification of the fabrics, the researcher must clearly determine the criteria used for defining them, e.g. the amount of inclusions/temper visible to the naked eye, wall thickness and so forth. They should also note that there should be an equal amount of samples for each defined group because of subsequent comparisons and statistical analyses. After conducting a macroscopic classification of ceramic structures, their variability will probably be more complex than after the initial classification.

It is preferred that the selected samples have been chronologically determined in order to approach the analysis of pottery production in different periods noting changes and continuity of specific aspects of production through time. Comparisons of technology are also connected to this, depending on the region where the material originated from. In that sense, pottery samples from different archaeological sites situated across a certain area (microregion) are selected with the aim of answering questions about the way pottery production is connected to, for example, the availability of different resources in the landscape over time. One of the main criteria when choosing samples is directly connected to vessel morphology. If the type of vessel the sample was part of is known, one has more options in the sense

pripada, onda su otvorene mnogo veće mogućnosti u interpretativnom smislu. Međutim, u arheološkom, osobito naseobinskom kontekstu fragmentacija posuda je izrazito velika. Prednost provođenja analize na amorfnim ulomcima je i njihova količina, za razliku od količine cjelovitih posuda, stoga se njihovom klasifikacijom može prikupiti veća količina podataka. Još je jedna prednost analize ulomaka neovisnost o ostalim varijablama, poput tipologije ili kronologije, što analitičaru osigurava višu razinu objektivnosti.

Nakon odabira uzoraka, potrebno je fotografirati i inventarizirati ulomak, veći dio posude kojoj uzorak pripada ili cijelu posudu (tip posude) te opisati fizičke karakteristike vanjske i unutarnje površine (obrada i boja površine), boju presjeka na svježem lomu uzorka te dodatne napomene ako se procijeni da za to postoji potreba (zabilježiti kategoriju određenu inicijalnom klasifikacijom). Ovi podaci unose se u ranije kreiranu bazu podataka u npr. *Excell Microsoft Office* programu. Nakon promatranja i bilježenja informacija o fizičkim karakteristikama ulomka keramičke posude, kliještima se lomi dio koji će se promatrati pomoću digitalnog mikroskopa. Važno je napomenuti da se mikroskopom promatra svježi lom uzorka koji omogućava jasnu sliku presjeka i bolji uvid u keramičku strukturu za razliku od tzv. starog loma koji je prekriven svojevrsnom patinom, zbog čega je ograničen izravan vizualni pristup keramičkoj strukturi. Keramički uzorci, koji ne sadrže mnogo primjesa, lome se relativno pravilno, odnosno površina na mjestu loma je ravna za razliku od uzoraka tzv. grube keramičke strukture čiji lom ostavlja nepravilnu površinu stoga i makrofotografija može biti slabije kvalitete. Ravan lom može se postići rezanjem ulomka pilom, međutim, pila može ostaviti horizontalne tragove u presjeku, što također nepovoljno utječe na vidljvost. Osim presjeka, dokumentira se vanjska i unutarnja površina uzorka posude. Prilikom promatranja uzoraka trebalo bi obuhvatiti više mjesta na svježem

of interpretation. However, in archaeological, especially settlement contexts, vessel fragmentation is very pronounced. An advantage of conducting the analysis on amorphous fragments is their number, unlike the number of whole vessels. Hence, by classifying them, one can collect a greater amount of data. Another advantage of analyzing fragments is the non-dependency on other variables like typology and chronology, which ensures a higher level of objectiveness.

After the samples have been selected, one must photograph and document the fragment, the larger part of a vessel from which the sample was obtained, or the entire vessel (type of vessel), and must describe the physical characteristics of the outer and inner surfaces (surface treatment and color), the color in the cross section on fresh breakage, and must make additional remarks if they are necessary (take down the category determined by initial classification). The data is then entered into a previously created data base in, e.g. *Excel Microsoft Office*. After studying and recording information about the physical characteristics of a pottery vessel fragment, pliers are used to break off the piece that will be studied under the digital microscope. It is important to note that the microscope is used to study fresh breakage on the sample, which allows for a clear image of the cross section and gives better insight into the ceramic fabric, unlike the so-called old breakage, which is covered by a sort of patina that limits the ability to visually study the structure. Pottery samples that do not contain many inclusions/temper break in a relatively regular way, i.e. breakage is straight, unlike samples of so-called coarse pottery, where breakage leaves an irregular surface, meaning that macrophotographs can be of lower quality. Straight breakage can be achieved by sawing the sample. However, saws can leave horizontal traces in the cross section which also negatively affect visibility. Apart from the cross section, one must document both the outer and the inner surface of a vessel sample. Sample observation should include as many spots on the fresh breakage as possible. It is also important to accompany each

lomu. Također, važno je uz svaku makrofotografiju navesti uvećanje pomoću kojega je snimljena i napomena o zapažanjima. Uvećanje se uglavnom prilagođava debljini stijenke uzorka koji se promatra i ono iznosi između 20 i 60 puta. Ako se obrađuje standardizirani materijal (stijenke ujednačene debljine), preporučuje se isto uvećanje za sve uzorke. Digitalni mikroskop ima mogućnost većih uvećanja do 250 puta, ali kvaliteta fotografije bit će smanjena, što je posljedica načina pripreme uzroka (prelomljeni uzorak) koji nije prilagođen za veća uvećanja (nepravilna površina uzorka). Ipak, veća uvećanja mogu se ponekad koristiti za npr. identifikaciju sitnih čestica minerala, što ovisi o njihovoj vrsti i stupnju vidljivosti. Digitalni mikroskop povezan je s računalom jednostavno kreiranim sučeljem koje pruža mogućnost korištenja alata poput mjerke, umetanja teksta, strelica ili kružnica, kao i alat za crtanje, a omogućena je i manipulacija fotografijama, npr. promjena orijentacije, negativ snimke i dr.[22] Maksimalna razlučljivost iznosi 300 dpi. Kako bi se postigla bolja vidljivost presjeka keramičkog ulomka i naglasio kontrast, makrofotografije mogu se dodatno urediti u programima za obradu fotografija ili se u tu svrhu koristi funkcija softvera za postizanje negativa snimke.

[22] Uz digitalni mikroskop dolazi i softver s osnovnim programom koji se koristi za analizu makrofotografija, međutim, takvi programi nemaju mogućnost kvantitativne analize. Za takav sofisticiraniji pristup mogu se nabaviti programi sa slobodnim pristupom putem interneta. Programi za sedimentologiju i petrologiju su dovoljno prilagođeni da se mogu koristiti i za analizu keramičkih struktura (Druc 2015, 96). Takvi programi omogućavaju mnogo objektivniji pristup analizi, ali jedan od nedostataka jest potpuna automatizacija. Više o takvom tipu kvantitativne analize makrofotografija vidjeti u Reedy, Kamboj 2004; Livingood, Cordell 2009.

macrophotograph with information about the magnification used, and remarks on observations. The magnification is mostly adjusted to the wall thickness of the sample under study, and it is usually between 20 and 60 times. If working with standardized material (walls of similar thickness), it is recommended to use the same magnification for all samples. The digital microscope can produce magnification larger than 250 times, but the image quality will be reduced as a result of preparation methods (breaking/cutting the sample), which are not suited for higher magnification (irregular sample surface). However, larger magnification is sometimes used to, for example, identify small mineral particles, which depends on their type and the level of visibility. The digital microscope is connected to a computer via a simple interface which allows one to use tools like measuring tapes, insert text, pointers, or circles, as well as use drawing tools and manipulate the photographs, e.g. change their orientation, produce a negative of the image, and so forth.[22] The maximum resolution is 300 dpi. In order to achieve better visibility of the cross section of a pottery fragment, and to enhance contrast, macrophotographs can additionally be edited in programs for photo editing, or they can be turned into negatives by using a feature of the software.

[22] The digital microscope comes with accompanying software used to analyze macrophotographs. However, such programs do not allow for a high-quality analysis. For such a sophisticated approach, one can use freeware found on the internet. Programs used in sedimentology and petrology are adapted to a level where they can also be used for analyzing pottery structures (Druc 2015, 96). Such programs allow for an objective approach to the analysis, but complete automatization is one of their bad sides. For more on this type of quantitative analysis of macrophotographs, see Reedy, Kamboj 2004; Livingood, Cordell 2009.

2.2. KARAKTERIZACIJA GLINOVITOG MATERIJALA I PRIMJESA

Glinoviti materijal i inkluzije u petrografiji se tretiraju zasebno,[23] a isti način primjenjuje se i pri makroskopskoj analizi. Promatranjem presjeka keramičkog uzorka cilj je zabilježiti značajke glinovitog materijala i ustanoviti eventualne primjese koje je lončar dodao smjesi. Međutim, makroskopskom metodom glinoviti materijal može se karakterizirati s određenim ograničenjima. Naime, glinoviti materijal (sirovina koju lončar koristi za izradu posuda) sastoji se od vrlo sitnih zrna veličine glina (< 2 mikrometra) i praha (2 – 60 mikrometara) te mineralnih inkluzija uglavnom dimenzija pijeska (60 – 2000 mikrometara). Glina je glavna komponenta svake keramičke strukture i čini uglavnom više od 50% volumena uzorka.[24] Pojedinačni minerali glina uglavnom su manji od 2 μm stoga ni jača uvećanja, ili korištenje petrografskog mikroskopa s polarizacijskim svjetlom, nisu dovoljna za njihovu karakterizaciju.[25] Minerali glina vidljivi su kao homogena masa koju je moguće karakterizirati samo prema kriteriju boje, no premda subjektivan, boja može biti dobar kriterij pri preliminarnom određivanju grupa keramičkih struktura. Boja glinovitog materijala ovisi o nekoliko faktora: vrsti minerala glina, količini organskih primjesa, prisutnosti željezovitih minerala te oksidacijskom stanju željeza unutar njih, prisutnosti ostalih finih čestica, npr. kalcita, i metodi te atmosferi pečenja.[26] S obzirom na to da je određivanje boje podložno subjektivnom doživljaju, preporučuje se korištenje atlasa boja *Munsell color system* ili definiranje nekoliko njih koje su najučestalije, odnosno korištenje ograničene količine boja i njihovih kombinacija radi veće objektivnosti.[27]

[23] Quinn 2013, 42.

[24] Quinn 2013, 42.

[25] Quinn 2013, 39.

[26] Rice 1987, 331–346; Quinn 2013, 42.

[27] S obzirom na to da je boja značajan pokazatelj atmosfere pečenja, što je vrlo važan segment proizvodnje, njezino je bilježenje nešto kompleksnije. Preporučuje se bilježiti sve boje u presjeku, počevši od unutarnje prema vanjskoj sti-

2.2. CHARACTERIZATION OF CLAYEY MATERIAL AND TEMPER

Clayey material and temper material are treated separately in petrography,[23] and the same approach is used in macroanalysis. When studying the ceramic cross section, the goal is to note all features of the clayey material and to establish possible temper material added to the paste by the potter. However, the clayey material can be characterized only to a certain extent by using macroanalysis. Namely, clayey material (raw material used to make vessels) consists of tiny grains the size of clay (< 2 micrometers) and dust (2 – 60 micrometers), and mineral inclusions mostly the size of sand (60 – 2000 micrometers). Clay is the main component of every ceramic fabric and mostly comprises over 50% of sample volume.[24] Individual clay minerals are mostly smaller than 2 μm, so they cannot be characterized even by using larger magnification or petrographic microscope with polarized light.[25] Clay minerals are visible as a homogenous mass which can only be characterized by color, which can be, albeit subjective, a good criterion used for defining groups of ceramic structures during preliminary determinations. The color of clayey material depends on several factors: the type of mineral clay, the amount of organic temper, the presence of iron oxides and the oxidation state of iron within them, the presence of other fine particles like calcite, as well as the firing method.[26] Seeing as color definition depends on subjective experience, using the *Munsell color system* color chart or defining several most frequent colors - using a restricted amount of colors and their combinations to achieve a greater level of objectivity - is recommended.[27]

[23] Quinn 2013, 42.

[24] Quinn 2013, 42.

[25] Quinn 2013, 39.

[26] Rice 1987, 331–346; Quinn 2013, 42.

[27] Seeing as color is a significant indicator of the firing method, a very important segment of production, noting it down is somewhat more complex. It is recommended to record all colors which appear in the cross section, starting from the inner surface of the vessel towards the outside or vice versa, i.e. to systematically record always using the same criteria (e.g. dark gray/dark gray/brown-yellow or dark grey/dark grey/dark grey/brown-yellow/dark grey). Apart from recording the colors, it is important to document their intensity and sharpness, i.e. the clarity of the border between the

Glinoviti materijal u sebi sadrži i minerale (kvarc, tinjci, kalcit i sl.), tj. inkluzije kao prirodnu sastavnicu sirovine, koje mogu biti i pokazatelj njezina podrijetla. Takve su čestice većih dimenzija vidljive prostim okom. Primjena optičke mikroskopije pomoću polarizacijskog svjetla uz stručnjaka geologa najbolji je načina karakterizacije navedenih minerala. Međutim, kod slabijih uvećanja nije uvijek moguće identificirati minerale. Ako su zrna jasno vidljiva, opisuju se njihove karakteristike (boja, oblik, veličina, zastupljenost itd.), ali ne preporučuje se imenovati, odnosno determinirati vrstu stijene ili minerala, osim ako analitičar dobro poznaje osnove petrologije i mineralogije. U suprotnome, valja konzultirati geologe ili iskusnije analitičare. Za identifikaciju željeza u smjesi može se koristiti magnet, a za identifikaciju karbonatnih minerala koristi se razrijeđena solna kiselina (otopina 5 – 10%). Kiselinu kapnemo na zrno koje želimo testirati i, ako se dogodi reakcija (otpuštanje plina ugljičnog dioksida u obliku mjehurića), to je pokazatelj da je u uzorku prisutan karbonatni mineral, kao što je npr. kalcit,[28] ili stijena poput vapnenca. Osim inkluzija u glinovitom materijalu, valja opisati i matriks u cjelini, tj. pokušati izmjeriti veličinu zrna minerala od kojih je matriks prirodno sastavljen (sitna zrna pjeskovitog materijala). Takva zrna uglavnom nisu veća od 0,06 mm i mogu se izmjeriti pomoću digitalnog mikroskopa pri uvećanjima od približno 200 puta. Kako bi karakterizacija glinovitog materijala bila sistematizirana i što preciznija, koriste se geološke granulometrijske tablice (tab. 1) s unaprijed definiranim vrijednostima i na-

Clayey material also contains minerals (quartz, mica, calcite etc.), that is, inclusions as natural components of raw material that can indicate its place of origin. Such larger particles are visible to the naked eye. Applying optical microscopy using a polarized light with an expert geologist present is the best way to characterize the listed minerals. However, if the grains are well visible, their characteristics can be described (color, shape, size, quantity etc.), but it is not recommended to name or determine the type of rock or mineral, unless the researcher is familiar with the basics of petrology and mineralogy. If that is not the case, one should consult with geologists or more proficient researchers. The presence of iron in a paste can be identified by using a magnet, and carbonate minerals by using a hydrochloric acid solution (5 – 10% solution). The acid is dripped onto the grain and if there is a reaction (releasing carbon dioxide in the form of bubbles), it is an indication that the sample contains a carbonate mineral like, e.g. calcite,[28] or a rock such as limestone. Apart from inclusions in the clayey material, one should also describe the entire matrix, i.e. try to measure the size of minerals which the matrix naturally contains (tiny grains of sandy material). Such grains are usually not larger than 0.06 mm and can be measured using a digital microscope with a magnification of approximately 200. In order for the characterization of clayey material to be systematic and as precise as possible, one should use geological granulometric tables (Tab. 1) with previously defined values and terms for the type of paste.[29] Researchers can create and make their own tables with criteria of values and names of specific groups and should, in that case, use them consistently. Apart from

jenci posude ili obrnuto, odnosno sustavno bilježiti uvijek prema istim kriterijima (npr. tamnosiva/tamnosiva/smeđe-žuta ili tamnosiva/tamnosiva/tamnosiva/smeđe-žuta /tamnosiva). Osim bilježenja boja, važno je dokumentirati i njihov intenzitet ili oštrinu granice između boje vanjske, odnosno unutarnje stijenke i boje jezgre, što se može razraditi u sklopu zasebne tehnološke analize koja je usmjerena interpretaciji tehnike i uvjeta pečenja keramike.

[28] Karbonatni materijal u uzorku keramike može biti posljedica nekih sekundarnih pojava, poput taloženja kalcita koji nastaje djelovanjem voda u tlu. Takvi talozi uglavnom se nalaze na površini ulomka ili u njegovim pukotinama, a njihova pojava u tome slučaju nema veze s podrijetlom materijala.

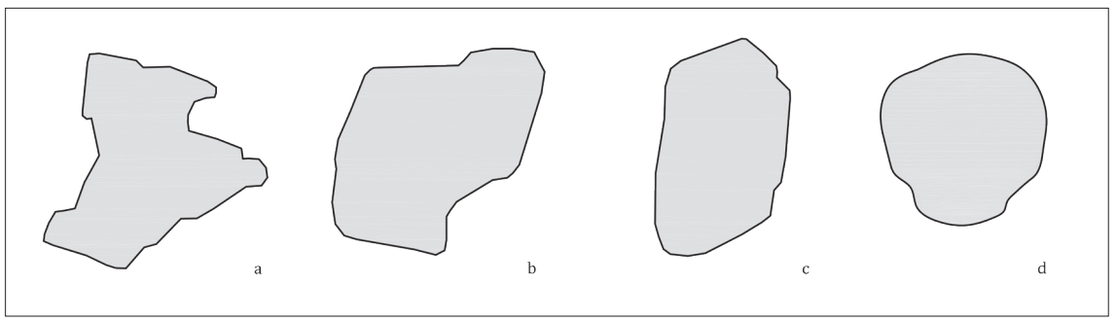
outer and inner surface color and the color of the core, all of which can be additionally defined within a separate technological analysis focused on interpreting the firing method and firing conditions.

[28] Carbonaceous material in a pottery sample can be the result of some secondary phenomena such as precipitation of calcite, which is a result of water in the soil. Such precipitates are mostly located on the surface of a fragment or in its crevices, and their appearance in those cases has nothing to do with the origin of the material.

[29] Rice 1987, 38; Prehistoric Ceramics Research Group 1997; Druc 2015, 16.

OPIS / DESCRIPTION	VELIČINA ČESTICA / PARTICLE SIZE
VRLO GRUB PIJESAK / VERY COARSE SAND	1 – 2 mm
GRUBI PIJESAK / COARSE SAND	0,63 – 1 mm
SREDNJI PIJESAK / MEDIUM SAND	0,2 – 0,63 mm
FINI PIJESAK / FINE SAND	0,125 – 0,2 mm
VRLO FINI PIJESAK / VERY FINE SAND	0,063 – 0,125 mm
PRAH / SILT	2 – 63 μm
GLINA / CLAY	< 2 μm

Tablica / Table 1. Standardi za klasifikaciju veličine čestica (Rice 1987, 38; Druc 2015, 16). / Standards for particle size classification (Rice 1987, 38; Druc 2015, 16).



Slika / Figure 2. Prikaz stupnjeva zaobljenosti zrna: uglata, djelomično uglata, djelomično zaobljena i zaobljena (Druc 2015, 17). / Representation of the degrees of grain roundness: angular, subangular, subrounded and rounded (Druc 2015, 17).

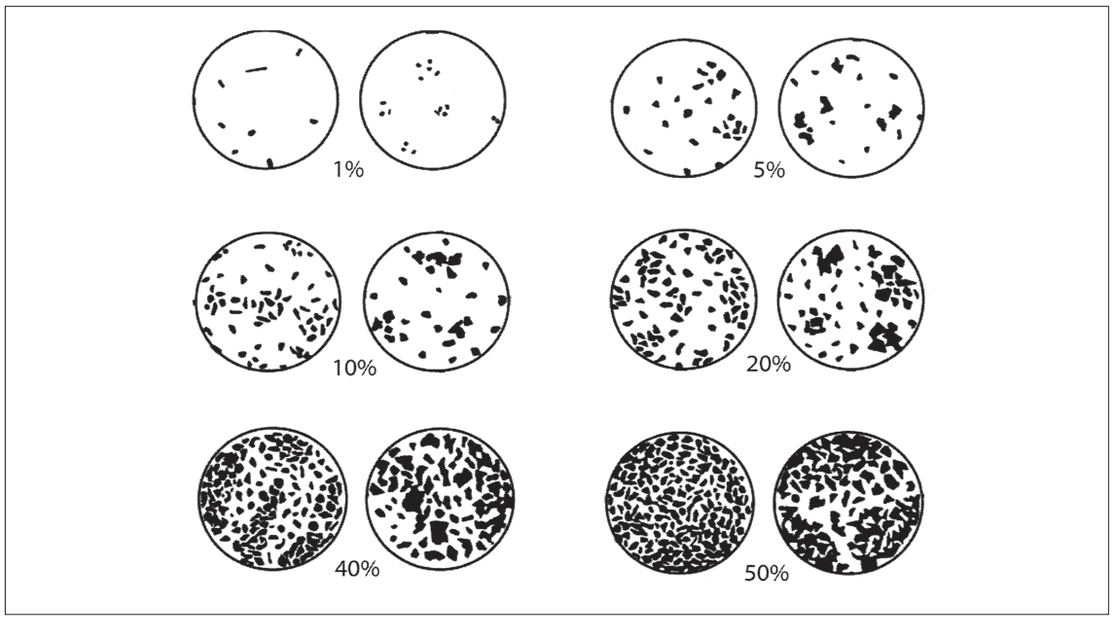
zivima za vrstu smjese.[29] Analitičar može osmisliti i izraditi vlastitu tablicu s kriterijima vrijednosti i nazivima pojedinih grupa i u tome slučaju dosljedno se njome koristiti. Osim veličine, potrebno je opisati i oblik zrna, bilo da se radi o inkluzijama ili primjesama. Oblik zrna definira se prema također unaprijed određenim kriterijima oblika, a ona mogu biti zaobljena, djelomično zaobljena, uglata i djelomično uglata (sl. 2).[30] Geološki, stupanj uglatosti/zaobljenothe size, one should describe the shape of the grain of both the temper and the inclusions in the paste. Grain shape is also defined based on previously defined criteria, and can be rounded, subrounded, angular, and subangular (Fig. 2).[30] Geologically speaking, the degree of angularity/roundedness of mineral/rock particles and their size are connected to transporting (via wind and/or water), i.e. to the distance of mineral grains from their source.[31] In that sense, they can be an indicator of the location of sedi-

[29] Rice 1987, 38; Prehistoric Ceramics Research Group 1997; Druc 2015, 16.

[30] Whitbread 1986; Quinn 2013, 84

[30] Whitbread 1986; Quinn 2013, 84

[31] Velde, Druc 1999, 26, 67–68.



Slika / Figure 3. Grafikon za određivanje gustoće zrna (Quinn 2013, 82). / Chart for determining grain density (Quinn 2013, 82).

sti čestica minerala/stijena i njihova veličina povezani su s transportom (vjetrom i/ili vodom), odnosno udaljenošću zrna minerala od njihova izvora.[31] U tome smislu, oni mogu biti indikator lokacije izvorišta sedimentnih glina, a navedeni parametri značajni su i za identifikaciju primjesa u lončarskoj smjesi.[32]

Bilježenjem gustoće zrna određuje se udio određene vrste zrna u keramičkoj strukturi, što može omogućiti, npr. određivanje količine primjesa koje lončar dodaje smjesi iz tehnoloških ili nekih drugih razloga. Gustoća zrna određuje se pomoću već oblikovanih tablica i izražena je u postocima (sl. 3). Promatranjem keramičkog uzorka pri slabijim uvećanjima moguće je procijeniti i zabilježiti relativnu gustoću primjesa, odnosno inkluzija u keramičkoj strukturi. Iako je i ovaj kriterij podložan subjektivnom doživljaju, bit će smanjen ako analizu većeg broja uzoraka provodi jedna osoba, prihvaćajući uvijek iste kriterije za procjenu.

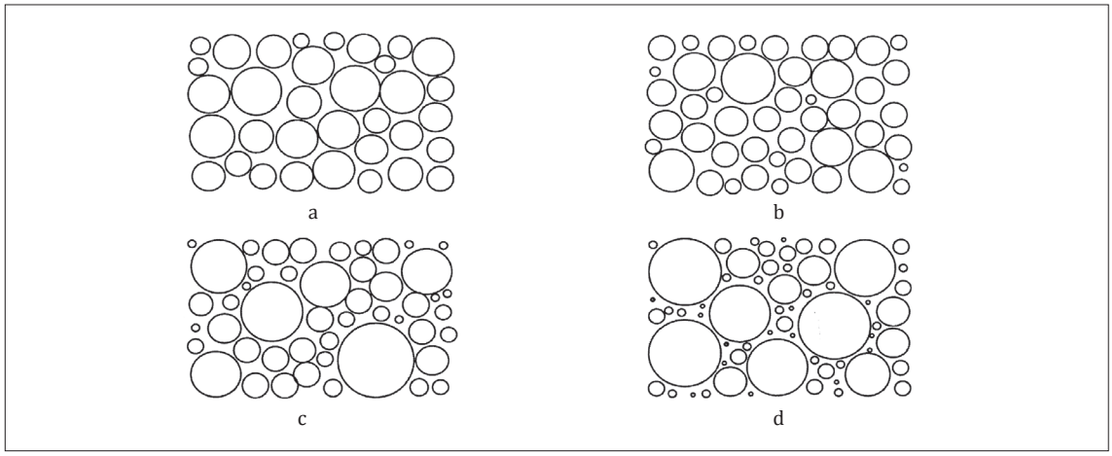
[31] Velde, Druc 1999, 26, 67–68.

[32] Quinn 2013, 83.

mentary clays, and the listed parameters are also important for identifying inclusions in the ceramic paste.[32]

Recording the grain density allows us to determine the share and kind of grains in the ceramic structure, which can enable us, for example, to determine the amount of temper added to the paste by the potter for technological or some other reasons. The simplest way to determine grain density is by using premade tables, and expressing it in percentages (Fig. 3). By observing ceramic samples at lower magnifications it is possible to estimate and record the relative density of temper and inclusion grains in the ceramic structure. Even though this criterion is subject to individual interpretation, subjectivity can be reduced if large numbers of samples are analyzed by the same person always using the same evaluation criteria.

[32] Quinn 2013, 83.



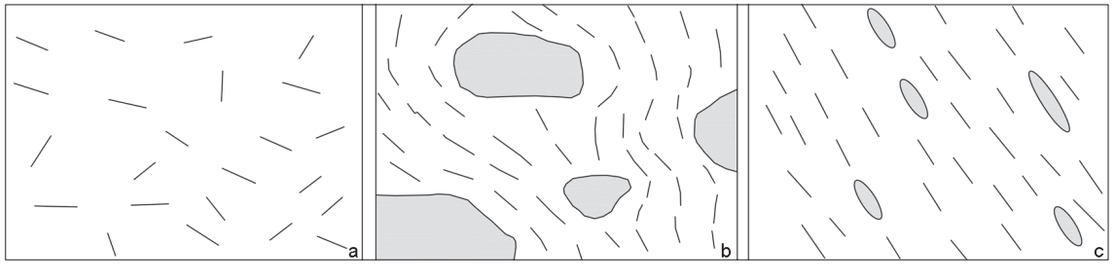
Slika / Figure 4. Grafikon za određivanje rasporeda zrna: (a) vrlo dobro raspoređena, (b) dobro raspoređena, (c) loše raspoređena, (d) vrlo loše raspoređena (Quinn 2013, 87). / Chart for determining grain distribution: (a) very well sorted, (b) moderately sorted, (c) poorly sorted, (d) very poorly sorted (Quinn 2013, 87).

Raspored inkluzija ili primjesa u smjesi pokazatelj su postupka pripreme smjese ili načina oblikovanja posude.[33] Prema kriterijima distribucije zrna mogu biti vrlo dobro, dobro, loše i vrlo loše raspoređena. U tu svrhu koriste se unaprijed određeni kriteriji iskazani u tablici (sl. 4). U istu svrhu koristi se i karakterizacija orijentacije zrna i praznina u odnosu na orijentaciju stijenke posude, a tzv. preferirana orijentacija odnosi se na položaj inkluzija i šupljina/pora u keramičkoj strukturi i na površini posude, ovisno o smjeru sile koja se na površinu vrši pri oblikovanju posude ili obrade površine.[34] Njihova orijentacija može biti paralelna, djelomično paralelna i nepravilna (sl. 5). Međutim, prisutnost pora može biti pokazatelj nekih drugih pojava. Na primjer, izdužene, paralelno orijentirane pore u strukturi upućuju na sekundarnu poroznost, a njihov nastanak može biti rezultat migracije plinova tijekom procesa pečenja keramike. Pore koje ne pokazuju preferiranu orijentaciju i pravilan oblik mogu ukazivati na lošu kvalitetu izrade keramičkih predmeta.[35] Oblik i orijentacija pora mogu ovisiti i o tehnici izrade keramičkih posuda pa izdužene i paralelno orijentirane pore mogu biti pokazatelj oblikovanja posude na

[33] Rye 1981, 61–88.
[34] Rye 1981, 61.
[35] Velde, Druc, 1999.

Distribution of temper or inclusion grains in the ceramic paste is an indicator of procedures in paste preparation, or of the vessel forming technique.[33] Based on distribution criteria, grains can be very well, moderately, poorly, or very poorly distributed. This is determined by predefined criteria shown in a table (Fig. 4). The characterization of grain and void orientation in relation to the orientation of the vessel walls is used for the same reason, i.e. the preferred orientation refers to the position of temper and voids/pores in vessel structure and on its surface depending on the direction of the force applied to the surface during vessel shaping or surface treatment.[34] Their orientation can be parallel, partially parallel and irregular (Fig. 5). However, the presence of pores can be an indicator of other phenomena, for example, elongated parallel pores indicate secondary porosity, and their emergence can be the result of gas migration during the process of firing. Pores which do not have the preferred orientation and regular shape can point to poor-quality production of ceramic objects.[35] Pore shape and orientation can also depend on the vessel forming techniques, so elongated and parallel pores can be an indicator of shaping the vessel on a potter's wheel, and round pores are an indicator of hand-made vessels.[36] Parallel ori-

[33] Rye 1981, 61–88.
[34] Rye 1981, 61.
[35] Velde, Druc, 1999.
[36] Cuomo di Caprio 2007.



Slika / Figure 5. Orijentacija zrna i pora/šupljina: (a) nepravilna, (b) djelomično orijentirana, (c) paralelno orijentirana (modificirano prema: Rye 1981, 61; Grzunov 2014). / Grain and pore/void orientation: (a) irregular orientation, (b) partially parallel orientation, (c) parallel orientation (modified after: Rye 1981, 61; Grzunov 2014).

kolu, a zaobljene pore pokazatelj su ručnog oblikovanja posude.[36] Paralelna orijentacija u pojedinim uzorcima može biti posljedica izrade posude uz pomoć rotacije, ali isto tako može biti i posljedica ručne izrade, stoga se interpretacije ovog tipa ne mogu izvoditi s potpunom sigurnošću.

Osim neplastičnih materijala (mineralnih zrna, litoklasta, groga), koje lončari obično dodaju smjesi, u strukturi pretpovijesne keramike često se nalaze i glinoviti peleti (engl. *argillaceous rock fragments*). Mikrostruktura je takvih primjesa slična strukturi glinovitog materijala stoga je njihova vidljivost na svježem lomu uzorka često smanjena. Međutim, postoje smjernice uz pomoć kojih je moguće razlikovati pelet od matriksa uz pomoć petrografskog mikroskopa s polarizirajućim svjetlom.[37] Glinoviti peleti mogu imati različiti karakter: mogu biti sastavni dio glinovitog materijala, kao posljedica nedovoljno izmiješane smjese, mogu biti namjerno dodane različite vrste glinovitog materijala da bi se poboljšala svojstva gline ili peleti mogu biti pripremljeni i dodani smjesi poput groga.[38] Definiranje karaktera glinovitih peleta nije uvijek jednostavno, ali njegova identifikacija predstavlja značajnu informaciju za rekonstrukciju proizvodnog postupka.

Osim različitih neplastičnih materijala, koje lončar dodaje smjesi, primjese mogu biti i organskog podrijetla, poput trave,

[36] Cuomo di Caprio 2007.

[37] Više u Withbread 1986; Cuomo di Caprio, Vaughan 1993.

[38] Whitbread 1986; Cuomo di Caprio, Vaughan 1993; Quinn 2013, 84; Albero Santacreu 2014, 62; Kudelić 2016.

entation can, in some samples, be the result of shaping the vessel using rotation, but can also be the result of shaping the vessel by hand, so interpretations of this sort cannot be completely accurate.

In addition to non-plastic minerals (mineral grains, lithoclasts, and grog) that the potters usually added to the paste, the ceramic fabirc usually includes argillaceous rock fragments. The microstructure of such inclusions is similar to that of clayey material, so it is often very difficult to see them in the cross section. However, there are guidelines which can be used to help differentiate between argillaceous rock fragments and the matrix by using a petrographic microscope with polarized light.[37] Argillaceous rock fragments can differ in character: they can be a constituent part of the clayey material as a result of insufficiently mixed pottery clay, they can be intentionally added to different kinds of clayey material to improve its properties, or they can be prepared and added like grog.[38] Determining the characteristics of argillaceous rock fragments is not always simple but its identification can provide very important data for reconstructing the pottery production process.

Apart from different non-plastic materials added to the paste by the potter, temper can also be organic, e.g. grass, chaff, hay, dung and so forth, and it can appear intentionally or unintentionally. Organic temper materials as well as non-plastic temper materials are added to

[37] For more, see Withbread 1986; Cuomo di Caprio, Vaughan 1993.

[38] Whitbread 1986; Cuomo di Caprio, Vaughan 1993; Quinn 2013, 84; Albero Santacreu 2014, 62; Kudelić 2016.

pljeve, slame, kravlje balege i sl. Njihova pojava također može biti slučajna i namjerna. Primjese od organskog materijala smjesi se dodaju u svrhu poboljšanja svojstava glina koje su vrlo plastične, kako bi se olakšalo oblikovanje i sušenje glinene posude te da bi se osigurala visoka razina otpornosti na termalni stres tijekom postupka pečenja i tijekom uporabe predmeta.[39] Organski materijal tijekom pečenja izgori, a u keramičkoj strukturi manifestira se u obliku šupljina i pora. Osim na takav način, njihov zapis manifestira se i u obliku tamnih mrlja nastalih uslijed njihova izgaranja i oslobađanja ugljika u strukturi keramike, a veće količine vrlo usitnjene primjese u smjesi mogu znatno utjecati na boju presjeka keramike. Prilikom promatranja svježeg loma uzorka treba navesti postoje li pokazatelji prisutnosti organskih primjesa te opisati oblik i orijentaciju pora, odnosno šupljina, ako se pretpostavlja da su nastale izgaranjem primjesa organskog podrijetla.

Dakle, veličina čestica, vrsta, oblik, raspored, gustoća, orijentacija i boja bilježe se za glinoviti materijal ako za to postoje pokazatelji. Ograničenja primjene makroskopske metode onemogućavaju potpunu karakterizaciju glinovitog materijala stoga je za potpunu analizu neophodno provesti i petrografsko-mineraloške analize. Međutim, promatranjem uzorka na prikazani način omogućeno je bilježenje boje presjeka te, ako je riječ o vrlo homogenoj smjesi bez krupnih primjesa, što omogućava bolju vidljivost matriksa, bilježi se i veličina čestica, vrsta, oblik, raspored, gustoća i orijentacija mineralnih zrna. Veličina čestica, vrsta, oblik, raspored, gustoća i orijentacija bilježe se za primjese identificirane u glinovitu materijalu poput kvarca, pjeskovitog materijala, groga i sl. Ako je zabilježeno korištenje više vrsta primjesa, za svaku posebno bilježi se oblik, a zajednički se bilježi veličina čestica, raspored, gustoća i orijentacija. Oblik, raspored i orijentacija bilježe se za pore i šupljine u keramičkoj strukturi.

[39] Skibo, Schiffer, Reed 1989; Gibson, Woods 1990, 27; Velde, Druc 1999, 83; Quinn 2013, 156, 158.

the ceramic paste in order to reduce the plasticity of the clayey material, to facilitate the forming and drying of the vessel, to ensure a good level of heat resistance during the firing process, and while the vessel is being used.[39] Organic material is burned off during firing, and appears in the ceramic structure in the form of voids and pores. It is also visible as small dark spots caused by the burning of the organic material and oxygen release within the pottery structure. Larger amounts of very finely shredded inclusions in the ceramic paste can significantly affect the color of pottery cross sections. When observing the cross section of a sample, one should record indicators of organic temper material presence, and should describe the shape and orientation of pores and voids if one assumes they are present due to organic inclusion burning.

Finally, grain size, type, shape, distribution, density, orientation, and color for the clayey material are recorded if there is a need to do so. Certain limitations of applying the macroscopic method do not allow for a complete characterization of the clayey material. Therefore, it is necessary to conduct a complete petrographic and mineralogical analysis. However, by observing the sample in the presented manner we are able to record the color of the cross section and, in case of working with a very homogenous paste without large inclusions which make studying the matrix easier, to record grain size, kind, shape, distribution, density and orientation, as well as the orientation of mineral grains. Grain size, kind, shape, distribution, density and orientation are recorded for those inclusions identified in the clayey material such as quartz, sandy material or grog. If more kinds of inclusions were used, the shape of each is recorded separately for each kind, and size, distribution, density, and orientation are recorded together. The shape, distribution, and orientation are also recorded for pores and voids in the ceramic structure.

[39] Skibo, Schiffer, Reed 1989; Gibson, Woods 1990, 27; Velde, Druc 1999, 83; Quinn 2013, 156, 158.

3. KARAKTERISTIKE LONČARSKIH SMJESA IZ BRONČANOG DOBA

Predstavljena metoda primijenjena je na uzorcima keramičkih posuda različitih kultura i kulturnih grupa brončanog doba s prostora sjeverne Hrvatske. Keramički je materijal otkriven tijekom arheoloških istraživanjima i definiran je relativno te apsolutno kronološki. Makrofotografijom je dokumentirano i analizirano ukupno 246 uzoraka keramike. Od toga 12 uzoraka pripada keramici vinkovačke kulture (nalazište: Donji Miholjac), 15 uzoraka keramici kulture Kisapostag i licenskoj keramici s područja Turopolja i Podravine (nalazišta: Đelekovec-Log, Vratnec, Kurilovec, Selnica Ščitarjevska), 13 uzoraka panonskoj inkrustiranoj keramici (nalazište: Jagodnjak-Krčevine), 182 uzorka pripada keramičkim posudama grupe Virovitica s područja Turopolja (nalazišta: Kurilovec-Belinščica, Selnica Ščitarjevska) i Podravine (nalazišta: Vratnec, Podvratnec, Podgorica, Podpanje, Jablanec, Močvar) i 24 uzorka kasnobrončanodobnoj keramici (nalazišta: Kalnik-Igrišče, Dubovac-Stari grad). Karakterizacija i opis sastava lončarske smjese, a to se posebno odnosi na glinoviti materijal i neplastične mineralne sirovine, bit će mnogo kvalitetniji ako analitičar do neke mjere poznaje geološki sastav tla područja koje istražuje.

3.1. KARAKTERIZACIJA GLINOVITOG MATERIJALA

Radi potpunije i kvalitetnije interpretacije, korišteni su rezultati već provedenih arheometrijskih analiza keramike i glina[40] kako bi se stekao bolji uvid u sastav sirovinskog materijala i njegovo podrijetlo. Rezultati provedenih arheometrijskih analiza keramike i glinovitog materijala, koji je prikupljen u blizini pretpovijesnih naselja na području Podravine i dijela Posavine (Tu-

[40] Petrografsko-mineraloške analize provedene su na ukupno 64 uzorka, od toga na 49 uzoraka keramike grupe Virovitica, 3 uzorka licenske keramike te 9 uzoraka kasnobrončanodobne keramike s nalazišta Kalnik-Igrišče.

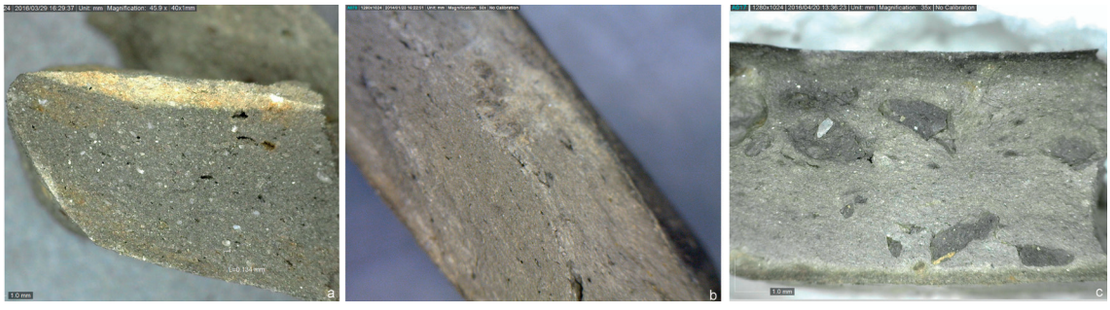
3. CHARACTERISTICS OF BRONZE AGE CERAMIC PASTES

The presented method was applied to samples of pottery vessels ascribed to different Bronze Age cultures and cultural groups from the territory of northern Croatia. The pottery was discovered in archaeological excavations and was chronologically dated both relatively and absolutely. Macrophotography was used to document and analyze a total of 246 pottery samples. A total of 12 samples belong to the Early Bronze Age Vinkovci Culture (site: Donji Miholjac), 15 samples to the Kisapostag Culture and Litzen pottery from Turopolje and the Podravina region (sites: Đelekovec-Log, Vratnec, Kurilovec, Selnica Ščitarjevska), 13 samples to Pannonian Encrusted Ware (site: Jagodnjak-Krčevine), 182 samples belong to pottery vessels of the Virovitica group from the Turopolje region (sites: Kurilovec-Belinščica, Selnica Ščitarjevska) and Podravina (sites: Vratnec, Podvratnec, Podgorica, Podpanje, Jablanec, Močvar), and 24 samples are Late Bronze Age pottery vessels (sites: Kalnik-Igrišče, Dubovac-Stari grad). The characterization and description of the ceramic paste, which especially refers to clayey material and non-plastic mineral raw materials, will be of higher-quality if the researcher is familiar with the geological composition of soil across the studied territory.

3.1. CHARACTERIZATION OF CLAYEY MATERIAL

In order for the interpretation to be more complete and of higher quality, the results of previously conducted archaeometric analyses (optical microscopy, XRD) conducted on pottery and clayey material samples were used primarily to gain better insight into the composition of the raw material and its origin.[40] The results of the conducted archaeometric analyses of pottery and samples of clayey material collected

[40] Petrographic and mineralogical analyses were conducted on a total of 64 samples, on 49 pottery samples of the Virovitica group, 3 samples of Litzen pottery, and 9 samples of Late Bronze Age pottery from the site of Kalnik-Igrišče.



Slika / Figure 6. Makrofotografije keramičkih struktura brončanodobne keramike načinjene od gline s finim do vrlo finim zrnima kvarcnog pijeska: (a) vinkovačka kultura – Donji Miholjac, uvećanje 45 x; (b) licenska keramika – Đelekovec-Log, uvećanje 60 x; (c) panonska inkrustirana keramika – Jagodnjak-Krčevine, uvećanje 35 x (snimila: A. Kudelić). / Macrophotographs of Bronze Age pottery made of clay with fine and very fine grains of quartz sand: (a) the Vinkovci Culture – Donji Miholjac, magnification 45 x; (b) Litzen pottery – Đelekovec-Log, magnification 60 x; (c) Pannonian Encrusted Ware – Jagodnjak-Krčevine, magnification 35 x (photo by: A. Kudelić).

ropolje), pokazuju da je za izradu posuda u brončano doba korišten sirovinski materijal lokalnog podrijetla.[41] Niz je provedenih istraživanja pokazao da udaljenost od mjesta eksploatacije sirovine do mjesta na kojem se izrađuju posude može iznositi od 1 do 10 km, međutim, najčešće se glina nabavlja u radijusu od 1 km od mjesta izrade posuda.[42] Većina je analiziranih keramičkih uzoraka pronađena u naseljima nizinskog tipa, smještenih uz veće ili manje vodotoke, stoga se pretpostavlja da je aluvijalni tip glina bio dovoljno kvalitetan i lako dostupan. Na osnovi iznesenih rezultata istraživanja i pretpostavki slično se može zaključiti i za nalaze na kojima nisu provedene arheometrijske analize iako su za dio uzoraka one u postupku obrade.

Promatranjem svježeg loma keramičkih uzoraka pomoću digitalnog mikroskopa zabilježena su i izmjerena vidljiva zrna u matriksu te je struktura okarakterizirana kao fina do vrlo fina, sastavljena od relativno sitnih zrna, veličine od 0,03 mm do 0,25 mm, djelomično uglatih i dobro raspoređenih (sl. 6). S obzirom na to da glinovito tlo aluvijalnog podrijetla sadrži samo određeni udio minerala glina, a preostali je dio sačinjen od praha i pjeskovitog materijala,[43]

[41] Kudelić 2015; Kudelić *et al.* 2018.

[42] Rice 1987, 116; Arnold 2000, 343.

[43] Pijesak je prirodni granularni materijal, sačinjen od fino razdijeljenih čestica stijena i minerala. Ako se odnosi na ter-

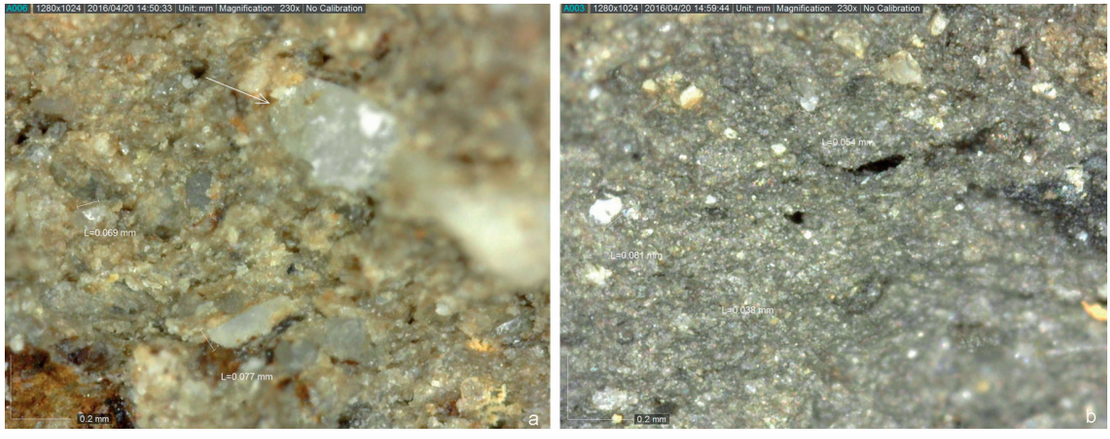
in the vicinity of prehistoric sites in Podravina and part of Posavina (Turopolje) show that raw material of local origin was used to produce vessels in the Bronze Age.[41] A series of studies has shown that the distance between the place of raw material exploitation and the location where vessels were produced can vary from 1 to 10 km, but that clay is most often collected in a radius of 1 km from the place of production.[42] Most of the analyzed pottery samples were found in lowland types of settlements that were situated near larger or smaller watercourses. Hence, the assumption is that alluvial clays were of good enough quality and easily available. Based on the presented research results and assumptions, the same can also be concluded for the finds which have not been microscopically studied, although some sample analyses are currently being conducted.

By observing the cross sections of ceramic samples using a digital microscope, visible grains in the matrix were recorded measuring between 0.03 mm to 0.25 mm in size, subangular and well distributed, so the fabric was defined as varying from fine to very fine (Fig. 6). Considering the fact that clayey soil of alluvial origin contains only a certain amount of clay minerals, and the rest is made up of powder and sandy material,[43] it is assumed that

[41] Kudelić 2015; Kudelić *et al.* 2018.

[42] Rice 1987, 116; Arnold 2000, 343.

[43] Sand is a natural granulated material made up of finely dispersed rock particles and minerals. In geology, it is mate-



Slika / Figure 7. Makrofotografije kvarcnog pijeska u keramičkoj strukturi posuda vinkovačke kulture – Donji Miholjac: (a) uvećanje 230 x, (b) uvećanje 230 x (snimila: A. Kudelić). / Macrophotographs of quartz sand in the structure of Vinkovci Culture pottery vessels – Donji Miholjac: (a) magnification 230 x, (b) magnification 230 x (photo by: A. Kudelić).

pretpostavlja se da je riječ o prirodnoj sastavnici sirovine i da je riječ o sitnom pijesku koji se sastoji od više vrsta silikatnih minerala, poput kvarca, feldspata, tinjaca i dr. S obzirom na mogućnosti makroskopske analize, o podrijetlu materijala ne može se reći mnogo više. Ipak, postoje minerali koji se mogu identificirati pomoću digitalnog mikroskopa, odnosno promatranjem svježeg loma uzorka pri manjim uvećanjima.

Najučestaliji i najprepoznatljiviji mineral je kvarc (sl. 7). Pripada skupini silikatnih minerala, a razlikuje se nekoliko varijeteta. Kvarc kristalizira heksagonski, svijetle je boje i staklastog sjaja te vrlo visoke tvrdoće. Sličan petrogeni mineral, svijetle boje te jednako učestao (tvori više od 60% Zemljine kore) je feldspat koji, za razliku od kvarca, mijenja svojstva pod utjecajem vode, a nalazi se u sedimentnim, magmatskim i metamorfnim stijenama. Predstavlja skupinu minerala (alkalne feldspate, kao npr. ortoklas, i plagioklase, kao npr. albiti) koje nije moguće razlikovati uporabom samo digitalnog mikroskopa pa su za identifikaciju potrebne petrografske ili kemijske

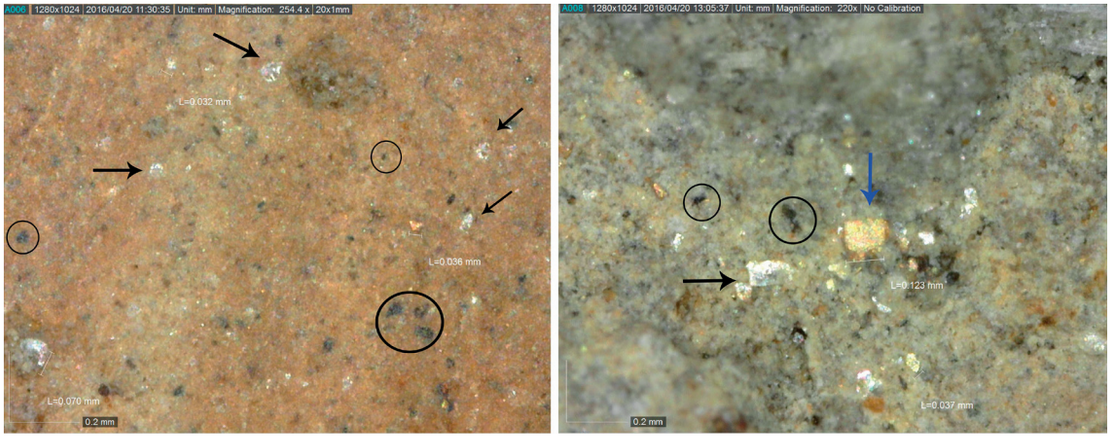
the grains are a natural component of the raw material, and that they are grains of fine sand comprised of more kinds of silicate minerals such as quartz, feldspar, mica etc. Regarding the limitations of macroanalysis we cannot say much more about the origin of the raw material. However, there are minerals which can be identified using a digital microscope, i.e. by studying cross sections under lower magnifications.

The most common and recognizable mineral is quartz (Fig. 7). It falls under the group of silicate minerals, and appears in several variants. Quartz crystallizes in a hexagonal pattern, is light in color, has a glassy sheen, and is very hard. Feldspar is a similar rock-forming mineral, light in color, is equally frequent (makes up over 60% of the Earth's crust) and, unlike quartz, changes its properties under the influence of water and can be found in sedimentary, igneous, and metamorphic rocks. It represents a group of minerals (alkaline feldspar such as orthoclase and plagioclase like albite) that cannot be discerned by using a digital microscope, but requires petrographic or chemical analyses.[44] This way, we can study the physi-

min u geologiji, riječ je o materijalu čiji je promjer od 60 do 200 mikrometara. Pijesak je najvećim dijelom sačinjen od silicijeva dioksida, SiO_2, najčešće u formi kvarca. Sastav je pijeska varijabilan i može sadržavati: muskovit, cirkon, rutil, apatit, granat, magnetit, turmalin itd.

rial measuring 60 – 200 micrometers in diameter. Sand is mostly comprised of silica SiO2, mostly in the form of quartz. The composition of sand varies and can contain: muscovite, zircon, rutile, apatite, garnet, magnetite, tourmaline, etc.

[44] Druc 2015, 24.



Slika / Figure 8. Makrofotografije minerala iz skupine tinjaca u keramičkoj strukturi; crni krugovi označavaju biotit i/ili amfibole, crne strelice označavaju muskovit, a plava flogopit; panonska inkrustirana keramika – Jagodnjak-Krčevine: (a) uvećanje 250 x, (b) uvećanje 220 x (snimila: A. Kudelić). / Macrophotographs of minerals from the mica group in the pottery fabric; black circles denote biotite and/or amphibolites, black arrows denote muscovite, and the blue one denotes phlogopite; Pannonian Encrusted Ware – Jagodnjak-Krčevine: (a) magnification 250 x, (b) magnification 220 x (photo by: A. Kudelić).

analize.[44] Na taj način promatraju se fizička svojstva pojedinih minerala i lom svjetla s njihove površine koji manifestira razlike u građi minerala, odnosno uređenost njihove kristalne rešetke. Pomoću digitalnog mikroskopa, razliku između feldspata i kvarca nije moguće sa sigurnošću utvrditi na temelju njihovih fizičkih karakteristika,[45] jer ovi minerali mogu biti izrazito slični.

Velik je broj posuda izrađen od smjese koja sadrži izrazito svjetlucavi pijesak. Riječ je o sitnim zrnima minerala iz skupine tinjaca ili liskuna (muskovit), slojevitih silikata koji se lome u listićima. Oni također pripadaju skupini silikatnih minerala koji su vrlo učestala sastavnica glinovitog materijala koji se koristio za izradu posuda u bronča-no doba, odnosno prirodna su sastavnica tala na prostoru sjeverne Hrvatske, posebice pijeska. Najzastupljeniji minerali iz skupine tinjaca su muskovit i biotit (sl. 8). Biotit je mineral tamnozelene do crne boje i vrlo je sličan mineralu amfibolu. Muskovit je uglavnom bezbojan, odnosno bijeli tinjac, ponekad žutih i smeđih tonova, dok je flogopit zlatne boje.

[44] Druc 2015, 24.

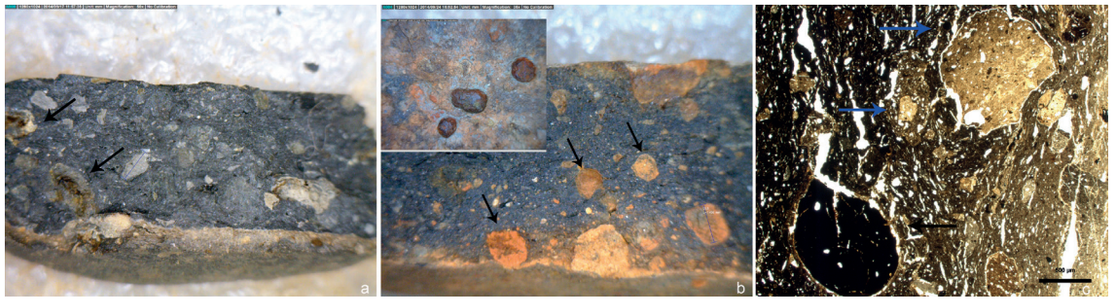
[45] Druc 2015, 24.

cal properties of individual minerals and the way light reflects from their surface, which is affected by differences in mineral composition, i.e. the organization of their crystalline grid. It is not completely possible to identify differences between feldspar and quartz based on the physical characteristics of each mineral by using a digital microscope,[45] because they can be very similar.

A large number of vessels is made from paste that contains highly reflective sand. The sand is comprised of tiny mineral grains from the group of mica (muscovite), layered silicates that break off in thin sheets. The group of minerals is a very common compound in clayey material used to produce Bronze Age vessels as it is a natural component of northern Croatian soils, especially sand. The most represented minerals from the mica group are muscovite and biotite (Fig. 8). Biotite is a dark green-black mineral and is very similar to amphibolites. Muscovite is mostly colorless, that is, a white kind of mica that sometimes appears in yellow and brown tones, while phlogopite is golden.

Oxides and hydroxides are also natural soil components, which make up a large portion of the Earth's crust, and many of them are im-

[45] Druc 2015, 24.



Slika / Figure 9. Makrofotografije oksida i hidroksida u keramičkoj strukturi; crne strelice označavaju željezovite granule i okside iz tla, a plave strelice grog: (a) Kurilovec-Belinščica, uvećanje 50 x; (b) Podgorica, uvećanje 35 x; manja makrofotografija prikazuje granule na površini posude, uvećanje 30 x; (c) Podgorica, mikrofotografija keramičkog preparata s vidljivim crnim zrnom željezova oksida, možda getita (snimile: A. Kudelić, M. Mileusnić). / Macrophotographs of oxides and hydroxides in the pottery fabric; black arrows denote ferrous granules and oxides from the soil, and blue ones denote grog: (a) Kurilovec-Belinščica, magnification 50 x; (b) Podgorica, magnification 35 x; the smaller macrophotograph shows granules on the vessel surface, magnification 30 x; (c) Podgorica, microphotograph of a pottery thin section sample with a visible black grain of an iron oxide, possibly goethite (photo by: A. Kudelić, M. Mileusnić).

Prirodna su sastavnica tla i oksidi i hidroksidi koji čine velik dio Zemljine kore i mnogi su od njih važni minerali, npr. hematit, magnetit i getit (željezovi oksidi / hidroksidi). U glinovitome materijalu manifestiraju se kao oksidirana zrna zaobljena ili djelomično zaobljena, crveno-smeđih, smeđih ili tamnijih, crnih tonova.[46] Tla sjeverne Hrvatske bogata su željezovim oksidima koji se vrlo lako primjećuju na keramici (sl. 9a). Hematit i ostali željezovi oksidi mogu se koristiti za pripremu pigmenata i glinovitih suspenzija za premaze koji se ponekad nanose na površinu posude u dekorativne svrhe. Iako su oksidi prisutni u gotovo svim analiziranim uzorcima, na keramičkim uzorcima iz srednjeg i kasnoga brončanog doba s prostora Podravine zabilježena je izrazitija pojava ovalnih oksidiranih granula promjera i do 3 mm (sl. 9: b, c). Takva su zrna pronađena i u uzorcima tla u blizini arheoloških nalazišta iste mikroregije.[47]

Uvidom u makrofotografije uzoraka keramičkih posuda brončanog doba s prostora sjeverne Hrvatske, kao i na osnovi rezultata provedenih petrografsko-mineraloških analiza,[48] može se zaključiti da je glinoviti

[46] Druc 2015.

[47] Kudelić *et al.* 2018.

[48] Kudelić 2015; Kudelić *et al.* 2018.

portant minerals, e.g. hematite, magnetite, and goethite (iron oxides / hydroxides). In the clayey material, they appear as rounded or subrounded oxidized grains, which vary in color from red-brown to brown or darker, black tones.[46] Northern Croatian soils are rich in iron oxides, which are easily identified in pottery sample cross sections (Fig. 9a). Hematite and other iron oxides can be used in preparing pigments and clayey suspensions for coating, which are sometimes applied to the surfaces of vessels for decorative purposes. Although oxides are present in almost all of the analyzed samples, Middle and Late Bronze Age samples from Podravina more frequently include oval oxidized granules measuring up to 3 mm in diameter (Fig. 9: b, c). Such grains were also found in soil samples collected in the vicinity of the archaeological sites in the same region.[47]

By studying macrophotographs of Bronze Age pottery vessel samples from northern Croatia, and on the basis of the previously conducted petrographic and mineralogical analyses,[48] we can conclude that the clayey material contained silicate minerals (quartz, muscovite, biotite, amphibole, pyroxene), iron oxides and, less frequently, carbonates (calcite, dolomite). The listed minerals are natural components of the

[46] Druc 2015.

[47] Kudelić *et al.* 2018.

[48] Kudelić 2015; Kudelić *et al.* 2018.

materijal sastavljen od silikatnih minerala (kvarca, muskovita, biotita, amfibola, piroksena), željeznih oksida i hidroksida te rjeđe karbonata (kalcit, dolomit). Navedeni su minerali prirodna sastavnica glinovitog materijala koji se koristio za izradu keramičkih posuda. Njihova zrna često nisu veća od 0,15 mm i imaju mali utjecaj na uporabna svojstva gotovog proizvoda.

3.2. KARAKTERIZACIJA PRIMJESA

U strukturi keramike iz brončanog doba često se nalaze veća zrna različith stijena i minerala, uglavnom pjeskovitog materijala (litoklasti), ili neke druge vrste neplastičnih materijala (grog) veličine od 0,1 do otprilike 3 mm. Takva zrna u lončarskoj smjesi mogu biti prirodna sastavnica glinovitog materijala, ali mogu biti pokazatelj uporabe posebno prikupljenog ili pripremljenoga sirovinskog materijala koji je lončar namjerno dodao smjesi (usitnjena stijena, pijesak, šljunak ili grog). Međutim, kako razlikovati zrna litoklasta ili minerala, koji su prirodna sastavnica tla (inkluzije), od namjerno dodanih primjesa minerala i stijena na svježem lomu uzorka pri manjim uvećanjima? Neplastični materijali, koji nisu prirodna sastavnica glinovitog materijala, npr. grog, razna zrna metamorfnih, sedimentnih i magmatskih stijena, i šljunak mogu se identificirati kao primjese. Iz ovih bi razloga bilo dobro da analitičar poznaje geologiju područja koje istražuje. Osim toga, vrlo je dobar pokazatelj veličina zrna i njihova zastupljenost/gustoća.[49] Ako je na svježem lomu uzorka zabilježeno jedno krupnije zrno, može se pretpostaviti da je riječ o prirodnoj inkluziji iz glinovitog materijala ili slučajnoj inkluziji koja nije uklonjena tijekom postupka pripreme smjese. Međutim, ako se krupna zrna litoklasta ili neke druge vrste mineralnih, organskih ili antropogenih materijala učestalo nalaze u keramičkoj strukturi te ako se takva tzv. gruba keramička struktura povezuje s određenim tipom posude, onda je riječ o namjerno dodanoj pri-

[49] Više u Shepard 1985, 161–165; Quinn 2013, 159–161.

clayey material used for pottery production. The mineral grains are often no larger than 0.15 mm, and they have little effect on the characteristics of the finished product.

3.2. CHARACTERIZATION OF TEMPER MATERIAL

The ceramic fabric of Bronze Age pottery often contains larger grains of different kinds of rocks and minerals, mostly sandy material (lithoclasts), or other kinds of non-plastic materials (grog), which vary in size from 0.1 to approximately 3 mm. Such grains in ceramic pastes can be natural components of clayey material, but can indicate specially collected or prepared raw material intentionally added to the paste by the potter (ground rock, sand, gravel, or grog). Still, how does one differentiate between grains of lithoclasts or minerals that are a natural component of soil (inclusions) and intentionally added temper of minerals and rocks on sample cross sections of fresh breakage when using smaller magnification? Non-plastic materials that are not a natural component of the clayey material, e.g. grog, different grains of metamorphous, sedimentary, and magmatic rocks and gravel can be identified as temper. This is why it is good for the researcher to know the geology of the area under study. Apart from that, grain size and distribution are very good indicators.[49] If one larger grain is visible on fresh breakage of a sample, one can assume that it is a natural inclusion in the clayey material or that it is a chance inclusion which was not removed in the from the clay paste during the preparation process. However, if larger grains of lithoclasts or some other kind of mineral, organic or anthropogenic materials are frequently found in the pottery structure, and if such a coarse ceramic fabric is connected to, for example, specific types of vessels, then we are dealing with an intentionally

[49] For more, see Shepard 1985, 161–165; Quinn 2013, 159–161.

mjesi.[50] S obzirom na to da je receptura lončarske smjese u izravnoj vezi s lončarevim odlukama, praksom, tradicijom i funkcijom konačnog proizvoda, ovaj segement analize od velike je važnosti za rekonstrukciju postupka proizvodnje posuda.

Analizom makrofotografija keramike vinkovačke kulture (26 – 22. st. pr. Kr.) s nalazišta Donji Miholjac primijećena je velika raznolikost lončarskih smjesa (12 uzoraka). Budući da uzorke nije bilo moguće povezati s tipom posude, zbog fragmentiranosti materijala napravljena je analiza ulomaka vidljivo različitih struktura kako bi se bolje upoznao materijal i stekao uvid u recepturu, kao i identificirale vrste primjesa. Stijenke su svih uzoraka relativno tanke, a vrijednosti njihove debljine kreću se od 0,35 do 0,6 cm. Primijećene su smjese kojima nisu dodavane primjese, a takvi su uzorci uglavnom okarakterizirani kao fina keramička struktura. Smjesa nakon pečenja poprimila je tamnosivu boju, a sastavljena je od vrlo finog do finog pijeska, djelomično uglatih i djelomično zaobljenih, vrlo dobro raspoređenih zrna silikatnih minerala. Od takve sitnozrnate smjese izrađene su posude glatke površine bez ukrasa, sive i tamnosive boje (sl. 10). Identificirana je i smjesa prirodne sitnozrnate strukture koja sadrži veće pore, odnosno šupljine, koje su vjerojatno posljedica pripreme smjese. Osim toga, primijećena su zrna pijeska i groga u malim količinama, do 1%. (sl. 11). Treća identificirana vrsta smjese sadrži 20% mineralnih primjesa, poput kvarcnog pijeska i litoklaste (kvarcit) maksimalne veličine 1,7 mm (sl. 12a). Zrna su djelomično uglata do djelomično zaobljena, loše su raspoređena i nemaju preferiranu orijentaciju. Na makrofotografiji svježeg loma uzorka primijećena je i promjena u boji koja se povezuje s izgaranjem organskog materijala, ali nema dovoljno pokazatelja pomoću kojih bi se organska primjesa mogla okarakterizirati. Međutim, zabilježen je i uzorak koji sadrži organski materijal, vidljiv na makrofotografiji svježeg loma uzorka, kao i na njegovoj

[50] Više u Shepard 1985, 161–165; Quinn 2013, 165.

added temper.[50] Seeing as ceramic paste composition is in direct connection with the potter's decisions, practice, tradition, and the function of the finished product, this segment of analysis is very important for reconstructing the process of pottery production.

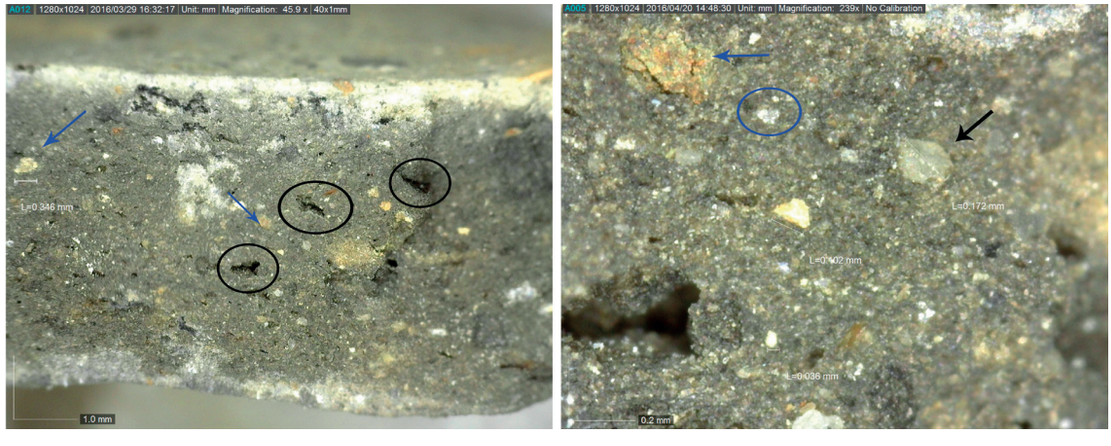
The analysis of macrophotographs of pottery material ascribed to the Early Bronze Age Vinkovci Culture (26th – 22nd cent. BC) from the site of Donji Miholjac revealed a high diversity of ceramic pastes (12 samples). Seeing as the samples could not be linked to specific types of vessels due to their fragmentation, the analysis was conducted on fragments with various visible fabrics in order to gain an insight into the recipe and to identify the type of temper. The walls of all the samples are relatively thin, and their thickness varies between 0.35 and 0.6 cm. Certain non-tempered pastes were noted, and such samples were mostly characterized as fine-grained fabric. Such ceramic pastes turned dark gray after firing, and are composed of very fine to fine sand composed of subangular and subrounded, very well distributed grains of silicate minerals. These fine-grained pastes were used to make vessels with smooth, undecorated surfaces, varying in color from gray to dark gray (Fig. 10). Another paste was identified that is also composed of naturally fine-grained clay with visible larger pores, that is, voids that are probably the result of clay paste preparation. In addition, tiny grains of sand and grog were noted in small amounts, up to 1% (Fig. 11). The third identified paste contains 20% of mineral inclusions such as quartz sand and lithoclasts (quartzite) of up to 1.7 mm in size (Fig. 12a). The grains are subangular to subrounded and are poorly sorted without a preferred orientation. A macrophotograph of a cross section showed a change in color that is associated with organic material burning, but there are not enough indicators that could help characterize the type of organic temper. However, a sample containing organic material visible on a macrophotograph of the sample cross section, as well as on its surface, was also noted (Fig. 13). Considering the density and relatively well distributed traces of burned organic material, we

[50] For more, see Shepard 1985, 161–165; Quinn 2013, 165.

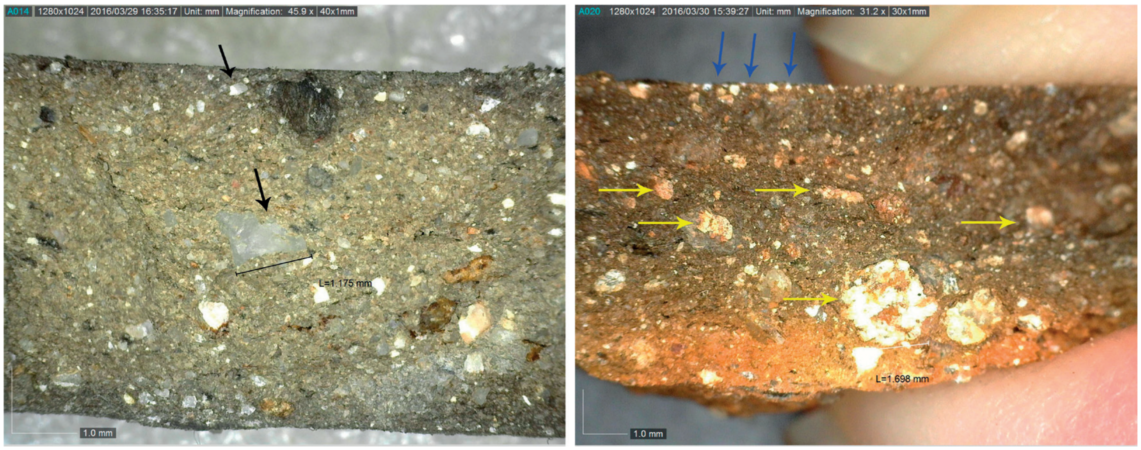
Slika / Figure 10. Makrofotografije vinkovačke keramike sastavljene od finih do vrlo finih zrna kvarcnog pijeska – Donji Miholjac: (a) uvećanje 36 x, (b) uvećanje 240 x (snimila: A. Kudelić). / Macrophotographs of Vinkovci Culture pottery comprised of fine to very fine grains of quartz sand – Donji Miholjac: (a) magnification 36 x, (b) magnification 240 x (photo by: A. Kudelić).

površini (sl. 13). S obzirom na gustoću i relativno dobro raspoređene tragove izgorenoga organskog materijala, može se zaključiti da organska primjesa, vrlo vjerojatno napravljena od suhe trave, slame ili pljeve u smjesi, nije slučajna. U istoj su smjesi zabilježena sitna zrna kvarcnog pijeska te veća zrna litoklasta od kojih se prepoznaje kvarcit i nedefinirana vrsta veličine dimenzija 1,5 mm u količni do 5% (sl. 13a). Lončarska smjesa uzorka broj osam pripremljena je slično kao i smjesa uzorka broj šest s jedna-

can conclude that the organic temper, probably made from dry grass, hay, or chaff, was not unintentional. The same paste also has tiny grains of quartz sand and larger grains of lithoclasts that contain quartzite and an unidentified kind of rock which is 1.5 mm in diameter and appears in amounts of up to 5% (Fig. 13a). The paste of sample 8 is prepared similarly to that of sample 6, has the same amount of temper material (20%), grain size, and wall thickness (0.55 cm), but a different kind of temper. The paste contains lithoclasts, quartz sand, and grains



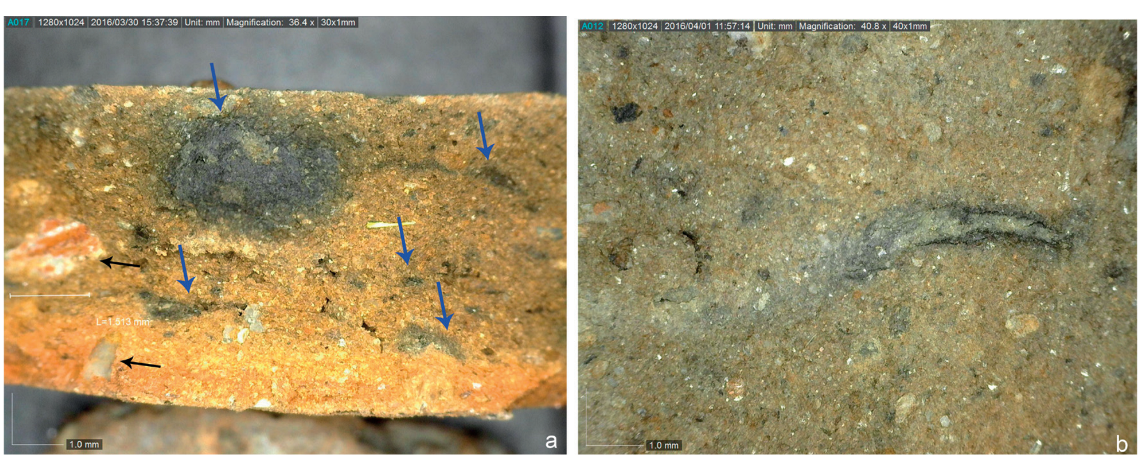
Slika / Figure 11. Makrofotografije vinkovačke keramike sastavljene od finih do vrlo finih zrna kvarcnog pijeska (plavi krug) koja sadrži i vrlo malu količinu sitnih zrna groga (plave strelice). Crni krugovi označavaju praznine u keramičkoj strukturi – Donji Miholjac: (a) uvećanje 45 x, (b) uvećanje 240 x (snimila: A. Kudelić). / Macrophotographs of Vinkovci Culture pottery comprised of fine to very fine grains of quartz sand (blue circle), which also contains a very small amount of tiny grains of grog (blue arrows); black circles denote voids in the ceramic fabric – Donji Miholjac: (a) magnification 45 x, (b) magnification 240 x (photo by: A. Kudelić).



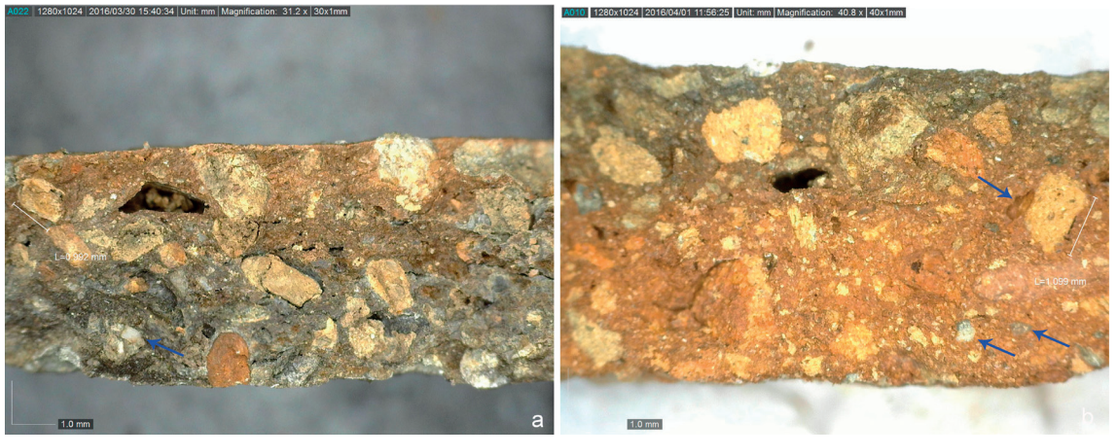
Slika / Figure 12. Makrofotografije vinkovačke keramike sastavljene od srednje finih do finih zrna kvarcnog pijeska – Donji Miholjac: (a) smjesa sadrži 20% primjesa kvarcnog pijeska i litoklasta (kvarcit je označen crnom strelicom), uvećanje 45 x; (b) smjesa sadrži 20% groga (označen žutim strelicama) i nekoliko zrna litoklasta, dok plave strelice označavaju paralelan raspored primjesa s unutarnjom stijenkom posude, uvećanje 36 x (snimila: A. Kudelić). / Macrophotographs of Vinkovci Culture pottery comprised of medium-fine to fine grains of quartz sand – Donji Miholjac: (a) the paste is tempered with 20% of quartzite sand and lithoclast (quartzite is marked by a black arrow), magnification 45 x; (b) the paste contains 20% of grog (marked by yellow arrows) and several grains of lithoclasts, while blue arrows denote the parallel distribution of inclusions in relation to the inner surface of the vessel, magnification 36 x (photo by: A. Kudelić).

kom količinom primjesa (20%), veličinom zrna i debljinom stijenki (0,55 cm), međutim, vrsta je primjese drugačija. Smjesa sadrži zrna litoklasta, kvarcni pijesak i zrna groga (sl. 12b). Zrna su djelomično uglata do djelomično zaobljena, loše raspoređena i nemaju preferiranu orijentaciju. Osim nave-

of grog (Fig. 12b). The grains are subangular to subrounded, poorly sorted, and do not have preferred orientation. In addition to the listed characteristics, the pastes can be characterized as fine to medium-fine, and it can be noted that some pastes contained up to 40% of temper material added intentionally by the potter - mostly



Slika / Figure 13. Makrofotografije vinkovačke keramike s tragovima primjesa od organskog materijala u keramičkoj strukturi i na površini posude vinkovačke kulture – Donji Miholjac: (a) plave strelice pokazuju tragove izgorenog organskog materijala, a crne strelice pokazuju primjese većih zrna litoklasta, uvećanje 40 x; (b) makrofotografija površine posude s tragom izgorenog materijala organskog podrijetla, uvećanje 40 x (snimila: A. Kudelić). / Macrophotographs of Vinkovci Culture pottery with traces of organic material temper in the ceramic fabric and on the surface of the vessel – Donji Miholjac: (a) blue arrows denote traces of burned-up material, and black arrows denote inclusions of larger grains of lithoclasts, magnification 40 x; (b) a macrophotograph of a vessel surface with traces of burned-up material of organic origin, magnification 40 x (photo by: A. Kudelić).



Slika / Figure 14. Makrofotografije svježeg loma keramike vinkovačke kulture sa 40% primjesa groga i/ili glinovitih peleta – Donji Miholjac: (a) uvećanje 30 x, (b) uvećanje 40 x (snimila: A. Kudelić). / Macrophotographs of Vinkovci Culture pottery tempered with 40% of grog and/or argillaceous rock fragments – Donji Miholjac: (a) magnification 30 x, (b) magnification 40 x (photo by: A. Kudelić).

denih karakteristika smjesa, koje se mogu okarakterizirati kao fine i srednje fine, zabilježene su i smjese kojima je lončar dodao čak 40% primjesa uglavnom krupnih, djelomično uglatih do djelomično zaobljenih zrna groga, i/ili glinovitih peleta veličine do 1,5 mm (sl. 14: a, b) te s obzirom na relativno tanku stijenku, krupna su zrna vrlo loše raspoređena.

Ranobrončanodobna kultura Kisapostag (22. – 19. st. pr. Kr.), čiji se materijalni ostaci nalaze uglavnom na prostoru zapadnog dijela savsko-dravskog međurječja, na našim prostorima još uvijek nije u potpunosti istražena, kao ni njezina veza sa srednjobrončanodobnom licenskom keramikom (18. – 15. st. pr. Kr.).[51] Osnovna razlika između kulture Kisapostag i licenske keramike način je ukrašavanja posuda (lončari kulture Kisapostag na površinu su posude utiskivali namotanu uzicu, a na površinu licenske keramike utiskivala se pletena vrpca). Kultura Kisapostag tumači se kao protolicenska faza, a na prostoru Transdanubije predstavlja prethodnicu kultura inkrustirane keramike[52] koja se na prostoru sjeverne Hrvatske pojavljuje na području Baranje. Preliminarno su pregledani uzroci

large, subangular to subrounded grains of grog and/or argillaceous rock fragments up to 1.5 mm in size (Fig. 14: a, b). Considering the relatively thin vessel walls, the large grains are very poorly sorted.

The Early Bronze Age Kisapostag Culture (22nd – 19th cent. BC), the material remains of which can mostly be found on the territory of the western part of the Sava-Drava river plains, has still not been fully researched, just like its relation to the Middle Bronze Age Litzen pottery (18th – 15th cent. BC).[51] The basic difference between Kisapostag and Litzen pottery is in decoration (potters of the Kisapostag Culture pressed string into the clay, and those producing Litzen pottery used braided ribbons). The Kisapostag Culture is seen as a pre-Litzen phase, and, in the area around the Danube, it is the predecessor of the Encrusted Ware Culture,[52] which appears in northern Croatia on the territory of Baranja. A preliminary analysis was conducted on pottery ascribed to both cultural occurrences, but, seeing as only a small number of samples was available (15) from several different sites, we only bring general remarks in this paper. The analysis of fresh breakage conducted on samples from sites in Podravina (Đelekovec-Log I, Vratnec I) and Turopolje (Kurilovec, Selnica

[51] Više u Marković 2002; Črešnar 2010; Teržan, Črešnar 2014, 667.

[52] Torma 1972.

[51] For more, see Marković 2002; Teržan, Črešnar 2014, 667; Črešnar 2010.

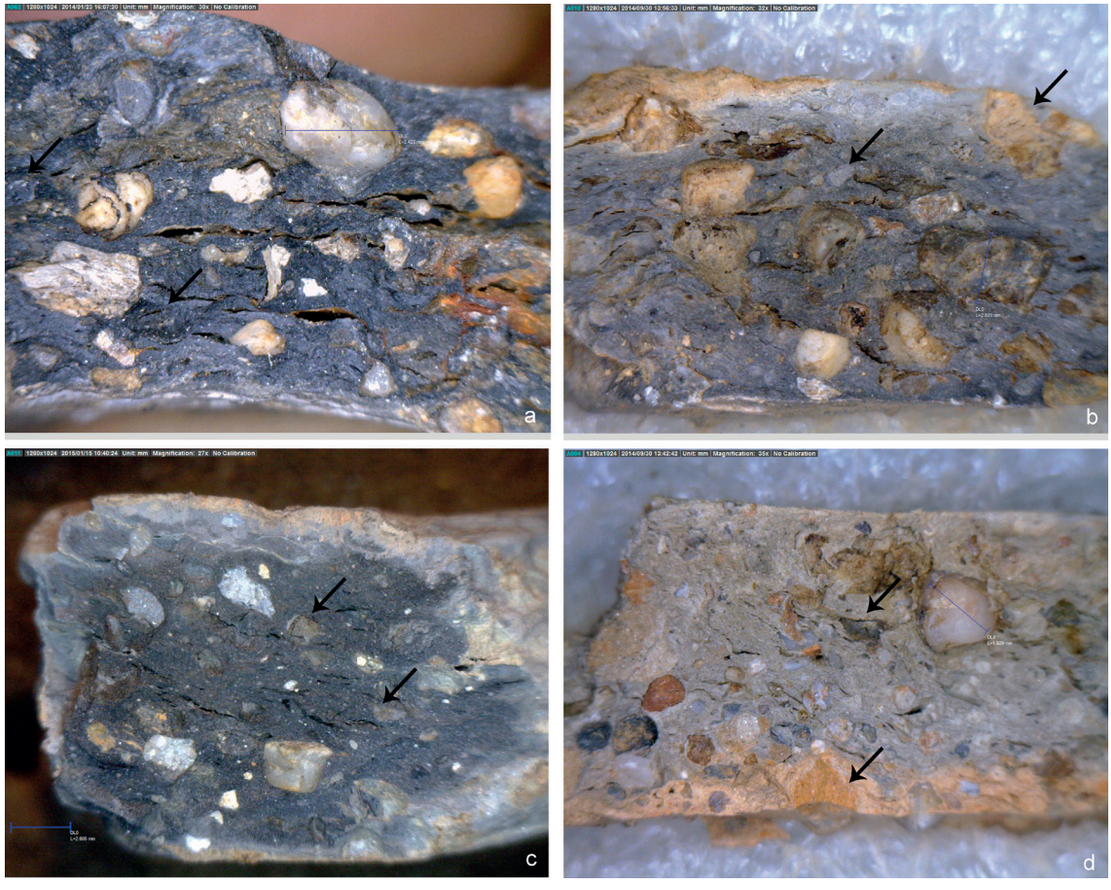
[52] Torma 1972.

keramičkih posuda obiju kulturnih pojava, a s obzirom na to da je dostupan bio samo manji broj uzoraka (15), ovdje se donose opća zapažanja s nekoliko različitih nalazišta. Analiza svježeg loma uzoraka, napravljena na keramici s nalazišta u Podravini (Đelekovec-Log I, Vratnec I) i Turopolju (Kurilovec, Selnica Ščitarjevska), pokazala je neke zajedničke elemente u odabiru recepture lončarskih smjesa. Naime, sličnosti se najviše primjećuju pri odabiru primjesa za izradu posuda debljih stijenki, odnosno tzv. grube strukture, međutim, količina uzoraka keramike kulture Kisapostag znatno je manja pa je karakterizacija temeljena uglavnom na uzorcima koji se sa sigurnošću pripisuju licenskoj keramici. U keramičkoj su strukturi zabilježena zaobljena zrna čestica veličine šljunka[53] i kvarcit, a zbog njihove veličine i količine pretpostavlja se da je riječ o primjesama. S obzirom na to da analizirani uzorci potječu iz ostataka naselja, koja su smještena u nizinskom dijelu sjeverne Hrvatske, neposredno uz manje i veće vodotoke (rijeka Sava i Drava), pretpostavlja se lokalno podrijetlo sirovinskog materijala. Uporaba znatnije količine takvih litoklasta (20 – 40%), vrlo loše raspoređenih, osnovna je karakteristika smjese (sl. 15) za izradu posuda koje su vjerojatno bile korištene za pripremu, pohranu hrane i njezinu termalnu obradu. Premda u smjesi dominiraju zaobljena zrna litoklasta (čestice veličine šljunka i kvarcit) do 4 mm veličine, u znatno su manjem omjeru prisutna i zrna groga (do 1 mm) manjih dimenzija (sl. 15). Takav je sastav smjese zabilježen na uzrocima licenske keramike i posuda kulture Kisapostag. Varijabilnost receptura uglavnom se odnosi na količinu litoklasta u odnosu na količinu groga ili glinovitih peleta, a na temelju preliminarnih analiza može se zaključiti da su zrna litoklasta u smjesi uvijek zastupljenija. Među dostupnim uzorcima nije zabilježena pojava organskih primjesa koje ostavljaju trag u svježem lomu uzorka. Pojava izduženih pora i šupljina, koje se

[53] Šljunak je prirodni granulirani materijal, sačinjen od razdijeljenih čestica stijena i minerala određene veličine. U geologiji, šljunak je bilo koja rastresita stijena sa zaobljenim zrnima koja su veća od 2 i manja od 75 milimetara.

Ščitarjevska) revealed some common elements in the choice of clay paste recipe. Namely, similarities are most notable in the choice of temper material for pottery production with thicker walls, i.e. coarse ceramic fabric. However, the amount of pottery samples of the Kisapostag Culture is significantly lower, so the characterization was mostly based on samples which could be ascribed to Litzen pottery with certainty. In the ceramic fabric, rounded grains of particles the size of gravel[53] and quartzite were recorded, and because of their size and amount, it is assumed that these are temper material. Seeing as the analyzed samples originated from the remains of settlements situated in lowland parts of northern Croatia right next to smaller and larger watercourses (the Sava and Drava rivers), it is assumed that the raw material was of local origin. Using more significant amounts of such lithoclasts (20 – 40%), which are very poorly sorted, is the main characteristic of the paste (Fig. 15) used to make vessels that were probably used for preparing, storing, and thermally processing food. Although the paste is dominated by rounded grains of lithoclasts (particles the size of gravel and quartzite) up to 4 mm in size, smaller amounts of grog or clay pelets (up to 1 mm) of smaller size (Fig. 15) were also noted. This type of ceramic fabric was noted on samples of Litzen pottery and Kisapostag Culture vessels. The variability of recipes mostly pertains to the amount of lithoclasts in relation to amounts of grog or clay pelets, and, based on preliminary analyses, it can be concluded that the paste always contains more grains of lithoclasts. The available samples did not have traces of organic materials that leave traces visible in the ceramic cross section. The presence of elongated pores and voids, mostly found in pastes which contain notably larger grains of mineral temper may be an indication of paste preparation and vessel production techniques (Fig. 15).

[53] Gravel is a natural granulated material made up of separate rock particles and minerals of certain sizes. In geology, gravel is any friable rock with round grains larger than 2 and smaller than 75 millimeters.



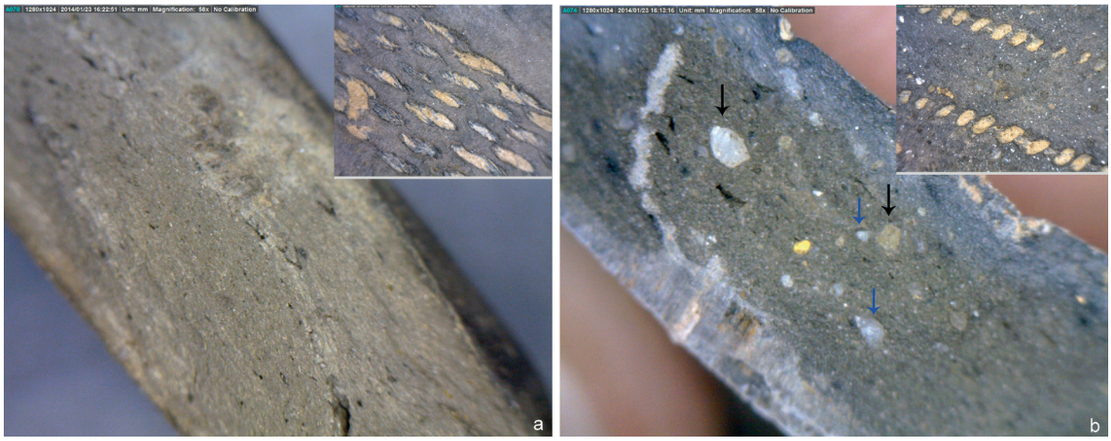
Slika / Figure 15. Makrofotografije licenske keramike i keramike kulture Kisapostag koja sadrži između 20 i 40% primjesa litoklasta zaobljenih i djelomično zaobljenih zrna te nekoliko zrna groga označenih crnim strelicama: (a) Vratnec I, uvećanje 30 x; (b) Kurilovec-Belinščica, uvećanje 30 x; (c) Đelekovec-Log, uvećanje 30 x; (d) Kurilovec-Belinščica, uvećanje 35 x (snimila: A. Kudelić). / Macrophotographs of Litzen pottery and pottery of the Kisapostag Culture which contains between 20 and 40% of rounded lithoclast grains and several grains of grog marked with black arrows: (a) Vratnec I, magnification 30 x; (b) Kurilovec-Belinščica, magnification 30 x; (c) Đelekovec-Log, magnification 30 x; (d) Kurilovec-Belinščica, magnification 35 x (photo by: A. Kudelić).

uglavnom nalaze u smjesi što sadrži izrazito velika zrna mineralnih primjesa, mogu biti pokazatelj pripreme smjese i tehnika izrade posude (sl. 15).

Posuda licenskih karakteristika i tankih stijenki (vrčić) izrađena je od izrazito fine sitnozrnate glinovite smjese koja sadrži zrna kvarcnog pijeska manja od 0,03 mm (sl. 16a). Smjesa za izradu ove posude nabavljena je na posebnom izvoru vrlo homogenoga glinovitog materijala ili je sirovinu lončar sekundarno pročistio. Svijetlosiva boja svježeg loma uzorka razlikuje se od ostalih keramičkih ulomaka, a to može biti posljedica sirovine koja sadrži vrlo mali postotak željeznih oksida ili je riječ o izra-

A vessel of Litzen characteristics and thin walls (small pot) was made out of notably fine-grained clayey material which contains grains of quartz sand smaller than 0.03 mm (Fig. 16a). The clay for making this kind of vessel was acquired at a particular source of very homogenous clayey material, or the raw material was secondarily refined by the potter. The light gray color of the sample cross section differs from the other samples, which can be a consequence of using raw material with a very low percentage of iron oxide, or of using an exceptionally carbonate-rich material.[54] On the other hand, the fresh breakage of a vessel decorated with ribbon imprints, associated with the Kisapostag Culture, shows

[54] Shepard 1985, 104.



Slika / Figure 16. Makrofotografije licenske keramike i keramike kulture Kisapostag i makrofotografije ukrašene površine istih uzoraka: (a) Đelekovec-Log, uvećanje 60 x; (b) Vratnec I, crnim su strelicama označena zrna groga ili glinovitih peleta, a plavima kvarcit, uvećanje 60 x (snimila: A. Kudelić). / Macrophotographs of fresh breakage on Litzen pottery and pottery of the Kisapostag Culture and macrophotographs of decorated surfaces of the same samples: (a) Đelekovec-Log, magnification 60 x; (b) Vratnec I, black arrows mark grains of grog or clay pelets, and blue ones mark quartz, magnification 60 x (photo by: A. Kudelić).

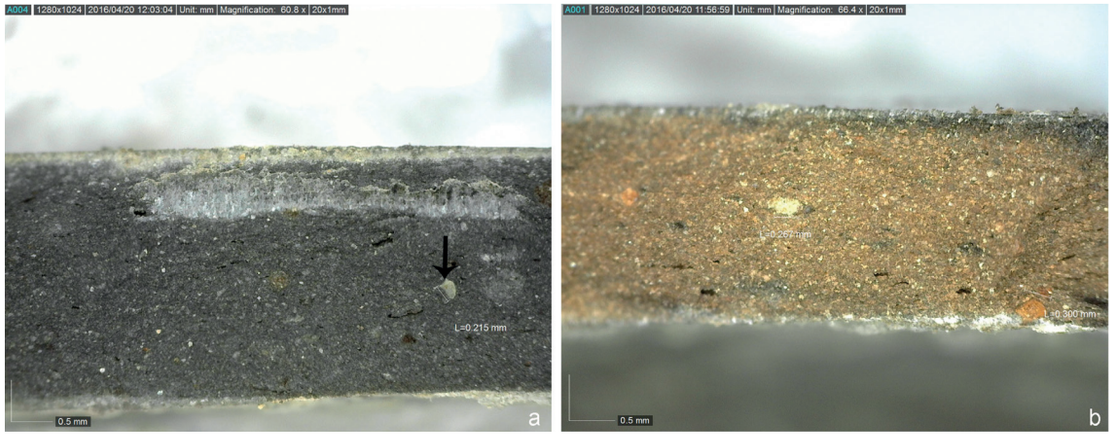
zito karbonatnoj sirovini.[54] S druge strane, na svježem lomu uzorka posude ukrašene tehnikom namotane niti, koja se povezuje s kulturom Kisapostag, glinoviti je materijal sastavljen od srednje finih zrna pijeska, a zabilježena je i pojava zrna groga i litoklasta veličine do 1 mm u količini do 2% (sl. 16b).

Panonska inkrustirana keramika relativno kronološki pripada srednjem brončanom dobu (19. – 17. st. pr. Kr.), a karakteristična je po razvedenim i raznolikim oblicima posuda, načinu ukrašavanja i atraktivnom stilu. Na osnovi skromnog broja uzoraka (13) napravljena je preliminarna analiza lončarskih smjesa s nalazišta Jagodnjak-Krčevine koje je smješteno u Baranji. Odabrani su uzorci inicijalno klasificirani u dvije skupine, finu i grubu strukturu, a oblik posuda kojima pripadaju nije bio poznat. Dio keramičkih uzoraka izrađen je od sitnozrnatoga glinovitog materijala, fine i vrlo fine strukture, sastavljene od kvarcnog pijeska, posebice tinjaca poput muskovita (sl. 6b, 8, 17). Stijenke su posuda vrlo tanke, debljine između 0,2 i 0,3 cm. Pojedini uzroci sadrže oko 1% primjesa sitnoga groga (sl. 17a) za koji se pretpostavlja da je slučajno u smjesi, uzimajući u obzir da je lončar koristio grog

[54] Shepard 1985, 104.

that the clayey material contains medium-fine grains of sand, and grains of grog and lithoclasts up to 1 mm in size in amounts of up to 2% (Fig. 16b).

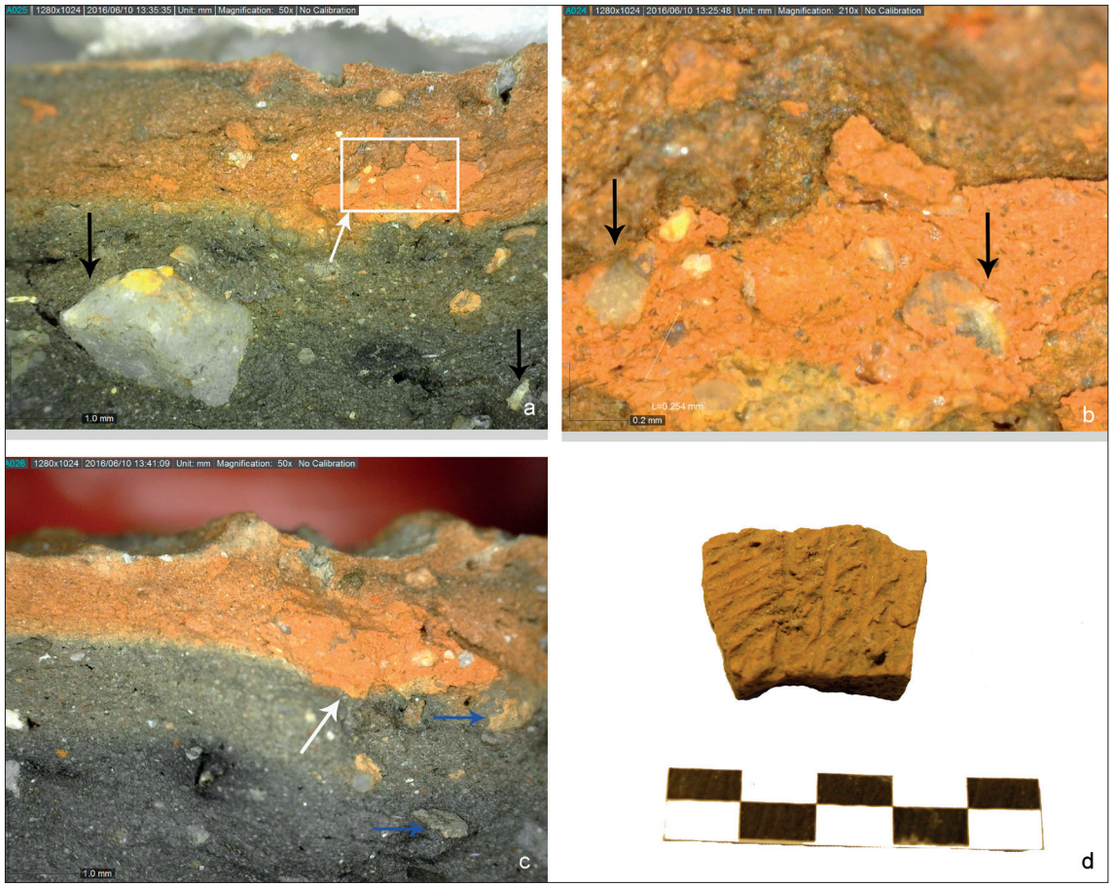
Pannonian Encrusted Ware, in the sense of relative chronology, is mostly ascribed to the Middle Bronze Age (19th – 17th cent. BC) and is characterized by indented and diverse vessel forms, decorations, and its attractive style. Based on a small number of samples (13), a preliminary analysis of ceramic fabric was conducted on samples from the site of Jagodnjak-Krčevine in Baranja. The selected samples were initially classified into two groups, fine and coarse ware, but the shape of the vessels could not be determined. A part of the pottery samples is composed of fine clayey material with fine and very fine quartz sand, and especially mica such as muscovite (Fig. 6b, 8, 17). The vessel walls are very thin, between 0.2 and 0.3 cm. Individual samples contain about 1% of tiny grog grains (Fig. 17a), for which we assume got into the paste by chance, seeing as the potter used large amounts of grog in the composition of the paste for vessels with thick walls. However, several samples of thin-walled vessels (0.2 cm) contain between 5 and 10% of grog, with grain size up to 0.5 mm. The paste used to produce such ves-



Slika / Figure 17. Makrofotografije panonske inkrustirane keramike sastavljene od finih i srednje finih zrna kvarcnog pijeska – Jagodnjak-Krčevine: (a) crna strelica označava zrno groga ili glinoviti pelet, uvećanje 60 x; (b) uvećanje 65 x (snimila: A. Kudelić). / Macrophotographs of the Pannonian Encrusted Ware comprised of fine and medium fine grains of quartz sand – Jagodnjak-Krčevine: (a) the black arrow denotes the grain of grog or clay pelet, magnification 60 x; (b) magnification 65 x (photo by: A. Kudelić).

u većim količinama, što je vidljivo iz sastava smjese za izradu posuda debljih stijenki. Ipak, nekoliko keramičkih ulomaka tankih stijenki (0,2 cm) sadrži između 5 i 10% groga, veličine zrna do 0,5 mm. Smjesa za izradu takvih posuda sadrži i organski materijal, a zabilježen je i ostatak sitnog, zaobljenog organskog materijala, vjerojatno neka vrste sjemenke (sl. 18). Uzorci posuda debljih stijenki (0,5 – 1,2 cm), čija je površina često prošarana metličastim urezima, predsels also contains organic material, sometimes in the shape of tiny, round black residue, probably some sort of seed. (Fig. 18). Samples of thick-walled vessels (0.5 – 1.2 cm), which often have combed incisions on the surface, belong to the so-called coarse ware, which is assumed to have been used for storing, preparing and thermally processing food. This paste is made from fine clayey material with added high amounts of large grains of grog which are sometimes accompanied by equally-sized grains of litho-

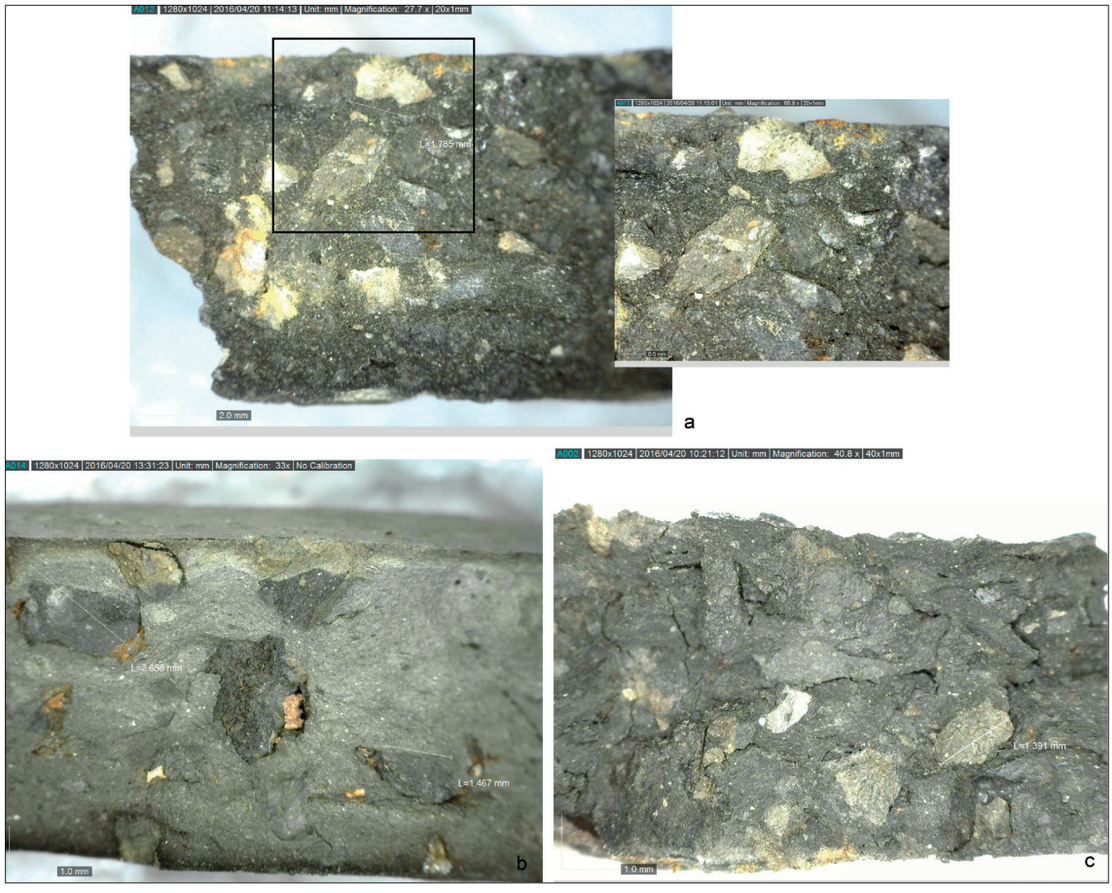
Slika / Figure 18. Makrofotografije panonske inkrustirane keramike sastavljene od srednje finih do finih zrna kvarcnog pijeska, primjesa organskog podrijetla, označenih crnim krugovima, i zrno groga/glinovitog peleta ili granula željezovitog oksida, označeno crnom strelicom – Jagodnjak-Krčevine: (a) uvećanje 55 x, (b) uvećanje 243 x (snimila: A. Kudelić). / Macrophotographs of the Pannonian Encrusted Ware comprised of medium fine and fine grains of quartz sand, inclusions or temper of organic origin are marked by black circles, and grog/clay pelet grain or iron-oxide granules are marked by black arrows – Jagodnjak-Krčevine: (a) magnification 55 x, (b) magnification 243 x (photo by: A. Kudelić).



Slika / Figure 19. Makrofotografije panonske inkrustirane keramike s primjesama litoklasta i groga – Jagodnjak-Krčevine: (a) bijelom strelicom i bijelim okvirom označeno je zrno groga, dok crna strelica prikazuje veliko zrno kvarcita, uvećanje 50 x; (b) uvećani prikaz zrna groga u čijoj strukturi se vide zrna litoklasta i kvarcnog pijeska, uvećanje 210 x; (c) prikaz drugog dijela istog uzorka s vidljivom površinom istog zrna groga (bijela strelica) i još nekoliko manjih zrna istaknutih plavom strelicom, uvećanje 50 x; (d) uvećanje 240 x, (e) fotografija vanjske stijenke ulomka, čija je površina metličasto izbrazdana (snimila: A. Kudelić). / Macrophotographs of Pannonian Encrusted Ware tempered with lithoclasts and grog – Jagodnjak-Krčevine: (a) the white arrow and the white frame denote the grain of grog, and the black arrow denotes the large grain of quartzite, magnification 50 x; (b) enlarged photograph of grains of grog with grains of lithoclasts and quartz sand, magnification 210 x; (c) a photograph of a second part of the same sample with a visible surface of the same grain of grog (white arrow) and several smaller grains marked by the blue arrow, magnification 50 x; (d) magnification 240 x, (e) a photograph of the outside wall of a fragment with combed decorations (photo by: A. Kudelić).

stavljaju dijelove tzv. grubog posuđa za koje se pretpostavlja da je moglo biti korišteno za skladištenje, pripremu hrane ili njezinu termalnu obradu. Takva je smjesa izrađena od finog glinovitog materijala kojemu je dodana veća količina krupnih zrna groga uz koja se ponekad nalaze i zrna litoklasta jednake veličine (sl. 19a). Prema tablici za mjerenje gustoće zrna u matriksu, zabilježeno je između 10 i čak 50% primjesa (sl. 20). U velikim zrnima groga ponekad se nalaze starija zrna, odnosno grog druge ge-

clasts (Fig. 19a). Based on grain density tables, the matrix contains between 10 and even 50% of temper in the paste (Fig. 20). Large grains of grog sometimes contain older grains, i.e. second-generation grog (Fig. 20). Grog grains were prepared from pottery with the same physical characteristics, as is clearly visible in the cross section of a sample which contains a grain of grog made following a similar recipe and from a vessel with a similarly treated surface (Fig. 19). The grog is a chunk from the outer wall of an older vessel and has visible traces of combed



Slika / Figure 20. Makrofotografije panonske inkrustirane keramike s primjesama groga – Jagodnjak-Krčevine: (a) crni okvir prikazuje uvećano zrno groga u kojemu su vidljiva zrna kvarcnog pijeska i zrno groga druge generacije, uvećanje 30 x i 60 x; (b) uvećanje 30 x, (c) uvećanje 40 x (snimila: A. Kudelić). / Macrophotographs of Pannonian Encrusted Ware tempered with grog – Jagodnjak-Krčevine: (a) the black frame denotes the enlarged grain of grog with visible grains of quartz sand and the grain of second-generation grog, magnification 30 x and 60 x; (b) magnification 30 x, (c) magnification 40 x (photo by: A. Kudelić).

neracije (sl. 20). Zrna groga pripremala su se od keramičkih posuda jednakih fizičkih karakteristika, što se dobro vidi na uzorku u čijem se presjeku nalazi zrno groga načinjeno prema sličnoj recepturi i na isti način obrađene površine posude (sl. 19). Grog predstavlja krhotinu vanjske stijenke starije posude. Na zrnu groga vidljivi su tragovi metličastog urezivanja, a na takav je način obrađena i površina ulomka posude. Zrno groga također u sebi sadrži kvarcit ili neku drugu vrstu litoklasta, što znači da je smjesa za izradu starije posude bila pripremljena od zrna litoklasta, slično kao i posuda čiji je ulomak analiziran.

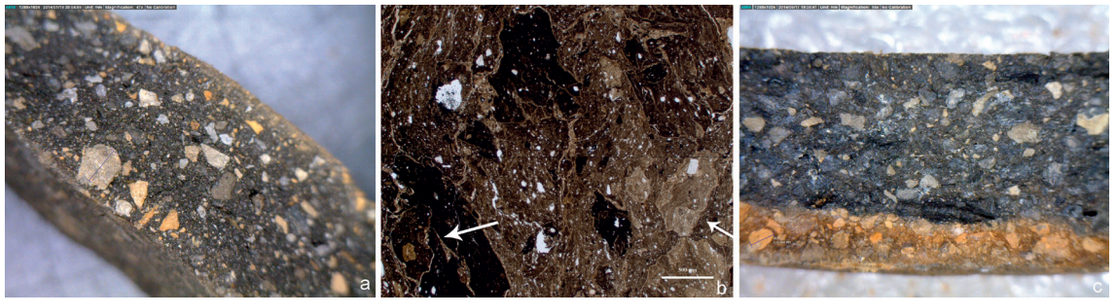
incisions, the same surface treatment as on the surface of the analyzed vessel fragment. The grain of grog also contains quartzite or some other kind of lithoclast, which means that the paste for the production of the older vessel was made out of grains of lithoclasts, similar to the vessel under study.

Kulturna grupa Virovitica (15. – 12. st. pr. Kr.) relativo kronološki datira se u kraj srednjeg i početak kasnoga brončanog doba te predstavlja dio kulture polja sa žarama. Na keramici virovitičke grupe napravljene su opsežne petrografsko-mineraloške analize na relativno velikom uzorku, a na još većem je uzorku napravljena i makroskopska analiza.[55] Stoga se ovdje predstavljeni rezultati makroskopskih analiza nadovezuju na rezultate arheometrijskih analiza. Za potrebe tih istraživanja prikupljeni su i uzorci glinovitog materijala iz neposredne blizine brončanodobnih nalazišta te je usporedbom s keramičkim materijalom utvrđeno da su posude izrađivane od lokalne sirovine. Glinoviti je materijal aluvijalnog podrijetla i uglavnom su to prahovite gline i glinoviti prah koji sadrže kvarc, zatim plagioklase, feldspate, željezove okside i rjeđe karbonate te sporadično muskovit. Makroskopskom metodom na većem uzroku ustanovljeno je da 99% uzoraka sadrži grog koji je lončar dodavao smjesi za izradu svih oblika keramičkih posuda, neovisno o njihovoj funkciji i veličini (sl. 21). Značajka virovitičke keramike, osobito one iz Turopolja, vrlo je visoka razina lomljivosti uslijed vrlo porozne strukture. Upravo se ova karakteristika dobro vidi na svježem lomu uzorka. Keramika se vrlo lako lomi kliještima, pri čemu se intenzivno mrvi. Promatranjem karakteristika matriksa na svježem lomu uzorka pomoću digitalnog mikroskopa (pri uvećanjima iznad 200 puta), zbog poroznosti, veće količine sitnih pora i pukotina, nije uvijek moguće zabilježiti karakteristike glinovitog materijala, osim u slučajevima kada je smjesi dodano vrlo malo primjesa, što omogućava bolju vidljivost matriksa. Neki od čimbenika koji su mogli utjecati na takvo stanje uzoraka niske su temperature pečenja i uporaba usitnjenih primjesa organskog materijala, a oba razloga vidno su utjecala na stanje keramike. U uzrocima iz Turopolja mineralna zrna iz matriksa su vrlo fina, veličine od 0,02 – 0,05 mm dok uzorci iz Podravine sadrže više tinjaca veličine i do 0,09 mm. Razlike u sastavu glinovitog materijala

[55] Kudelić 2015; Kudelić *et al.* 2018.

The Virovitica cultural group (15th – 12th cent. BC) is by relative chronology dated to the end of the Middle and beginning of the Late Bronze Age, and belongs to the wider cultural horizon of the early period of the Central European Urnfield Culture. Extensive petrographic and mineralogical studies have been conducted on a relatively large number of samples of Virovitica pottery, and a macroanalysis was done on an even larger number of samples.[55] Hence, the results of macroscopic analyses presented in this paper are complemented by the results of the conducted archaeometric analysis. For research purposes, clayey material samples were collected from the immediate vicinity of Bronze Age sites, and it was concluded, after comparisons with pottery material, that pottery was produced out of locally available raw material. The clayey material is of alluvial origin and mostly includes silty clays and clayey silt which contain quartz, plagioclase, feldspar, iron oxides, less often carbonates, and sporadically muscovite. The analysis of the pottery material revealed grog, which was added to the paste for making all forms of vessels, regardless of their function and size (Fig. 21), in 99% of the samples. A feature of Virovitica pottery, especially from the Turopolje region, is a very high level of fragility due to its highly porous structure. Precisely this characteristic is clearly visible on the cross section of the samples. The pottery is very easily broken off with pliers and crumbles intensely. When studying matrix characteristics on fresh breakage on samples using a digital microscope (magnification over 200), it was not always possible to record the characteristics of the clayey material due to porosity, large amounts of tiny pores and cracks, except in cases when very few inclusions were added to the paste allowing better visibility of the matrix. Some of the factors that could have affected the state of the samples are usage of minced organic temper, and low firing temperatures - both visibly affecting the state of the pottery. Mineral grains from the matrix of the Turopolje region samples are very fine, between 0.02 and 0.05 mm in size, and the samples from the Podravina region contain more mica, measuring up to even 0.09 mm. The differences in clayey material composition

[55] Kudelić 2015; Kudelić *et al.* 2018.



Slika / Figure 21. Makorfotografija keramike kulturne grupe Virovitica s primjesama groga: (a) Podgorica, uvećanje 50 x; (b) Selnica Ščitarjevska, mikrofotografija preparata s prikazom groga prve i druge generacije; (c) Kurilovec-Belinščica, uvećanje 55 x (snimile: M. Mileusnić, A. Kudelić). / Macrophotograph of the Virovitica cultural group grog-tempered pottery (a) Podgorica, magnification 50 x, (b) Selnica Ščitarjevska, a microphotograph of a specimen displaying first-generation and second-generation grog, (c) Kurilovec-Belinščica, magnification 55 x (photo by: M. Mileusnić, A. Kudelić).

prije svega su posljedica prirodnog sastava tla pojedinog područja, što se dobro vidi i prema izrazitijoj zastupljenosti željezovih oksida u keramici iz Podravine.

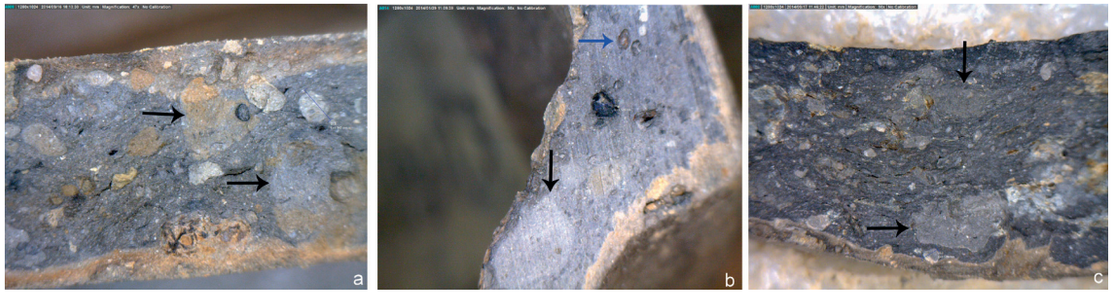
Grog koji je vjerojatno pripremljen od ulomaka starijih keramičkih posuda dodavao se u količini od 2 – 40%, a veličina zrna iznosi između 0,1 i 3 mm. Na osnovi gustoće zrna zabilježenih makrofotografijom svježeg loma uzorka, identificirane su četiri skupine lončarskih smjesa od kojih je najzastupljenija smjesa koja sadrži oko 7% primjesa. Istraživanje nije u potpunosti ukazalo na eventualne obrasce ili pravilnosti u odabiru pojedine lončarske smjese u odnosu na npr. tip posude, međutim, smjesa koja sadrži oko 25% primjese groga najviše se koristila za izradu posuda u Turopolju, i to uglavnom za tipove posuda 3, 4, 8 i 18 (lonci, duboke zdjele – posude koje su mogle biti korištene za termalnu obradu hrane na vatri i šalice). Na području Podravine slična smjesa koristila se za izradu posuda tip 5 i 19 (duboke zdjele, šalice i plitke zdjele, odnosno posude koje ne pokazuju tragove uporabe na vatri). Statistički je na cjelokupnom uzorku utvrđeno da se količina primjesa povećava s prosječnom debljinom stijenke posude.[56] U većim zrnima groga također su primijećena manja, starija zrna, načinjena od istog materijala, odnosno riječ je o drugoj generaciji groga (sl.21b).

[56] Kudelić 2015.

are primarily the result of the natural composition of soil in specific areas, as is clearly visible through a more notable presence of iron oxides in the pottery from Podravina.

Grog, which was probably prepared from fragments of older pottery vessels, was added in amounts from 2 to 40%, and the size of grains is between 0.1 and 3 mm. Based on the density of grains recorded on macrophotographs of fresh breakage on samples, we identified 4 groups of clay pastes, and the pastes which has about 7% of grog grains is the most common. Research has not fully revealed potential patterns or regularities in choosing specific clay paste in relation to, e.g. vessel type. However, the fabric which contains about 25% of grog grains was most frequent for vessel production in Turopolje, and mostly for vessel types 3, 4, 8, and 18 (pots and deep bowls - vessels which were mostly used for thermal processing of food, and cups). In Podravina, a similar paste was used to make type 5 and 19 vessels (deep bowls, cups, and shallow bowls, that is, vessels which do not display traces of exposure to fire). Statistically, the complete number of samples shows that the amount of temper increases in correlation with wall thickness.[56] Smaller, older grains made from the same material were recorded in grog grains, indicating second-generation grog (Fig. 21b).

[56] Kudelić 2015.



Slika / Figure 22. Makorfotografija keramike kulturne grupe Virovitica s vidljivim glinovitim peletima označenima crnim strelicama – Kurilovec-Belinščica: (a) glinoviti peleti zaobljenih rubova (plava strelica), uvećanje 500 x; (b) glinoviti pelet zaobljenih rubova i željezoviti oksidi (plava strelica), uvećanje 50 x; (c) glinoviti peleti difuznih i zaobljenih rubova, uvećanje 50 x (snimila: A. Kudelić). / Macrophotograph of Virovitica cultural group pottery with visible argillaceous rock fragments marked with black arrows – Kurilovec-Belinščica: (a) argillaceous rock fragments with round edges (blue arrow), magnification 500 x; (b) an argillaceous rock fragment with round edges and iron oxides (blue arrow) magnification 50 x; (c) argillaceous rock fragments with diffused and round edges, magnification 50 x (photo by: A. Kudelić).

Osim primjesa groga, u brončanodobnoj je keramici zabilježena i pojava glinovitih peleta (sl. 22). U uzrocima keramike s nalazišta u Kurilovcu zabilježene su zaobljene granule, čiji sastav odgovara sastavu matriksa, međutim, razlika se manifestira u boji (sl. 22a, 22b). Dokumentirani su peleti difuznih rubova i nepravilnih oblika koji se vjerojatno slučajno nalaze u smjesi (sl. 22a, 22c). Tragovi izgorenoga organskog materijala na svježem lomu keramike zabilježeni su samo na jednom uzorku, a na osnovi provedenih eksperimenata ustanovljeno je da je smjesi vjerojatno dodana suha trava, slama i pljeva.[57] Preostali keramički materijal ima presjek ujednačene tamnosive boje i izrazito poroznu strukturu, a to su neki od pokazatelja uporabe vrlo usitnjene organske primjese. Pretpostavlja se da je u tu svrhu korištena balega preživača.

Kasno brončano doba (11. – 9. st. pr. Kr.) i razdoblje prijelaza na željezno doba obilježilo je sve očitije društveno raslojavanje. Jedno od najznačajnijih nalazišta s kraja kasnoga brončanog doba u sjevernoj Hrvatskoj je Kalnik-Igrišče. Petrografsko-mineraloške analize na manjem broju keramičkih uzoraka, kao i analize lokalnih glina, napravljene su još devedesetih godina prošlog

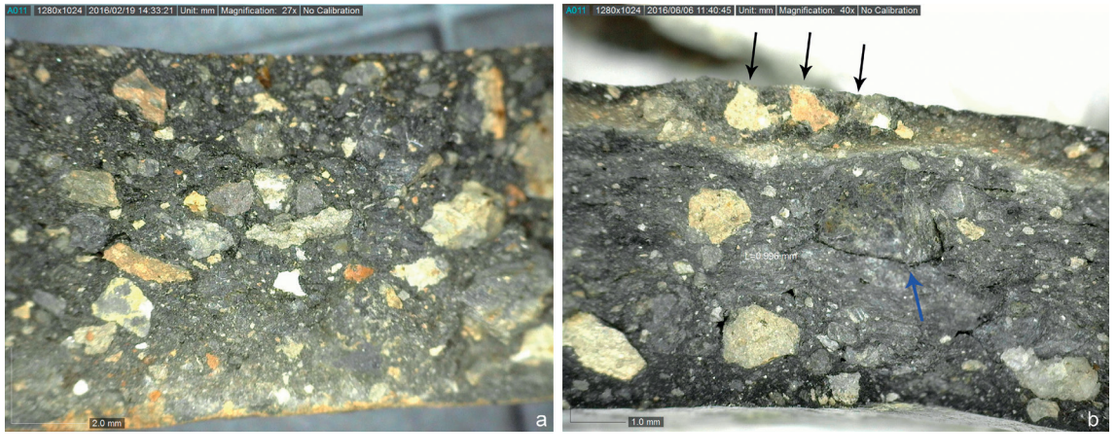
[57] Kudelić 2015; Kudelić 2016.

In addition to grog, Bronze Age pottery samples also included clay pelets (argillaceous rock fragments) (Fig. 22). Pottery samples from the site at Kurilovec have rounded granules of the same composition as the matrix, but of different color (Fig. 22a, 22b). We also recorded clayey inclusions with diffuse edges and irregular shapes that are probably accidentally in the clay paste (Fig. 22a, 22c). Traces of burned-up organic material in the cross section are only visible on one sample, and, based on the conducted experiments, it was established that dry grass, hay, and chaff were probably added to the paste.[57] The rest of the material is of equal dark gray color and has a porous structure, and these features are some of the indicators of using very small organic temper. It is assumed that dry dung of ruminants was used for that purpose.

The Late Bronze Age (11th – 9th cent. BC) and the transition into the Iron Age were marked by increasingly notable social stratification. One of the most significant sites dated to the end of the Late Bronze Age in northern Croatia is Kalnik-Igrišče. Petrographic and mineralogical analyses were done on a smaller number of samples, analyses of local clays were done back in the 1990s,[58] and technological and macrophotograph analyses of pottery samples are still underway. All of these studies have increased the

[57] Kudelić 2015; Kudelić 2016.

[58] Vrdoljak 1995.



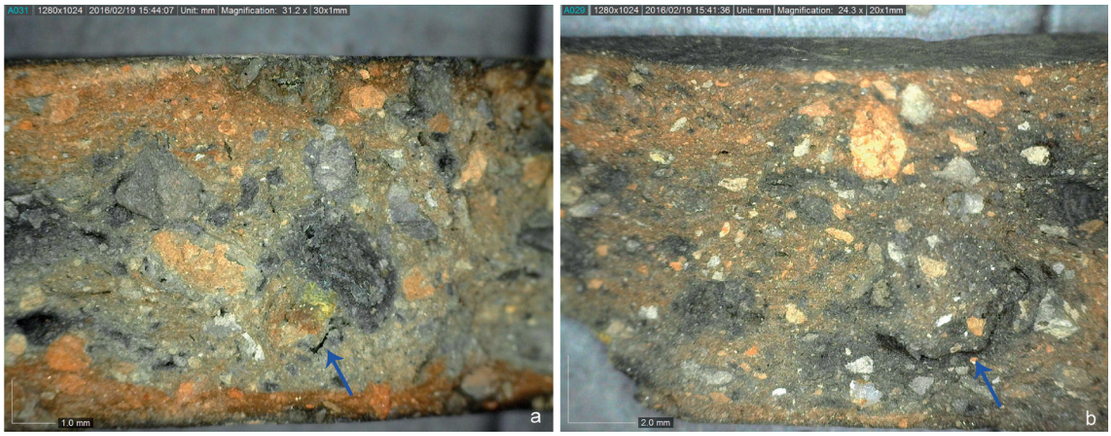
Slika / Figure 23. Makrofotografija keramike iz kasnoga brončanog doba s primjesama groga – Kalnik-Igrišče: (a) uvećanje 30 x, (b) crne strelice označavaju paralelan raspored primjesa s unutarnjom stijenkom posude, uvećanje 40 x (snimila: A. Kudelić). / Macrophotograph of Late Bronze Age grog tempered pottery – Kalnik-Igrišče: (a) magnification 30 x, (b) black arrows denote the parallel distribution of inclusions with the inner vessel wall, magnification 40 x (photo by: A. Kudelić).

stoljeća,[58] a tehnološka analiza i analiza makrofotografija uzoraka keramike, koja se i dalje provodi, nadopunila je postojeću bazu podataka. Uz uzorke s nalazišta na Kalniku provedena je i preliminarna makroanaliza uzoraka keramike s nalazišta Dubovac pokraj Karlovca koji potječu iz istovremenog naselja. Oba nalazišta smještena su na povišenim lokacijama (do 500 metara nadmorske visine), za razliku od lokacija ranije spomenutih prapovijesnih naselja koja se nalaze u izrazito nizinskim područjima. Tipološko-morfološka analiza keramičkih posuda s nalazišta na Kalniku ima jasne pokazatelje standardizacije oblika. Drugim riječima, posude određenog tipa istih su dimenzija ili se izrađuju u nekoliko veličina, a na njima se koriste ujednačene tehnike oblikovanja i obrade površine. To se posebno primjećuje na oblicima zdjela s uvučenim rubom, loncima sa suženim vratom i izrazito ljevkastim otvorom te kod lonaca izduženog, zaobljenog tijela, blago izvučenog otvora, na čijoj se površini često nalazi horizontalno postavljena glinena traka u kojoj su kružni otisci. Zbog dobro očuvanih posuda omogućena je analiza i usporedba tipa posude i lončarske

[58] Vrdoljak 1995.

existing database. Along with the samples from Kalnik, a preliminary macroanalysis of pottery samples from the contemporaneous settlement of Dubovac near Karlovac was conducted. Both sites are situated on elevated positions (up to 500 meters above sea level), unlike previously discussed prehistoric settlements, which are mostly situated in lowland areas. The typological and morphological analysis of pottery from Kalnik clearly indicates standardization of vessel forms. In other words, certain vessel types have the same dimensions or are made in several sizes, and they are formed and processed in the same manner. This is especially visible on bowl forms with an inward-facing rim, pots with a narrowed neck and a notably funnel-shaped opening, and pots with an elongated round body and a slightly outward-facing rim decorated with horizontal plastic application with circular impressions. Well-preserved vessels allowed us to analyze and compare vessel types and clay pastes they were made from.[59] Considering the fact that the research is still in progress, only the basic characteristics of the ceramic fabric are presented. Just like in the earlier period, the basic temper material added to the paste by

[59] Karavanić 2009; Karavanić, Kudelić 2011; Karavanić *et al.* 2015.



Slika / Figure 24. Makrofotografije keramičke strukture zdjela s uvučenim rubom iz kasnoga brončanog doba s tragovima izgorenih primjesa od organskog materijala (plave strelice označavaju moguće tragove organskog materijala) i groga – Kalnik-Igrišče: (a) uvećanje 30 x, (b) uvećanje 25 x (snimila: A. Kudelić). / Macrophotographs of the pottery structure of a bowl with an inward-facing rim from the Late Bronze Age with traces of burned-up organic temper (blue arrows denote possible traces of organic material) and grog – Kalnik-Igrišče: (a) magnification 30 x, (b) magnification 25 x (photo by: A. Kudelić).

smjese od koje su napravljene.[59] S obzirom na to da se istraživanja još provode, ovdje će biti predstavljene samo osnovne karakteristike keramičke strukture.

Kao i u razdoblju koje je prethodilo ovome, osnovna primjesa koju je lončar dodavao smjesi je grog (sl. 23), a varijabilnost receptura uglavnom se odnosi na količinu i veličinu dodanih zrna. Na makrofotografijama uzoraka koji pripadaju zdjelama uvučenog ruba zabilježena su uglavnom zrna groga (20%), međutim, u smjesi su primijećeni i tragovi izgorenoga organskog materijala koji se povezuje sa zdjelama koje su pečene u drugačijim uvjetima od ostalih posuda. Naime, tragovi izgorenoga organskog materijala, koji je u uzorku relativno dobro raspoređen, nema preferiranu orijentaciju i mogu se povezati s primjesama poput pljeve ili suhe trave, pripadaju posudi koja je pečena u oksidacijskim uvjetima, stoga je presjek uzorka smeđe-narančaste boje (sl. 24). Nakon inicijalnog pečenja posude su podvrgnute sekundarnoj redukciji pa su vanjska i unutarnja stijenka uzoraka tamnosive boje. Smjesa kojoj je lonačar dodavao velika zrna

[59] Karavanić 2009; Karavanić, Kudelić 2011; Karavanić *et al.* 2015.

the potter is grog (Fig. 23), and the variability of recipes mostly refers to the size and amount of added temper grains. Macrophotographs of samples of bowls with inward-facing rims mostly recorded grains of grog (20%). However, the paste also contained traces of burned-up organic material that is linked to bowls, which were fired under different conditions than other vessels. Namely, traces of burned-up organic material, which is relatively well distributed, do not have preferred orientation, and can be connected to inclusions such as chaff or dry grass. They were part of a vessel which was fired in an oxidation atmosphere and, consequently, the sample has a brown-orange cross section (Fig. 24). After the initial firing, the vessels were fired again in a reduction atmosphere, so the outer and inner surfaces of the samples are dark gray. The potter added large grains of grog to the paste that was used in the production of pots which do not have notable surface treatment, and which were used at the hearth for thermal processing of food. Large, subangular grains of grog sometimes exceed the size of 5 mm, and were added in amounts of around 20% (Fig. 23a). The grains of grog which are 0.2 – 2 mm in size, and appear in amounts of 10 – 20%, are poorly sorted and were added to the paste used

groga koristila se za izradu lonaca čija površina nije posebno tretirana, a korištene su na ognjištu za termalnu obradu hrane. Velika, djelomično uglata zrna groga, ponekad prelaze veličinu od 5 mm, a dodavala su se u količini oko 20% (sl. 23a). Za izradu šalica i manjih zdjela tankih stijenki (0,35 cm) i glačane površine, lončar je smjesi dodavao između 10 i 20% groga veličine zrna od 0,2 do 2 mm (sl. 23b).

Vrlo sličan sastav lončarskih smjesa zabilježen je i na uzorcima s nalazišta Dubovac-Stari grad, smještenog uz rijeku Kupu pokraj Karlovca. Uzorci su odabrani prema inicijalnoj karakterizaciji materijala na tzv. finu, srednju i grubu keramičku strukturu. Gotovo sve analizirane smjese sadrže zrna groga. Zrna su djelomično uglata i djelomično zaobljena, dobro i umjereno raspoređena, veličine između 0,3 i 3 mm. Lončar je smjesi dodavao od 2 do 40% groga. Na svježem lomu triju uzoraka primijećeni su tragovi izgorenoga organskog materijala (sl. 25) koji se mogu povezati s primjesama poput pljeve, suhe trave ili sjemenki. Posuda tankih stijenki također sadrži grog, ali i dobro raspoređeni organski materijal, a pripada posudi pečenoj u oksidacijskim uvjetima (sl. 25). Ručka koja pripada posudi glatkih stijenki izrađena je od vrlo fine smjese, bez većih mineralnih inkluzija, međutim, u strukturi je zabilježen vrlo usitnjen organski materijal, dobro raspoređen u matriksu (sl. 25).

for producing thin-walled vessels averaging 0.35 cm in thickness, and were discovered in a cup and a small decorated bowl with a polished surface (Fig. 23b).

A very similar composition of clay paste was noted in samples from the site of Dubovac-Stari grad, situated next to the Kupa River near Karlovac. Samples were selected based on the initial characterization of ceramic material as being of fine, medium-fine, and coarse fabric. Almost all analyzed pastes contain grains of grog. The grains are subangular and subrounded, well and fairly well distributed, and vary in size from 0.3 to 3 mm. The potter added 2 – 40% of grog to the paste. The fresh breakage on three samples have traces of burned-up organic material (Fig. 25), which can be linked to temper such as chaff, dry grass, or seeds. A vessel with thinner walls, fired in an oxidation atmosphere, contains grog, but also well distributed organic material (Fig. 25). A handle fragment from a thin-walled vessel from the site of Dubovac was made out of very fine paste without larger mineral inclusions, but it also contains very tiny organic material which is well distributed in the matrix (Fig. 25).

Slika / Figure 25. Makrofotografija keramike iz kasnoga brončanog doba s primjesama groga – Dubovac-Stari grad: (a) uvećanje 30 x, (b) primjese groga i tragovi primjesa od organskog materijala, uvećanje 45 x; (c) dio ručke izrađene od vrlo finog, sitnozrnatoga glinovitog materijala s tragovima izgorenoga organskog materijala, uvećanje 45 x (snimila: A. Kudelić). / Macrophotograph of the Late Bronze Age grog tempered pottery – Dubovac-Stari grad: (a) magnification 30 x, (b) inclusions of grog and traces of organic inclusions, magnification 45 x; (c) fragment of a handle made out of very fine, fine-grained clayey material with traces of burned-up organic material, magnification 45 x (photo by: A. Kudelić).

4. TUMAČENJE ODABIRA LONČARSKE SMJESE

Prema rezultatima ranije provedenih istraživanja[60] i preliminarno provedenih analiza makrofotografija uzoraka keramike iz brončanog doba na prostoru sjeverne Hrvatske, utvrđeno je da su lončarske smjese raznolike te da se njihova varijabilnost uglavnom može razmatrati u kulturno-kronološkim okvirima karakteristika keramičkog materijala. Ipak, nekoliko je značajnih informacija utvrđeno na razini odabira vrste i količine primjesa. Odabir glinovitog materijala za pripremu smjese kroz čitavo razdoblje brončanog doba bio je ograničen na neposrednu okolicu naselja, odnosno podrijetlo sirovinskog materijala bilo je vjerojatno lokalno. Razlog je prije svega laka dostupnost kvalitetnog aluvijalnog tipa sedimenta i primjesa. Općenitim uvidom u keramičke strukture brončanodobne keramike može se reći da su posude malih dimenzija i tankih stijenki, poput šalica, vrčeva i zdjela bile izrađene od relativno finoga glinovitog materijala, s vrlo malo primjesa ili bez njih. S obzirom na to da su sitnozrnate inkluzije silikatnih minerala vrlo dobro raspoređene u glinovitome materijalu, pretpostavlja se da smjesi nisu dodavane kao primjese te da su sastavni dio sedimenta.[61] To se posebno odnosi na muskovit koji je vidljiv na površini keramičkih posuda, kao svjetlucavi pijesak, i koji se u objavama često pogrešno tumači kao glina s primjesama muskovita (engl. *mica-tempered*). Izrazitija je zastupljenost ove vrste silikata zabilježena u uzorcima inkrustirane keramike na prostoru Baranje (sl. 8) i uzorcima keramike vinkovačke kulture iz Donjeg Miholjca iako se u manjem omjeru nalazi i u keramičkim uzorcima s ostalih nalazišta koja su ovdje obrađena. Dobra vidljivost listića muskovita na površini keramičkih posuda, osobito onih tamne boje, može biti posljedica glačanja ili poliranja površine posude jer se na taj način mijenja orijentacija listića koji postaju paralelni s površinom posude te postaju vidljivi čitavom svojom površinom.

[60] Kudelić 2015; Kudelić *et al.* 2018.

[61] Više u Shepard 1985, 162.

4. INTERPRETING CERAMIC PASTE SELECTION

Based on the results of previously conducted research,[60] as well as preliminary analyses of macrophotographs of Bronze Age pottery samples from northern Croatia, it was determined that the clay paste recipes are different, and that this variability can mostly be considered in the cultural and chronological framework of the pottery material characteristics. However, several important pieces of information were gathered on the level of choosing the kind and amount of temper. The selection of clayey material used for paste preparation throughout the entire Bronze Age was limited to the immediate vicinity of a settlement, i.e. the raw material is probably of local origin. The primary reason for this was the availability of high-quality alluvial type sediments and temper material. By studying the general overview of Bronze Age ceramic fabric, we can say that smaller vessels with thin walls, such as cups, jugs, and bowls, were made out of relatively fine non-tempered clayey material or material with a very small amount of temper. Seeing as fine-grained and silicate mineral inclusions are very well distributed in the clayey material, it can be assumed that they were not added to the paste as temper, but were a constituent part of the sediment.[61] This especially refers to muscovite, which is visible on the vessel surface as shiny sand and which is often misinterpreted in publications as mica-tempered clay. A more notable representation of this kind of silicate was noted in samples of incrusted ware from Baranja (Fig. 8) and samples of Vinkovci Culture pottery from Donji Miholjac, although smaller amounts of muscovite were also noted in samples from other sites discussed in this paper as well. Good visibility of muscovite on the surface of pottery vessels, especially those of darker color, can be the result of polishing the vessel surface, because it changes the orientation of particles, making them parallel to the vessel surface and causing the entire surface of these particles to be visible.

[60] Kudelić 2015; Kudelić *et al.* 2018.

[61] For more, see Shepard 1985, 162.

Mnogo više informacija o odabiru može se prikupiti identifikacijom i analizom primjesa koje lončar koristi za izradu smjese. Bez obzira na vrstu primjese, one u keramičkoj strukturi mogu biti obilne ili pak sporadične. Primijećeno je obilno korištenje (20 – 40%) primjesa groga (i glinovitih peleta) ili litoklasta u smjesi iz svih kulturnih skupina. Ta je količina zabilježena na posudama koje sadrže tragove sekundarne oksidacije vanjske stijenke, što je dobar pokazatelj da je posuda korištena na vatri (sl. 12b, 14, 15d). U osnovi neplastične primjese (mineralna zrna, litoklasti ili grog) glini se dodaju kako bi se pospješilo oblikovanje i pečenje keramike, pojačala čvrstoća i termička izdržljivost, što u konačnici utječe i na poroznost posude.[62] Takvi neplastični materijali dodaju se smjesi da bi se pojačala otpornost na termalni stres (pri pečenju ili za posude koje se koriste na vatri). Termalni je stres pojava širenja i skupljanja materijala u kontaktu s visokom temperaturom, pri čemu je napeta forma stijenke posude podložna pucanju. Iz tih se razloga u smjesu gline dodaju primjese otporne na visoke temperature, oko kojih se pri pečenju posude stvaraju mikropukotine te one kasnijom upotrebom na vatri omogućavaju slobodan prostor za nesmetano stezanje. U tu svrhu često se koristi kvarc. Toplinska je otpornost složen parametar i pod utjecajem je prijenosa topline, toplinskog širenja, čvrstoće i otpornosti, a na njega utječe i oblik posude, stoga se moraju razmotriti svi navedeni parametri.[63]

Zabilježene su i lončarske smjese koje također sadrže veće količine primjese, međutim, ne povezuju se s posudama namijenjenima korištenju na vatri. Stoga je tumačenje odabira količine primjesa u funkcionalnom smislu do neke mjere upitna. Upravo se ova pojava uglavnom povezuje s primjesama groga čija količina (1 – 7%) nije dovoljna da pozitivno utječe na fizička svojstva posude (npr. termalna svojstva). U sklopu kulturne grupe Virovitica, i u kasnom brončanom dobu, lončari koriste isključivo grog za izra-

[62] Rye 1981, 39; Shepard 1985, 25; Velde, Druc 1999.

[63] Schiffer *et al.* 1994; Hein, Müller, Kilikoglou 2007, 15.

A lot more data on this selection can be gathered by identifying and analyzing the temper material used by the potter in the paste preparation process. Regardless of the type, temper material can appear in the ceramic structure in abundance or sporadically. Large amounts (20 – 40%) of grog (and clay pelets) and lithoclasts in pastes were used by all cultural groups. These amounts were noted in vessels that had traces of secondary firing in an oxidation atmosphere on the outer surface, which is a good indicator of the vessel having been used in fireplaces (Fig. 12b, 14, 15d). Basically, non-plastic inclusions (mineral grains, lithoclasts, or grog) were added to the pastes in order to improve the shaping and firing of the vessel, to increase its firmness and thermal resistance, which also affected the porosity of the vessel.[62] Such non-plastic materials were added to the paste in order to improve the resistance to thermal stress (during firing or during use). Thermal stress is an occurrence where material expands and shrinks in contact with higher temperatures, whereby the tense vessel wall is prone to breaking. That is why temper resistant to high temperatures is added to the paste. Microcracks appear around these temper grains during firing that enable stress-free shrinkage during subsequent exposure to fire. Quartz is often used for that purpose. Thermal resistance is a complex parameter affected by the transfer of heat, thermal expansion, firmness and resistance, and by the shape of the vessel, which is why all listed parameters must be considered.[63]

Ceramic pastes that contained higher amounts of temper material, but which cannot be associated with vessels that were exposed to fire were also noted. Therefore, explaining the choice of temper amounts in terms of functionality is somewhat questionable. Precisely this occurrence is most often connected with grog, the amount of which (1 – 7%) is not enough to positively affect the physical properties of the vessel (e.g. thermal properties). In the framework of the cultural group Virovitica and the Late Bronze Age, potters exclusively used grog in the production of all vessel types, and larger amounts (10 – 30%) of such temper were often used in

[62] Rye 1981, 39; Shepard 1985, 25; Velde, Druc 1999.

[63] Schiffer *et al.* 1994; Hein, Müller, Kilikoglou 2007, 15.

du svih oblika posuda, a veće količine (10 – 30%) takve primjese često se koriste i za izradu posuda tankih stijenki (sl. 21a, 23b). Prevladavajuće je mišljenje da je uporaba groga tehno-funkcionalna, a prema nekim istraživanjima za postizanje optimalne kvalitete kaolinske gline u smjesu je potrebno dodati između 20 i 50% neplastičnih materijala.[64] Prednost groga prije svega je njegova dostupnost, zatim relativno jednostavna priprema i funkcionalne karakteristike koje mogu osigurati posudi otpornost na termalni stres i razna mehanička oštećenja.[65] Međutim, korištenje groga može se tumačiti i na drugačiji način. Podaci iz arheoloških i etnoarheoloških izvora govore o sustavnom recikliranju keramike i snažnim elementima tradicije u odabiru primjesa.[66] U tome smislu ovaj fenomen može se smatrati kao simbolički aspekt ugradnje starijih posuda u nove, a takvo recikliranje materijala i njegova transformacija predstavljaju simbolično održavanje kontinuiteta i identiteta unutar zajednice.[67]

Organski materijal (suha trava, slama, pljeva, sjemenke, kravlja balega i sl.) zastupljen je u pojedinim uzorcima gotovo svih kulturnih grupa, a iznimka je licenska keramika. Prisutnost organskih materijala u smjesi može poboljšati svojstva glina koje su vrlo plastične, a s obzirom na to da većina primjesa izgori tijekom pečenja te u strukturi keramike ostaju manje ili veće šupljine/pore, one smanjuju i utjecaj termalnog stresa na stijenke posude.[68] Premda je analiziran mali broj uzoraka, postoje pokazatelji da je takva vrsta materijala korištena kao primjesa za izradu samo nekih tipova posuda, npr. zdjela s uvučenim rubom. U ovom slučaju, razlozi uporabe organskih primjesa ne mogu se tumačiti termalnom otpornošću tijekom uporabe jer zdjele ne sadrže tragove izlaganja vatri, a slično se pretpostavlja i

[64] Rye 1981, 39.

[65] Rice 1987, 229; Spindel 1989, 69 (prema Kreiter 2007, 117); Velde, Druc 1999, 116.

[66] Sterner 1989, 458 (prema Deal, Hagstrum 1995, 122); Kreiter 2007; Gosselain 2011.

[67] De Boer 1974, 336; Smith 1989, 61; Chapman 2000; Brück 2006.

[68] Skibo, Schiffer, Reed 1989.

the production of thin-walled vessels (Fig. 21a, 23b). The prevailing opinion is that using grog was techno-functional, and some research has shown that, in order to achieve the optimal quality of kaolin clay, one must add between 20 and 50% of non-plastic materials.[64] The advantage of grog is primarily its availability, and another is the relatively simple preparation and functional characteristics, which can make the vessel resistant to thermal stress and diverse mechanical damage.[65] However, using grog can also be interpreted in a different way. Data from archaeological and ethnological sources speaks in favor of systematic pottery recycling, pointing to strong elements of tradition in temper selection.[66] In that sense, this phenomenon can be seen as a symbolic aspect of incorporating older vessels into new ones, meaning that such recycling and transformation of the material are a symbolic act of keeping the continuity and identity within a community.[67]

Organic material (dry grass, hay, chaff, seeds, cow dung and so forth) is present in individual samples of almost all cultural groups, with the exception of Litzen pottery. The presence of organic temper materials in a paste enhances the properties of plastic clays and, seeing as most inclusions burn up during firing, leaving smaller or larger voids/pores in the structure of the pottery, they reduce the effect of thermal stress on the vessel walls.[68] Even though the number of analyzed samples is small, there are indicators that such material was used as temper in the production of only some types of vessels, e.g. bowls with inward-facing rims. In this case, the reasons for using organic temper cannot be interpreted through, e.g. thermal resistance during vessel use, seeing as the bowls do not have

[64] Rye 1981, 39.

[65] Rice 1987, 229; Spindel 1989, 69 (after Kreiter 2007, 117); Velde, Druc 1999, 116.

[66] Sterner 1989, 458 (after Deal, Hagstrum 1995, 122); Kreiter 2007; Gosselain 2011.

[67] De Boer 1974, 336; Smith 1989, 61; Chapman 2000; Brück 2006.

[68] Skibo, Schiffer, Reed 1989.

za panonsku inkrustiranu keramiku te posude vinkovačke kulture. Tumačenje odabira organske primjese moglo bi biti u vezi s termalnom otpornošću tijekom postupka proizvodnje, odnosno pečenja keramike.

Glineni peleti za sada su zabilježeni u uzorcima panonske inkrustirane keramike i keramike virovitičke grupe, međutim, preciznija karakterizacija nije moguća jer ova metoda ne dopušta jasno razlikovanje između groga i peleta.

Na uzorcima vinkovačke kulture primijećena je velika raznolikost lončarskih smjesa, vrste primjesa i recepture, stoga je za bolje razumijevanje njihova odabira potrebno provesti opsežnije analize. Ipak, primjećeni su uzorci kojima nije dodavana primjesa i oni u kojima se nalazi i nekoliko različitih vrsta primjesa, dok je debljina stijenke svih uzoraka prilično ujednačena (oko 0,5 cm). Velika varijabilnost lončarskih smjesa može biti pokazatelj suživota različitih tehno-kulturnih praksa, ali ona predstavlja i dobar indikator vanjskih utjecaja, promjena tradicije ili populacije.[69]

Bez obzira na kronološku diskrepanciju između kulture Kisapostag i licenske keramike, lončarske smjese s izrazitijom količinom litoklasta, često vrlo krupnih zaobljenih zrna (do 5 mm), tek preliminarno, predstavljaju dobre pokazatelje smanjene varijabilnosti, odnosno visoke razine sličnosti u pripremi smjese. Pojava neznatne količine groga, uz obilnije prisutne primjese litoklasta, za sada se može tumačiti u okvirima dostupnosti sirovine. Zaobljena zrna litoklasta mogu se vrlo lako nabaviti u prirodi u obliku šljunka i predstavljaju gotovu petrogenu primjesu, za razliku od groga koji zahtijeva posebnu pripremu. S druge strane, analiza makrofotografija svježeg loma panonske inkrustirane keramike pokazala je drugačiju praksu. Osnovna je vrsta primjesa grog (i/ili glinoviti peleti) koji se smjesi dodavao u većim količinama, i to za izradu određene vrste posuda, a količina litoklasta, iako prisutna gotovo je zanemariva. Ipak, za sada

[69] Stark 1991; Stark, Longacre 1997; Arnold 2000; Gosselain 2000.

traces of fire exposure, and a similar thing is suggested for Pannonian Encrusted Ware and vessels of the Vinkovci Culture. Interpretation of organic temper selection may be related to thermal resistance during the manufacturing process or firing.

Clay pelets (argillaceous rock fragments) have, so far, only been noted in samples of Pannonian Encrusted Ware and pottery of the Virovitica group. However, more precise characterization has been prevented due to the difficulty of distinguishing pellets from grog by using this method.

Samples of the Vinkovci Culture display a wide variety of clay pastes, type of temper, and recipes, so in order to better understand their selection, it is necessary to conduct more-encompassing analyses. However, samples which had a pretty even vessel wall thickness (about 0.5 cm) without added temper and those which had several types were also noted. The large variability in ceramic pastes can be an indicator of the cohabitation of several different technological and cultural practices, but also of outside influences, changes in tradition or population.[69]

Regardless of the chronological discrepancy between the Kisapostag Culture and Litzen pottery, ceramic pastes with more pronounced amounts of very often large and rounded lithoclast grains (up to 5 mm) represent, albeit preliminarily, indicators of reduced variability, that is, of a high level of similarity in paste preparation. The presence of insignificant amounts of grog, along with lithoclasts, can be interpreted in terms of the availability of raw materials. Rounded grains of lithoclasts can easily be obtained from the environment, in the form of gravel, and represent a natural rock-forming temper, unlike grog, which requires special preparation. On the other hand, the analysis of macrophotographs of Pannonian Encrusted Ware ceramic fabric revealed a different practice. The basic temper is grog (and/or clay pelets), which was added to the paste in larger amounts, and only to produce certain kinds of vessels, and the amount of lithoclasts, although noted, is almost negligible. However, for now, there are good indicators for

[69] Stark 1991, Stark, Longacre 1997; Arnold 2000; Gosselain 2000.

postoje dobri pokazatelji vrlo ujednačenih recepata, smjese bez groga i one s velikom količinom većih zrna groga uz koje se rjeđe nalaze i zrna litoklasta. Takav je odabir čini se povezan s debljinom stijenke, obradom površine te vjerojatno i funkcijom posuda. Miješanje različitih vrsta primjesa u arheološkoj, ali i etnološkoj praksi nije neuobičajeno.[70]

Odabir lončarske smjese može biti povezan s tehnikom ukrašavanja njihove površine. Licenski ukras, odnosno tehnika utiskivanja tkane uzice ili namotane niti na površinu glinene posude, izvodi se s lakoćom i izgleda urednije ako se utiskuje u smjesu koja ne sadrži krupne primjese, a jednak odabir smjese povezuje se i s tehnikom rovašenja, žljebljenja i urezivanja, kakva se koristila za dekoriranje posuda s inkrustacijom (panonska inkrustirana keramika). S druge strane, posude vinkovačke kulture jednakih karakteristika izrađene su od sitnozrnatoga glinovitog materijala, međutim, površina takvih posuda uglavnom je neukrašena.

Tragovi tehnika izrade i obrade površine keramičkih posuda, koji mogu biti vidljivi u keramičkoj strukturi, posebna su tematika koja do neke mjere prelazi okvire ovog rada. Međutim, upravo su pojedini elementi koji se promatraju u keramičkoj strukturi, poput orijentacije i rasporeda pora/šupljina, čestica minerala ili neplastičnih zrna, jedan od pokazatelja tog dijela keramičke proizvodnje.[71] Tehnike oblikovanja posuda dijele se na primarne, koje podrazumijevaju izradu posude, i sekundarne, koje se odnose na završnu obradu kao što je stanjivanje stijenke, glačanje površine i sl. Raspored zrna groga, koji se nalaze paralelno uz vanjsku stijenku posude (sl. 26a, 23b, 12b), mogu biti pokazatelj uporabe kalupa, odnosno zrna groga, a predstavljaju materijal koji je služio za oblaganje kalupa i njegovo lakše odvajanje od posude.[72] Takav raspored groga u keramičkoj strukturi, osim primarnih metoda izrade posuda, vjerojatniji je po-

[70] Quinn 2013, 168; Albero Santacreu 2014, 70.

[71] Rye 1981, 67–72.

[72] Quinn 2013, 174, Fig. 6.33.

similar recipes for pastes without grog, and for those with larger amounts of grog grains which are seldom accompanied by grains of lithoclasts. Such a choice is connected to vessel wall thickness, surface processing, and, probably, vessel function. The mixing of different kinds of temper is not unusual in archaeological, as well as ethnological practice.[70]

The selection of ceramic paste can be connected to, e.g. decorative techniques. Litzen decorations, i.e. impressing a braided ribbon or thread onto the surface of a pottery vessel, are easily done and look more orderly if impressed onto a paste with fewer inclusions, and the same selection of paste is connected to gauging, grooving, and incising used to decorate incrusted vessels (Pannonian Encrusted Ware). On the other hand, the mostly undecorated vessels of the Vinkovci Culture with the same characteristics are made out of fine-grained clayey material.

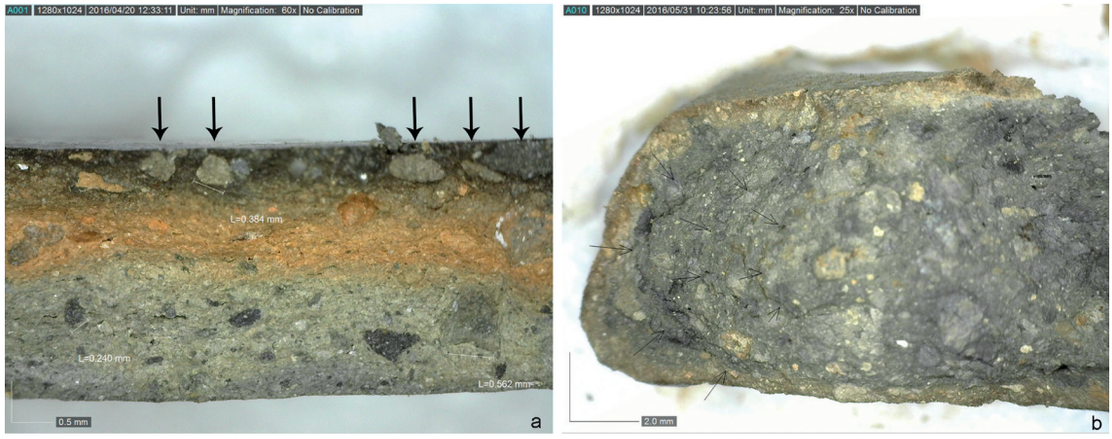
Traces of forming techniques and surface treatment that may be visible in ceramic fabrics are a separate topic that falls within the scope of this paper to a certain extent. Still, certain elements studied in the pottery fabric, such as orientation and the distribution of voids/pores, mineral particles, or non-plastic grains, are one of the indicators of that aspect of pottery production.[71] Techniques of vessel shaping are divided into primary, including forming the vessel, and secondary, including final processing such as thinning of the vessel walls and so forth. The distribution of grog grains that are parallel to the outer vessel wall (Fig. 26a, 23b, 12b) can be an indicator of using a cast, i.e. the grains of grog are the remains of material used to cover the cast in order to enable the separation of the vessel from the cast.[72] Such a distribution of grog in the ceramic structure, apart from primary techniques of vessel production, is a more probable indicator of secondary techniques such as surface polishing.[73] The category of secondary techniques of pottery production, that is, final processing, includes slip, a liquid suspension of clayey material and minerals (and/or other ma-

[70] Quinn 2013, 168; Albero Santacreu 2014, 70.

[71] Rye 1981, 67–72.

[72] Quinn 2013, 174, Fig. 6.33.

[73] Albero Santacreu 2014, 85–86.



Slika / Figure 26. Makrofotografije brončanodobne keramike s tragovima tehnika izrade posuda: (a) crne strelice označavaju paralelan raspored primjesa s unutarnjom stijenkom posude i pokazatelj su primjene tehnike glačanja površine posude – Jagodnjak-Krčevine, uvećanje 36 x; (b) koncentričan raspored i orijentacija zrna neplastičnih materijala u keramičkoj strukturi mogu biti pokazatelj tehnike izrade posude pomoću glinenih traka ovalnog presjeka – Kurilovec-Belinščica, uvećanje 25 x (snimila: A. Kudelić). / Macrophotographs of Bronze Age pottery with traces of surface treatment and forming techniques: (a) black arrows denote the parallel distribution of inclusions and the inner vessel wall, which is an indicator of applying the technique of polishing the vessel surface – Jagodnjak-Krčevine, magnification 36 x; (b) the concentric distribution and orientation of grains of non-plastic materials in the structure of pottery can be an indicator of using a specific forming technique, coiling – Kurilovec-Belinščica, magnification 25 x (photo by: A. Kudelić).

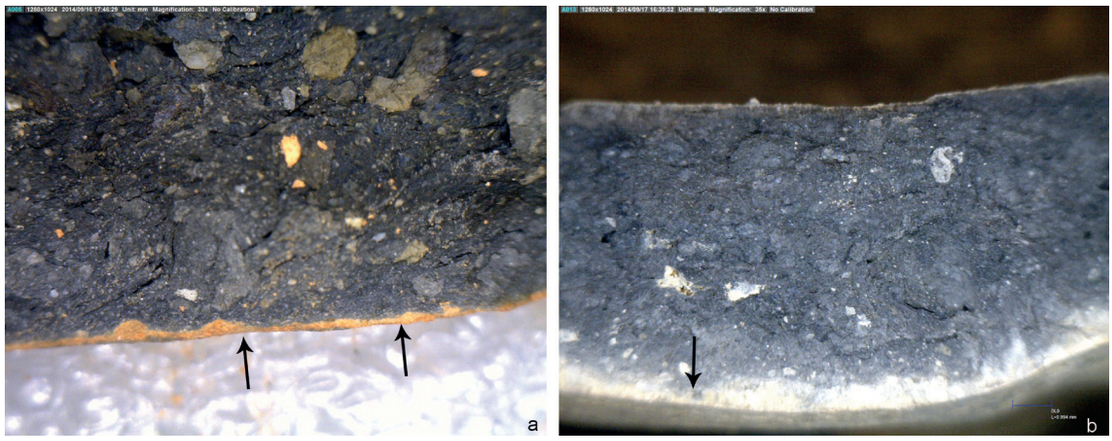
kazatelj sekundarnih tehnika, poput glačanja površine.[73] U kategoriju sekundarnih tehnika izrade posuda, odnosno finalnoj obradi, pripada slip, tekuća suspenzija glinovitog materijala i minerala (i/ili drugih materijala) koja se prije pečenja u tankom sloju nanosi na čitavu površinu posude. Slip uglavnom sadrži manju količinu inkluzija sitnijih čestica u odnosu na sastav smjese i često je drukčije boje. Njegova debljina ovisi o tehnici i sastavu suspenzije, a kada je sloj premaza deblji, može se zabilježiti i makrofotografijom (sl. 27). Šupljine i pore, paralelne sa stijenkom posude, zabilježene su u gruboj keramičkoj strukturi kulture Kisapostag i licenske keramike na svim uzorcima, neovisno o području odakle potječu, stoga su dobar pokazatelj ujednačenih tehnika izrade posuda (sl. 15). Orijentacija zrna neplastičnih materijala i pora u keramičkoj strukturi, poput koncentričnog ili izrazito zakrivljenog smijera orijentacije, mogu biti pokazatelj tehnike izrade posude pomoću glinenih traka ovalnog presjeka (sl. 26, 22c).

Provedenim istraživanjem ustanovljeno je da lončarski odabiri u sklopu brončanodobnih zajednica na prostoru sjeverne

terial), which is used to thinly cover the entire vessel surface before firing. Slip mostly contains smaller amounts of inclusions of particles that are smaller than those in the paste composition, and are often of a different color. Its thickness depends on the technique and composition of the suspension, and, when the coating is thicker, it can also be recorded on macrophotographs (Fig. 27). Voids and pores that are parallel to vessel walls were noted on coarse ware of the Kisapostag Culture and Litzen pottery on all samples, regardless of where they came from, and are a good indicator of very similar pottery production techniques (Fig. 15). The orientation of non-plastic grains and pores in the ceramic structure, such as concentric or notably curved orientation, can be an indicator of the coiling pottery technique of forming vessels (Fig. 26, 22c).

The conducted research has shown that the potter's choices within Bronze Age communities in northern Croatia reflect certain variability and specific similarities (Tab. 2), which are a good foundation for developing a systematic analy-

[73] Albero Santacreu 2014, 85–86.



Slika / Figure 27. Makrofotografije brončanodobne keramike s tragovima uporabe debelog sloja premaza ili slipa, a od matriksa se razlikuje sitnijim sastavnim česticama i drugačijom bojom – Kurilovec-Belinščica: (a) uvećanje 35 x, (b) premaz izrazito svijetle, bež boje, uvećanje 35 x (snimila: A. Kudelić). / Macrophotographs of Bronze Age pottery with traces of using a thick layer of coating or slip which differs from the matrix due to very tiny particle components and color – Kurilovec-Belinščica: (a) magnification 35 x, (b) the notably light, beige-colored coating, magnification 35 x (photo by: A. Kudelić).

Hrvatske odražavaju složenu varijabilnost i specifične sličnosti (tab. 2) koje predstavljaju dobar temelj za razvoj sistematizirane analize lončarskih smjesa svake pojedine kulturološki određene grupe/zajednice te da je njihova analiza ukazala na izraziti potencijal budućih proširenih istraživanja.

sis of ceramic fabrics in order to determine the composition of clay pastes for every cultural group/community, and this analysis expressed the potential of future, more-encompassing research.

	LITOKLASTI / LITHOCLAST	GROG–GLINOVITI PELETI / GROG–CLAY PELETS	ORGANSKI MATERIJAL / ORGANIC MATERIAL
Vinkovačka kultura / Vinkovci–Somogyvár culture (Donji Miholjac)	+	+	
Kisapostag kultura i licenska keramika / Kisapostag culture and Licen pottery (Turopolje i/and Podravina)	++	+	
Panonska inkrustirana keramika / Pannonian Encrusted Ware (Jagodnjak-Krčevine)	+	++	+
Kulturna grupa Virovitica / Virovitica cultural group (Turopolje i/and Podravina)		+	+
Kasno brončano doba / Late Bronze Age (Kalnik-Igrišče i/and Dubovac-Stari grad)		+	+

Tablica / Table 2. Korištene vrste primjesa za pripremu lončarskih smjesa u brončano doba na području sjeverne Hrvatske (++ – učestalije korištena vrsta primjese). / Types of temper material used for preparing Bronze Age ceramic pastes in northern Croatia (++ – more frequently used type of temper).

5. ZAKLJUČAK

Da bi se ustanovili složeni mehanizmi odabira lončarskih smjesa u okviru i između kulturnih grupa / zajednica iz brončanog doba sjeverne Hrvatske, valja provesti mnogo opsežnije istraživanje. Ipak, ovdje su predstavljeni osnovni kriteriji za njihovu karakterizaciju u okviru mogućnosti manjih uvećanja uzoraka, kao i preliminarni rezultati provedenih makroskopskih analiza koje čine dobre smjernice za odabir novih uzoraka i buduća istraživanja. Pretpostavka je da brončanodobni lončari svojstva primjesa koje dodaju u smjesu od kojih izrađuju predmete dobro poznaju te da njihov odabir nije slučajan. Pretpostavka je također da je njihov odabir djelomično povezan s dostupnošću pojedinog materijala, a prema rezultatima provedenih analiza zabilježene vrste primjesa i glinoviti materijal mogli su se nabaviti u neposrednoj okolici naselja ili u samom naselju. Zabilježene su i velike različitosti u odabiru recepata za pripremu lončarskih smjesa, a to se posebice odnosi na odabir vrste primjesa. Pretpostavka je da su različitosti produkt društvenih zbivanja na prostoru savsko-dravskog međurječja, odnosno da su odabiri uvjetovani kulturološkim čimbenicima.

Desetljećima su razvijane teorije, a provedena su i brojna ekstenzivna arheološka i etnoarheološka istraživanja koja se bave tehnologijom, tehnikom, tehnološkim odabirima i njihovim odnosom s društvenim i kulturno uvjetovanim naslijeđem i ritualom. Rezultati takvih istraživanja ukazuju na to da su u lončarskoj praksi pretpovijesnih zajednica najznačajniji pokazatelji tehnoloških odabira, tradicije ili varijabilnosti skriveni u dubokim kulturološko-ideološkim vrijednostima zajednice. Tehnički izbori najbolje se mogu tumačiti kao kulturno naučeno ponašanje, a ne usvojena strategija.[74] Iako lončari načelno imaju mogućnost

[74] Gosselain, Livingstone Smith 1995, 158.

5. CONCLUSION

Future research is required in order to understand the complex mechanisms of ceramic paste selection among and between Bronze Age cultural groups/communities in northern Croatia. However, the basic criteria for their characterization within the possibilities of smaller magnifications, as well as preliminary results of conducted macroscopic analyses which give good guidelines for new sample selection and future research were presented in this paper. The assumption is that Bronze Age potters knew the properties of temper added to the paste and that their selection was not accidental, and that this selection was partially connected to the availability of certain material. The conducted analyses revealed that temper and clayey material could have been obtained in the immediate vicinity of settlements or within the settlements themselves. Differences in the selection of recipes for ceramic paste preparation, which especially refers to the choice of temper material, were also noted. It is assumed that the differences are a result of social conditions in the Sava-Drava river valley, that is, that the selection was affected by cultural factors.

Theories have been evolving for decades, and numerous extensive archaeological and ethnoarchaeological studies have been conducted on the questions of technology, technique, technological choices, and their relation to socially and culturally conditioned heritage and ritual. The results of such research show that the most significant indicators of technological choices, tradition, and variability in the pottery-making practices of prehistoric communities are hidden in the deeply-rooted cultural and ideological values of a community. Technological choices can best be explained as culturally-learned behavior, and not as an adopted strategy.[74] Although potters generally could make different technological choices, they were greatly influenced by technological traditions which

[74] Gosselain, Livingstone Smith 1995, 158.

različitih tehnoloških odabira, oni su uvelike diktirani tehnološkom tradicijom u sklopu koje djeluju.[75] Naša je zadaća u ulomcima keramičkih posuda pokušati pronaći pokazatelje tradicije i pokazatelje promjena u lončarskim praksama te ih sistematizirano bilježiti kako bismo pokušali bolje razumijeti te procese.

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[75] Gosselain, Livingstone Smith 1995, 158.

surrounded them.[75] Our task is to try and find indicators of tradition, as well as changes in pottery production practices, and to systematically record them in order to gain insight into these processes.

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[75] Gosselain, Livingstone Smith 1995, 158.

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Keramički nalazi brončanog i željeznog doba iz istraživanja Romualdove pećine 2014. godine

Bronze Age and Iron Age pottery finds recovered during the 2014 excavation in Romuald's Cave

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U sklopu projekta „Arheološka istraživanja kasnog pleistocena i ranog holocena na prostoru Limskog kanala – ARHEOLIM", koji je financirala Hrvatska zaklada za znanost (projekt br. 7789), arheološka iskopavanja provedena su na nekoliko važnih pećinskih lokaliteta od kojih je jedan Romualdova pećina. Lokalitet je bio predmetom istraživanja znanstvenika od početka 20. st. zbog svoga istraživačkog potencijala. Arheološki su slojevi Romualdove pećine sadržavali materijal iz brončanog i željeznog doba. Iako su određeni podaci o materijalu prikazani u nekoliko ranijih radova, do sada je izostala detaljna objava. Ovaj rad donosi pregled keramičkog materijala iskopanog pri istraživanju u Romualdovoj pećini 2014. godine.

Ključne riječi: *ARHEOLIM, Romualdova pećina, keramika, rano brončano doba, srednje brončano doba, mlađe brončano doba, završno brončano doba, prvi stupanj željeznog doba*

Within the project "Archaeological Investigations into the Late Pleistocene and Early Holocene of the Lim Channel, Istria – ARCHAEOLIM", financed by the Croatian Science Foundation (Project no. 7789), archaeological excavations have been undertaken at several important cave sites, including Romuald's Cave. Because of the research potential of the site, it has been investigated by scientists since the beginning of the 20th century. Archaeological layers identified in Romuald's Cave contained material dating to the Bronze and Iron ages. Although some information about these finds has already been published in several papers, a more detailed description has been lacking. This paper provides an overview of the pottery finds unearthed during the 2014 excavation in Romuald's Cave.

Key words: *ARCHAEOLIM, Romuald's Cave, pottery, Early Bronze Age, Middle Bronze Age, Late Bronze Age, Final Bronze Age, incipient Iron Age*

UVOD

Keramički materijal opisan u ovome radu produkt je arheoloških istraživanja u Romualdovoj pećini, smještenoj na istočnim obroncima Limskog kanala. Istraživanja su provođena tijekom srpnja 2014. godine u sklopu projekta „Arheološka istraživanja kasnog pleistocena i ranog holocena na prostoru Limskog kanala" Hrvatske zaklade za znanost.[1]

Prva istraživanja Romualdove pećine počela su već u 19. st., kada pećina postaje predmet proučavanja velikog broja znanstvenika.[2] Od najvećeg su značaja istraživanja M. Maleza tijekom kojih je pronađeno kameno oruđe iz razdoblja gornjeg paleolitika. U gornjim slojevima M. Maleza pronašao je i nešto keramičkih nalaza iz brončanog doba.[3]

Od novijih istraživanja valja istaknuti revizijsko istraživanje D. Komše iz 2007. godine.[4] Istraživanje je provedeno zbog prikupljanja različitih uzoraka i apsolutnog datiranja slojeva, a pri istraživanju je zabilježena prapovijesna keramika, kosti te kameni artefakti. Proučavanje Romualdove pećine nastavilo se u obliku sustavnih istraživanja u sklopu već spomenutog projekta Hrvatske zaklade za znanost pod vodstvom dr. sc. Ivora Jankovića.

Za keramički materijal opisan u ovome radu važne su sonde 2 i 3 (sl. 1). Sonda 2 otvorena je zbog čišćenja sonde iz istraživanja M. Maleza te u njoj nisu zabilježeni jasni stratigrafski odnosi, a sonda 3 otvorena je 2014. godine, u prednjoj pećinskoj dvorani s ciljem korelacije stratigrafskog slijeda.[5] U sondi 3 tijekom istraživanja 2014. godine zabilježeno je 14 slojeva, od kojih je prvih 5 moguće pripisati razdobljima brončanog i željeznog doba.[6] U slojevima 1 – 5 pronađeni su keramički i kosturni ostaci životinja koji su okvirno datirani u brončano i željezno

[1] Za detaljniji pregled, vidjeti Janković *et al*. 2016.

[2] Battaglia 1926; Gnirs 1925; Komšo 2003; 2008.

[3] Malez 1987.

[4] Komšo 2008.

[5] Janković *et al*. 2016, 8.

[6] Za detalje o stratigrafiji, vidjeti: Janković *et al*. 2016, 9–10.

INTRODUCTION

The pottery finds presented in this work were recovered during archaeological excavation in Romuald's Cave, located on the eastern slopes of the Lim Channel. The exploration took place in July 2014, as part of the Croatian Science Foundation's project "Archaeological Investigations into the Late Pleistocene and Early Holocene of the Lim Channel".[1]

Romuald's Cave was first investigated in the 19th century, when the cave attracted the interest of many scientists.[2] The most important excavation was carried out by M. Malez, and yielded stone tools dating to the Upper Palaeolithic. In the upper layers, Malez also found some pottery artefacts dating to the Bronze Age.[3]

As regards the most recent investigations, the 2007 revision excavation by D. Komšo is worth emphasizing.[4] The goal of the excavation was to collect various samples and determine absolute dates for individual layers, and during this excavation, prehistoric pottery, bones and stone artefacts were recovered. Romuald's Cave continued to be explored through systematic excavation carried out within the scope of the abovementioned project of the Croatian Science Foundation, under the leadership of Ivor Janković.

The trenches relevant to the pottery finds presented in this paper are trenches 2 and 3 (Fig. 1). Trench 2 was opened with a view to cleaning an earlier trench dug by Malez; it contained no clear stratigraphy. In 2014, trench 3 was excavated in the front hall of the cave, with a view to correlating the stratigraphic sequence.[5] During the 2014 investigation, 14 layers were recorded in trench 3, five of them attributable to the Bronze and Iron Age periods.[6] In layers 1 – 5, potsherds and animal-bone remains were recovered, provisionally dated to the Bronze and Iron ages, as well as human skeletal remains from the Bronze Age.[7] The animal remains belong to the following species: badger (*Meles meles*), hare and/or

[1] For a detailed overview, see Janković *et al*. 2016.

[2] Battaglia 1926; Gnirs 1925; Komšo 2003; 2008.

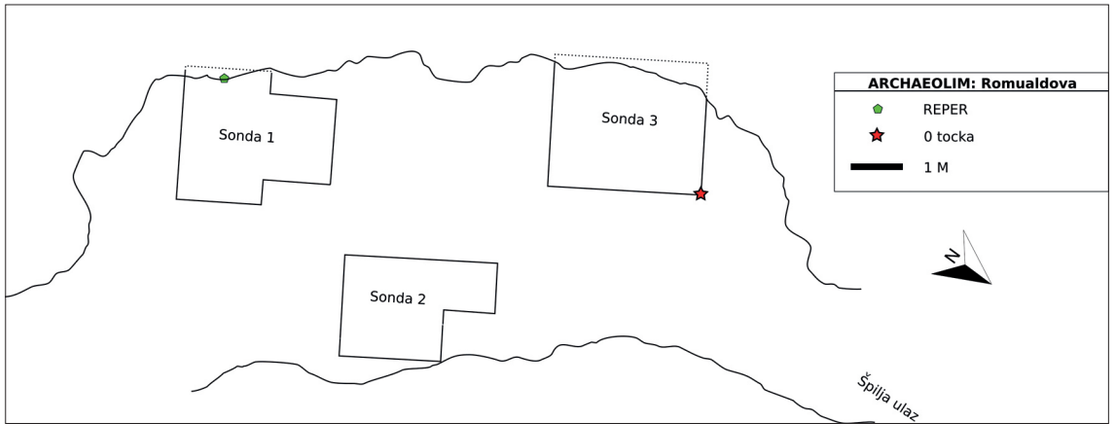
[3] Malez 1987.

[4] Komšo 2008.

[5] Janković *et al*. 2016, 8.

[6] For details on stratigraphy, see Janković *et al*. 2016, 9–10.

[7] Janković 2015; Janković, Ahern, Smith 2015; Janković, Mihelić, Ahern 2015; Janković *et al*. 2015; 2016.



Slika / Figure 1: Položaj sondi 2 i 3 unutar Romualdove pećine (izradio J. C. M. Ahern). / Position of trenches 2 and 3 within Romuald's Cave (made by J. C. M. Ahern).

doba te ljudski kosturni ostaci iz brončanog doba.[7] Životinjski ostaci pripadaju vrstama: jazavca (*Meles meles*), zeca i/ili kunića (*Lepus europeus* / *Oryctolagus cunilicus*), lisice (*Vulpes vulpes*) i domaće ovce (*Ovis aries*).[8] Ljudski su kosturni ostaci pripisani dvjema osobama: djetetu, vjerojatno mlađem od 5 godina, i odrasloj osobi, vjerojatno starijoj od 35 godina. Ostaci odrasle osobe, vjerojatno muškarca, iskorišteni su za radiometrijsko datiranje uz korištenje AMS metode kojom su datirani 3150 ± 46 godina prije sadašnjosti.[9]

Prvi su rezultati analize keramičkih ostataka upućivali na završno razdoblje srednjega brončanog doba, kasno brončano doba te početak starijega željeznog doba.[10] Nažalost, manjak jasnijih stratigrafskih i apsolutno kronoloških podataka onemogućio je detaljniju procjenu o fazama naseljavanja pećine kroz ova razdoblja.[11] Detaljna analiza keramičkih ostataka opisana u ovome radu teži rješavanju stratigrafskih i kronoloških problema.[12]

rabbit (*Lepus europeus* / *Oryctolagus cunilicus*), fox (*Vulpes vulpes*) and domestic sheep (*Ovis aries*).[8] The human skeletal remains have been attributed to two persons: a child, probably under 5 years of age, and an adult, probably over the age of 35. The remains of the adult, probably a male, have been used for radiometric dating using the AMS method, which has dated them to 3150 ± 46 BP.[9]

The first results of pottery analysis suggested their dating to the final period of the Middle Bronze Age, the Late Bronze Age and the beginning of the Early Iron Age.[10] Unfortunately, the lack of clear stratigraphic data and absolute chronology had made it impossible to estimate in more detail the various phases of inhabitation of the cave during these periods.[11] The detailed analysis of pottery finds provided in this work aims to resolve problems relating to stratigraphy and chronology.[12]

[7] Janković 2015; Janković, Ahern, Smith 2015; Janković, Mihelić, Ahern 2015; Janković *et al*. 2015; 2016.

[8] Janković 2016, 12.

[9] Janković *et al*. 2015; 2016.

[10] Janković *et al*. 2015.

[11] Janković *et al*. 2016, 11.

[12] U ovome je radu materijal svrstan u kronološke faze prema podjeli A. Cardarellija (1983.). Nazivi za određene kronološke faze prevedeni su u skladu s prijedlogom K. Buršić-Matijašić (1998, 33–34). Faza *Bronzo medio* prevedena je kao srednje brončano doba, *Bronzo recente* kao mlađe brončano doba, *Bronzo finale* kao završno brončano doba, a faza *Prima età del Ferro* kao prvi stupanj željeznog doba.

[8] Janković 2016, 12.

[9] Janković *et al*. 2015; 2016.

[10] Janković *et al*. 2015.

[11] Janković *et al*. 2016, 11.

[12] In this paper, the archaeological material is classified into chronological phases according to A. Cardarelli's classification (1983). The names of various chronological phases were originally translated into Croatian according to the proposal by K. Buršić-Matijašić (1998, 33–34). The *Bronzo medio* phase is here translated as the Middle Bronze Age, *Bronzo recente* as the Late Bronze Age, *Bronzo finale* as the Final Bronze Age, and the *Prima età del Ferro* phase as the incipient Iron Age.

OPĆE ZNAČAJKE KERAMIČKOG MATERIJALA

Keramički materijal iz Romualdove pećine iznimno je fragmentiran, što je u velikom broju slučajeva onemogućilo, ili otežalo, detaljniju tipološku, a posljedično i kronološku analizu. Najbolje paralele za materijal pronađen pri istraživanju u Romualdovoj pećini pronađene su u materijalu iz Monkodonje[13] i Limske gradine.[14] Važno je spomenuti kako materijal s oba lokaliteta ima svoje vlastite probleme, što je dodatno otežalo rješavanje pitanja datacije nalaza. Primjerice, objava materijala pronađenog pri iskopavanju u Monkodonji[15] iz 1950-ih bila je otežana zbog izgubljenog dnevnika istraživanja, nejasnih iskopa prevelikih dubina te miješanja materijala iz različitih uništenih vrećica.[16] Objave novih istraživanja u Monkodonji u velikoj mjeri rješavaju probleme datiranja materijala s ovog lokaliteta, ali i bacaju novo svjetlo na kronologiju brončanog doba u Istri.[17] Za rješavanje kronoloških, a ponajviše tipoloških i terminoloških pitanja, djelomično je korišten i rad A. Cardarellija,[18] a koristili su ga i drugi autori.[19] Ipak, valja naglasiti kako je spomenuta publikacija u kontekstu novijih istraživanja velikim dijelom zastarjela te je treba uzeti s rezervom. Navedene publikacije odabrane su zbog svog volumena i značaja kako bi se uskladila terminologija i pojednostavilo razumijevanje građe. Kronološki i tipološki problemi naknadno su korigirani literaturom novijeg datuma.[20]

[13] Buršić-Matijašić 1998; Hellmuth Kramberger 2017a.

[14] Urem 2012.

[15] Nakon što je rad već predan na recenziju, objavljena je nova i hvalevrijedna monografija posvećena Monkodonji (Hellmuth Kramberger 2017a; 2017b) koja rješava velik broj tipoloških i kronoloških problema. Rezultati prezentirani u toj monografiji naknadno su uvršteni u okvire ovoga rada.

[16] Buršić-Matijašić 1998, 53–54.

[17] Hänsel, Mihovilić, Teržan 2015; Hellmuth Kramberger 2017a; 2017b.

[18] Cardarelli 1983.

[19] Buršić-Matijašić 1998; Urem 2012.

[20] Hänsel, Mihovilić, Teržan 1999; Hellmuth Kramberger 2017a.

GENERAL FEATURES OF THE POTTERY

The pottery finds from Romuald's Cave are extremely fragmented, and in a large number of cases this made it very difficult, if not impossible, to analyse them in terms of their typology and, subsequently, also their chronology. The best parallels of the pottery finds recovered during the excavation of Romuald's Cave have been found among the archaeological material from Monkodonja[13] and the Limska Gradina hillfort.[14] It is worth mentioning that there are problems in relation to finds from both these sites, which additionally aggravated the issue of their dating. For example, the publication of the material discovered during the 1950s excavation at Monkodonja[15] was difficult because of the disappearance of the excavation journal, unclear trenches that were too deep, and the mixing together of finds from different bags that had been destroyed.[16] The publication of the results of recent excavations at Monkodonja have resolved, to a large extent, the issue of the dating of the material discovered at that site, and it has also thrown new light on the chronology of the Istrian Bronze Age.[17] We have made reference to the work of A. Cardarelli, [18] also used by some other authors,[19] when resolving chronological issues, and primarily typological and terminological issues. However, it is important to underline that, in the context of recent explorations, the abovementioned publication is mostly outdated, and it should be treated with caution. The abovementioned publications have been selected because of their volume and importance, with a view to harmonizing the terminology employed, and facilitating the comprehension of the subject under discussion. Chronological and typological issues were subsequently addressed through the usage of more recent literature.[20]

[13] Buršić-Matijašić 1998; Hellmuth Kramberger 2017a.

[14] Urem 2012.

[15] After the paper had been submitted for review, a praiseworthy new monograph on Monkodonja (Hellmuth Kramberger 2017a; 2017b) was published, which has resolved a large number of typological and chronological issues. The results presented in the monograph have been included subsequently in this paper.

[16] Buršić-Matijašić 1998, 53–54.

[17] Hänsel, Mihovilić, Teržan 2015; Hellmuth Kramberger 2017a; 2017b.

[18] Cardarelli 1983.

[19] Buršić-Matijašić 1998; Urem 2012.

[20] Hänsel, Mihovilić, Teržan 1999; Hellmuth Kramberger 2017a.

Ulomci keramike iz Romualdove pećine statistički su obrađeni na temelju fakture te dijelova tijela. U radovima je ranijih autora[21] često isticano kako je keramika na lokalitetima, koji se u kronološko-prostornom okviru podudaraju s materijalom iz Romualdove pećine, većinom srednje fakture[22] uz postojanje manjih količina izrazito grube i izrazito fine keramike.[23] To je posebno važno u objavi materijala s Limske gradine s obzirom na velik broj tipoloških paralela između materijala iz Romualdove pećine i materijala sa spomenutog lokaliteta.[24] Međutim, za potrebe ovog rada sama je faktura detaljnije razdvojena na nešto veći broj skupina. Izdvojene su četiri osnovne skupine:

a) Gruba smeđa – veže se uz keramičke posude debelih stijenki, uglavnom pithose. Iako je glina u ovom slučaju nekada i dobro pročišćena, kvaliteta pečenja vidljiva u presjeku i debljina stijenke pokazuju da se radi o gruboj keramici. Boja ulomaka posuda ove fakture uglavnom se veže uz različite tonove smeđe boje.

b) Srednje gruba smeđa – ulomci srednje fakture i stijenki srednje debljine. Veže se uglavnom uz lonce, zdjele i amfore. Može sadržavati veći ili manji broj inkluzija. Ulomci ove fakture statistički su najčešći. Valja naglasiti kako je u sondi 2 zabilježeno i 6 ulomaka koji bi se mogli smatrati crnom inačicom ove fakture, tj. srednje grubom crnom keramikom. Boja keramike ove fakture varira od svijetlo smeđih do tamnosmeđih tonova, uz poneke crvenkasto-smeđe i narančasto-smeđe primjerke.

[21] Urem 2012, 72. S druge strane, K. Buršić-Matijašić (1998, 57) keramiku po fakturi dijeli samo na grubu i finu.

[22] Keramika je uglavnom smeđe boje, ali uvelike varira u tonovima. Javljaju se žute, svijetlosmeđe, tamnosmeđe, crno-smeđe, crvenkasto-smeđe, narančasto-smeđe i druge varijante, što ne čudi s obzirom na to da se uglavnom radi o srednje pečenoj keramici. Takva slika odgovara keramici s Limske gradine (Urem 2012, 72), ali i slici keramike s Monkodonje (Hellmuth Kramberger 2017a, 64–67).

[23] Detaljna je analiza materijala korištenog za izradu keramičkih posuda s Monkodonje donesena u najnovijoj objavi tog lokaliteta (Hellmuth Kramberger 2017a, 37-76) te će budućim radovima zasigurno pomoći u preciznijem definiranju same sirovine.

[24] Urem 2012, 72.

The potsherds from Romuald's Cave have been processed statistically according to their fabric and the part of the vessel they belonged to. Earlier authors[21] often emphasized that pottery deriving from sites which correspond to Romuald's Cave in terms of chronology and spatial location was mainly of a medium fabric,[22] with small quantities of exceptionally coarse, and also of exceptionally fine, pottery.[23] This information is particularly important when it comes to the published material from the Limska Gradina hillfort, given the high number of typological parallels between the finds from that site and those from Romuald's Cave.[24] However, for the purpose of this paper, the pottery fabric has been further classified into more groups. Thus we distinguish four basic groups:

a) coarse brown – associated with pottery with thick walls, mainly pithoi. In such cases, the clay can even be cleaned well, but the firing quality as revealed by cross-section and wall thickness indicates that this pottery is coarse. The colour of potsherds of such fabric is mainly brown, in various tones.

b) medium-coarse brown – potsherds of a medium fabric, with walls of a medium thickness. It is associated mainly with pots, bowls and amphorae. It can contain various quantities of inclusions. Potsherds of such fabric are statistically most frequent. It is worth mentioning that trench 2 contained 6 pottery fragments that could be considered to belong to a black variant of this fabric, i.e. medium-coarse black pottery. The colour of the pottery of such fabric varies between light-brown and dark-brown tones, with some reddish-brown and orange-brown specimens.

[21] Urem 2012, 72. On the other hand, when it comes to the fabric, K. Buršić-Matijašić (1998, 57) classifies pottery only into coarse and fine.

[22] Pottery is mostly brown in colour, but its tone can vary significantly. Thus, it can be yellow, light brown, dark brown, blackish-brown, reddish-brown, orange-brown and others, which is not surprising if we consider that this pottery is mainly medium-fired. The picture corresponds to the pottery from the Limska Gradila hillfort (Urem 2012, 72), and also to that from Monkodonja (Hellmuth Kramberger 2017a, 64–67).

[23] A detailed analysis of the material used for the production of pottery at Monkodonja is presented in the latest publication of the finds from the site (Hellmuth Kramberger 2017a, 37-76), which will undoubtedly be very helpful for a more precise definition of the raw material in future papers.

[24] Urem 2012, 72.

c) Pjeskovita smeđa – ulomci srednje fakture s velikom količinom primjese sitno tucanog kamena koji djeluje gotovo kao pijesak. Pri otiranju prstom površina djeluje hrapavo pa se kod lošije pečenih primjeraka skida s površine. Nije potpuno jasno radi li se o drugom izvoru gline ili o naknadnom dodavanju. Iako i ulomci srednje grube smeđe fakture mogu sadržavati inkluzije usitnjenog kamena, razlika između ove dvije fakture uočljiva je na dodir. Uz ulomke srednje grube smeđe fakture radi se o statistički drugoj najbrojnijoj skupini. Tipološki odredljivi ulomci ove skupine uglavnom se vežu uz lonce, i to vjerojatno lonce za kuhanje, moguće zbog pojačane otpornosti na temperaturu zbog primjesa. O tome dodatno svjedoči i činjenica da su tragovi gorenja s donje strane dna poznati upravo kod dna ove fakture (N-80; N-96, T. 4: 7).[25] D. Urem bilježi dodavanje tucanog kamena u glinu od koje su proizvedene neke od posuda, međutim, ne odvaja ovaj tip fakture kao zasebnu skupinu.[26]

d) Fina – keramika ove fakture obično se veže uz posude tanjih stijenki. Od tipova prevladavaju zdjele i šalice. Boja može biti sivo-bež, smeđa i crna. U svojoj objavi materijala s Monkodonje, K. Buršić-Matijašić navodi kako je većina fine keramike crne boje[27], što se zapravo slaže s materijalom iz Romualdove pećine, gdje se i u slučaju smeđe fine keramike radi o keramici izrazito tamnosmeđih tonova.

Valja naglasiti da se kod posuda svih faktura pojavljuje glačanje površine, osim u slučaju pjeskovite smeđe. Glačanje se pojavljuje i s unutrašnje i s vanjske strane posude, što odgovara situaciji poznatoj s drugih lokaliteta.[28] Drugi oblici ukrašavanja također nisu rezervirani za neku određenu grupu, već slične načine ukrašavanja nalazimo na ulomcima različite fakture.

[25] Svi dijagnostički ulomci pronađeni pri iskopavanju u Romualdovoj pećini nalaze se u katalogu na kraju rada.

[26] Urem 2012, 72.

[27] Buršić-Matijašić 1998, 57.

[28] Urem 2012, 72.

c) sandy brown – potsherds of a medium fabric, with a large quantity of inclusion consisting of finely crushed stone with an appearance similar to that of sand. Under the fingers, the surface seems rough, and in poorly-fired pieces, it crumbles. It is not entirely clear whether this clay originates from a different source, or whether the inclusion was subsequently added. Although pottery of the medium-coarse brown fabric can also contain crushed-stone inclusion, the difference between the two fabrics is noticeable to the touch. The pottery with this fabric makes up the second-most numerous group, following sherds of the medium-coarse brown fabric. The sherds in this group that could be analysed by type have been identified primarily as pots, probably cooking pots, possibly due to their greater resistance to heat resulting from the inclusions. This is additionally corroborated by the fact that traces of burning on the lower side of the vessel's bottom have been noticed precisely on the bottoms of such fabric (N-80; N-96, Pl. 4: 7).[25] Urem noted that crushed stone had been added to the clay used to produce some of the vessels, but she did not separate pottery of such fabric into a separate group.[26]

d) fine – pottery of such fabric is usually associated with vessels of thin walls. As regards the types, such pottery consists primarily of bowls and cups. The colour can be grey-beige, brown and black. In her publication of the material recovered at Monkodonja, K. Buršić-Matijašić wrote that the fine pottery was mostly black,[27] which corresponds to the material discovered in Romuald's Cave, where the fine brown pottery is actually very dark in its tone.

It should be emphasized that pottery of all fabrics have polished surfaces, except for those of the sandy brown fabric. The vessels' walls are polished on both inside and outside, which corresponds to the material recovered from other sites.[28] Other methods of decoration are not specific to a single group either; similar decoration has been found on potsherds of different fabrics.

[25] All diagnostic shards discovered during the excavation in Romuald's Cave are listed in the catalogue at the end of the paper.

[26] Urem 2012, 72.

[27] Buršić-Matijašić 1998, 57.

[28] Urem 2012, 72.

REZULTATI STATISTIČKE ANALIZE

Sama statistika, kako na temelju fakture tako i na temelju dijelova tijela, urađena je odvojeno za sondu 2 i sondu 3. Preliminarni rezultati statističkih analiza sonde 3 već su ranije objavljeni,[29] dok su podaci vezani uz sondu 2 doneseni prvi put u ovom radu. Pri detaljnoj obradi keramičke građe iz sonde 3 uočeno je da brojevi pomalo odudaraju od broja prikazanoga u preliminarnom izvješću. Brojevi prikazani u ovome radu konačni su brojevi ovog istraživanja.

Statistička analiza bazira se na izračunu udjela broja pojedine skupine ulomaka u ukupnom broju ulomaka pronađenih unutar svake pojedine sonde. Također, zbog statističke relevantnosti, učinjena je i druga statistička analiza koja se bazira na udjelu mase svake pojedine skupine ulomaka u ukupnoj masi svih ulomaka pronađenih unutar svake pojedine sonde. Takav pristup korišten je zbog činjenice da je teško na isti način vrednovati broj ulomaka fine keramike i broj ulomaka grube keramike. Ulomci grube keramike obično su sačuvani u većim dimenzijama, debljih su stijenki te sadržavaju veći broj inkluzija.[30] Usporedba ukupnog udjela mase i broja pojedine skupine ulomaka omogućava bolji uvid u statističku zastupljenost svake pojedine skupine.

Podjela prema fakturi

a) Sonda 2

Ukupni broj ulomaka keramike pronađenih u sondi 2 iznosio je 544. Od toga ukupnog broja podjela prema fakturi iznosila je brojčano i u postocima (sl. 2): gruba, smeđa faktura – 23 ulomka (4,2%); srednje gruba, smeđa faktura – 354 ulomka (65,1%); pjeskovita, smeđa – 119 ulomaka (21,9%); srednje gruba, crna – 6 ulomaka (1,1%); crna, fina – 29 ulomaka (5,3%); smeđa, fina

[29] Janković *et al*. 2015.

[30] Primjerice, teško je na isti način vrednovati debeli rub pithosa grube fakture i rub šalice tankih stijenki fine fakture iako je njihov broj zapravo jednak.

RESULTS OF STATISTICAL ANALYSIS

Statistical analyses have been made separately for trench 2 and trench 3, on the basis of both the pottery fabric and the part of the vessel's body. The preliminary results of statistical analysis for trench 3 have been published previously,[29] while those for trench 2 are being presented for the first time in this paper. During the detailed processing of the pottery material discovered in trench 3, it was noticed that the numbers deviated slightly from those present in the preliminary report. The numbers presented in this paper are the final numbers relevant to this investigation.

The statistical analysis is based on the calculation of the proportion of potsherds of a particular group within the total number of potsherds recovered from a trench. Moreover, with a view to obtaining statistically relevant results, another statistical analysis has been made, based on the proportion of the mass of each group of potsherds in the total mass of all potsherds discovered in a trench. This approach was selected because of the fact that it would be difficult to attach the same importance to the number of sherds of fine pottery, and to the number of sherds of coarse pottery. Coarse pottery sherds are often preserved in larger pieces, their walls are thicker and they contain more inclusions.[30] A comparison of the total share of the mass of a certain group of potsherds and its number allows a better insight into the statistical representation of each group.

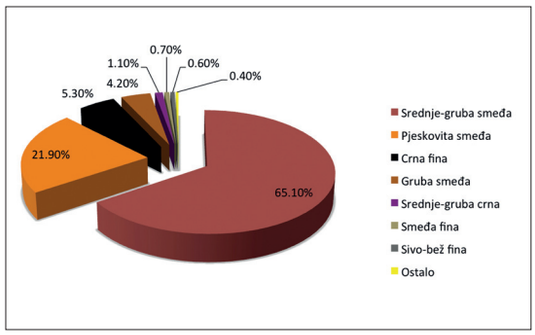
Division by fabric

a) Trench 2

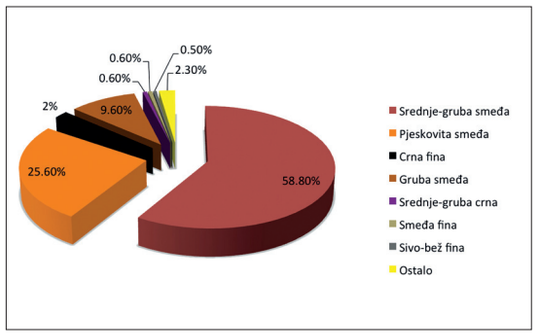
The total number of potsherds recovered from trench 2 is 544. The division of that number by fabric, in terms of both numbers and percentages, is as follows (Fig. 2): coarse brown fabric – 23 sherds (4.2%), medium-coarse brown fabric – 354 sherds (65.1%), sandy brown – 119 sherds (21.9%), medium-coarse black – 6 sherds (1.1%), fine black – 29 sherds (5.3%), fine brown – 4 sherds (0.7%), and fine grey-

[29] Janković *et al*. 2015.

[30] For example, it is difficult to attach the same importance to the thick rim of a pithos of a coarse fabric, and to the rim of a thin-walled cup, although they each make up one fragment.



Slika / Figure 2: Postoci brojčanog udjela određenih vrsta faktura u ukupnom broju ulomaka pronađenih u sondi 2 (izradio F. Franković). / Percentages, by numbers, of specific fabrics in the total number of potsherds recovered from trench 2 (made by F. Franković).



Slika / Figure 3: Postoci masenog udjela određenih vrsta faktura u ukupnoj masi ulomaka pronađenih u sondi 2 (izradio F. Franković). / Percentages, by mass, of specific fabrics in the total mass of potsherds recovered from trench 2 (made by F. Franković).

– 4 ulomka (0,7%) te sivo-bež, fina – 3 ulomka (0,6%). Ovdje valja spomenuti i 2 ulomka potpuno prekrivena kalcijevim karbonatom (0,4%) uslijed djelovanja špiljskih uvjeta te 1 ulomak narančaste boje i srednje fakture koji treba datirati u kasniji, vjerojatno rimski period. Primjerci rimske keramike pronalaženi su i na obližnjoj Limskoj gradini.[31] Iz prikazanih je statističkih podataka moguće zaključiti da je najveći broj ulomaka (479 ili 88,1%) srednje grube fakture (smeđa, pjeskovita i crna), što odgovara rezultatima s drugih lokaliteta.[32]

U masenom smislu statistika izgleda malo drugačije, što ne čudi s obzirom na to da fina keramika ima tanje stijenke te se obično sačuva u manjim ulomcima nego keramika grube fakture. Zbog dva navedena faktora, maseni udio ulomaka grublje keramike bit će veći od udjela njihova broja. Ukupna je masa svih ulomaka iznosila 6135 g. Udjeli ulomaka pojedinih faktura iznosili su (sl. 3): gruba smeđa – 590 g (9,6%); srednje gruba, smeđa – 3609 g (58,8%); pjeskovita, smeđa – 1571 g (25,6%); srednje gruba, crna – 38 g (0,6%); crna, fina – 120 g (2%); smeđa, fina – 36 g (0,6%) te sivo-bež, fina – 31 g (0,5%). Masa ulomaka obloženih kalcijevim karbonatom i jednog ulomka narančaste boje iz kasnijeg perioda iznosi 140 g (2,3%).

[31] Urem 2012, 12.

[32] Urem 2012, 72.

beige – 3 sherds (0.6%). We should also mention two sherds completely covered in calcium carbonate (0.4%) as a result of cave conditions, and one orange sherd of a medium fabric, which should be dated to a later period, possibly Roman. Specimens of Roman pottery have also been found at the nearby Limska Gradina hillfort.[31] The statistical data presented allow the conclusion that the majority of pottery fragments (479, or 88.1%) are of the medium-coarse fabric (brown, sandy and black), which corresponds to the results of excavation at other sites.[32]

When it comes to the mass, the statistical picture is somewhat different, and this should not come as a surprise, given the fact that fine pottery has thin walls and is usually preserved in smaller fragments than the pottery of coarse fabric. Due to these two factors, the mass fraction of coarse potsherds is higher than the proportion of their number. The total mass of all sherds is 6135 g. The shares of the sherds of specific fabrics are as follows (Fig. 3): coarse brown – 590 g (9.6%), medium-coarse brown – 3609 g (58.8%), sandy brown – 1571 g (25.6%), medium-coarse black – 38 g (0.6%), fine black – 120 g (2%), fine brown – 36 g (0.6%), and fine grey-beige – 31 g (0.5%). The mass of the sherds covered in calcium carbonate and of the one orange sherd dating from a later period is 140 g (2.3%).

[31] Urem 2012, 12.

[32] Urem 2012, 72.

b) Sonda 3

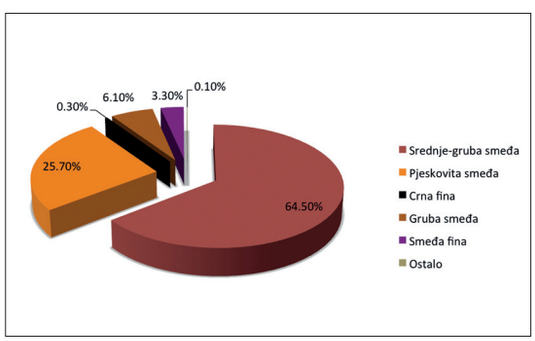
Unutar sonde 3 pronađena su ukupno 642 ulomka keramike. Od toga ukupnog broja, podjela prema fakturi iznosila je brojčano i u postocima (sl. 4): gruba, smeđa – 39 ulomaka (6,1%); srednje gruba, smeđa – 414 ulomaka (64,5%); pjeskovita, smeđa – 165 ulomaka (25,7%); crna fina – 2 ulomka (0,3%) te smeđa, fina – 21 ulomak (3,3%). Kao i u slučaju sonde 2, unutar sonde 3 pronađen je 1 ulomak (0,1%) narančaste keramike koji možda datira u kasniji period (rimski period?). Valja naglasiti da, iako se unutar ove sonde ističe veći broj fine keramike smeđe boje, dio je finih ulomaka smeđe boje zapravo iznimno tamne, gotovo crne boje. Ovi su ulomci odvojeni u dvije skupine prema fakturi zbog činjenice da se u slučaju ulomaka opisanih kao fine crne fakture radi o specifičnim tankim, izrazio crnim ulomcima, obično uglačane ili polirane površine, izrađenima od dobro pročišćene gline. Keramika fine crne fakture djeluje kao da je pečena na višim temperaturama od fine smeđe gline.

Ukupna masa svih ulomaka pronađenih unutar sonde 3 je 11.743 g. Udjeli ulomaka pojedinih faktura iznose (sl. 5): gruba, smeđa – 1151 g (9,8%); srednje gruba, smeđa – 7226 g (61,5%); pjeskovita, smeđa – 3255 g (27,7%); crna, fina – 5 g (0,1%); smeđa, fina – 94 g (0,8%), dok masa ulomka narančaste boje iznosi 12 g (0,1%).

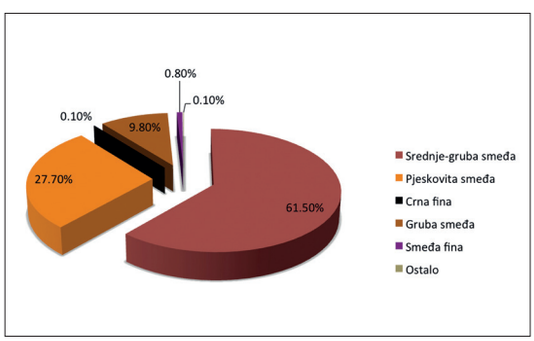
b) Trench 3

A total of 642 potsherds were found in trench 3. Of the total number, sherds of different fabrics are present in the following numbers and percentages (Fig. 4): coarse brown fabric – 39 sherds (6.1%), medium-coarse brown fabric – 414 sherds (64.5%), sandy brown – 165 sherds (25.7%), fine black – 2 sherds (0.3%), fine brown – 21 sherds (3.3%). As in trench 2, a sherd of orange pottery (0.1%) which could originate from a later period (Roman?) was found in trench 3, too. It is important to underline that, although this trench contained a higher number of fine brown potsherds, some of them are actually very dark, nearly black. These sherds have been separated into two groups according to the fabric, due to the fact that the sherds described as being of fine black fabric are specifically thin and prominently black, usually with smoothened or polished surface, made of well-cleaned clay. The pottery of fine black fabric appears as though it was fired at higher temperatures than that of fine brown fabric.

The total mass of all sherds discovered in trench 3 is 11743 g. The shares of the sherds of specific fabrics are as follows (Fig. 5): coarse brown – 1151 g (9.8%), medium-coarse brown – 7226 g (61.5%), sandy brown – 3255 g (27.7%), fine black – 5 g (0.1%), fine brown – 94 g (0.8%), while the mass of the orange sherd is 12 g (0.1%).



Slika / Figure 4: Postoci brojčanog udjela određenih vrsta faktura u ukupnom broju ulomaka pronađenih u sondi 3 (izradio F. Franković). / Percentages, by number, of specific fabrics in the total number of potsherds recovered from trench 3 (made by F. Franković).



Slika / Figure 5: Postoci masenog udjela određenih vrsta faktura u ukupnoj masi ulomaka pronađenih u sondi 3 (izradio F. Franković). / Percentages, by mass, of specific fabrics in the total mass of potsherds recovered from trench 3 (made by F. Franković).

Podjela prema dijelovima tijela

a) Sonda 2

Od ukupnog broja 544 ulomka (sl. 6) očekivano su najbrojniji neukrašeni ulomci tijela posuda koji broje 497 ulomaka (91%). Od dijagnostičnih su ulomaka izdvojena 22 ulomka rubova (4%), 11 ulomaka dna (2%), 7 ručki (1,3%), 3 drške (0,5%), 2 plastične aplikacije (0,4%) te 2 ukrašena ulomka (0,4%), od kojih je jedan ukrašen urezivanjem, a drugi moguće bojenjem. Zasebno su izdvojena 2 ulomka (0,4%), obložena kalcijevim karbonatom uslijed djelovanja špiljskih procesa, kako ne bi izravno utjecali na statistiku (posebno na maseni udio).

Iako su drške i plastične aplikacije svrstane u dvije različite kategorije, valja naglasiti kako bi se jedan broj drški mogao smatrati i plastičnim aplikacijama. Spomenute primjerke u funkcionalnom smislu može se smatrati drškama, a prava atribucija zapravo ovisi o dimenzijama samih aplikacija. Veće bi se aplikacije mogle smatrati drškama, dok bi se manje mogle odrediti samo kao aplikacije. Dimenzije 3 dvojbena primjerka upravo su negdje između onoga što bi se jasno moglo, ili odrediti, ili otpisati kao drška. Svakako, valja naglasiti kako na slične probleme nailazimo i kod drugih autora, gdje se ponekad koristi izraz "aplikacija", a ponekad "drška" pa se čini da atribucija određene kategorije ovisi uglavnom o dimenzijama.[33]

Ovdje je važno napomenuti kako se u većeg broja dijagnostičkih ulomaka, posebice rubova i dna, radi o sitnim ulomcima bez jasno sačuvane profilacije, kod kojih nije bilo moguće detaljnije odrediti tip posude kojem pripadaju, a posljedično ni preciznije datirati pojedine ulomke. Zbog toga treba imati na umu da je stvarni broj ulomaka iskoristivih za detaljniju kulturno-kronološku analizu zapravo iznimno nizak.

Od ukupne mase ulomaka (sl. 7) iz sonde 2 (6135 g) na ulomke tijela posuda odlazi 5066 g (82,6%). Ostali podaci iznose: ulom-

[33] Vidjeti atribuciju potkovičastih aplikacija / drški kod Urem 2012.

Division by parts of the body

a) Trench 2

As could be expected, of the total number of 544 potsherds (Fig. 6), the most numerous were undecorated fragments of vessels' bodies; there were 497 such sherds (91%). Among the diagnostic potsherds, there are 22 rim fragments (4%), 11 bottom fragments (2%), 7 handles (1.3%), 3 handgrips (0.5%), 2 plastic appliques (0.4%), and 2 decorated sherds (0.4%), one of which is incised and the other possibly painted. There are also two sherds (0.4%) covered in calcium carbonate as a result of cave processes, which have been treated separately to avoid their direct impact on the statistics (especially the mass fraction).

Although the handgrips and plastic appliques have been separated into two categories, it is worth mentioning that some of the handgrips could be interpreted as plastic appliques. Functionally, they could be seen as handgrips, but their real attribution depends on the size of the appliques. Bigger appliques could be interpreted as handgrips, whereas smaller ones could be described just as appliques. The dimensions of three questionable specimens lie somewhere between what could clearly be categorized as a handgrip and what would be excluded from being one. It should be pointed out that similar problems have been encountered by other authors, too, and they sometimes use the term *applique*, and sometimes *handgrip*, and it seems that such attributions depend mainly on the size.[33]

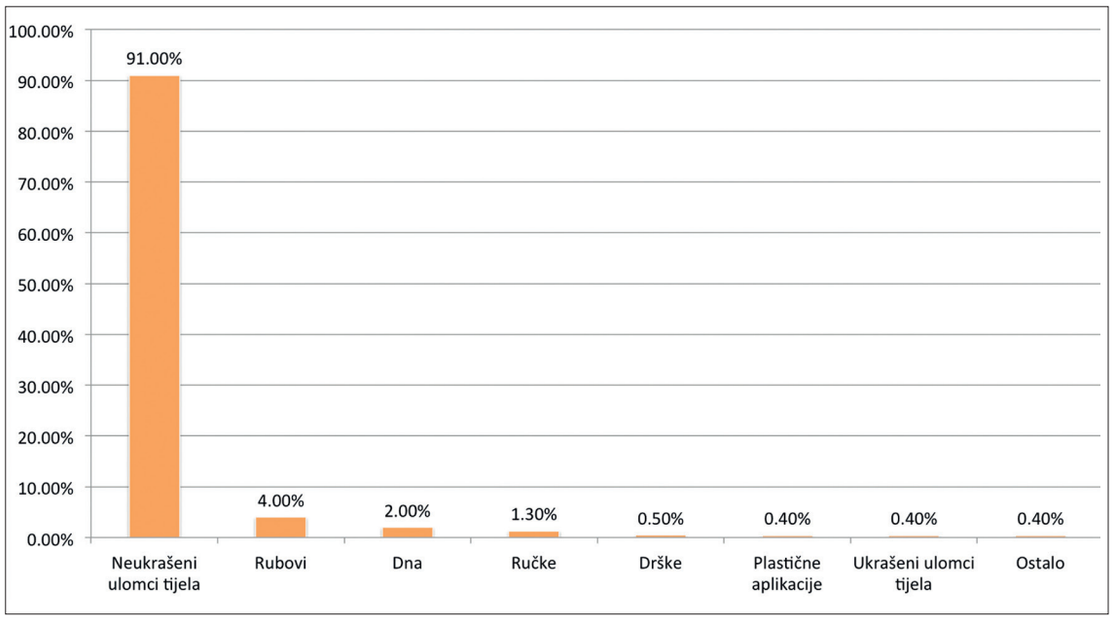
It is worth mentioning that many of the diagnostic potsherds, especially those belonging to rims and bottoms, are very small, and no clear profiles have been preserved, making it impossible to determine the type of the vessel they belonged to, and, subsequently, making it impossible to date those sherds with any precision. Therefore it is important to bear in mind that the real number of potsherds that can be used for a detailed cultural and chronological analysis is actually very low.

Of the total mass of sherds (Fig. 7) from trench 2 (6135 g), fragments of vessels' bodies make

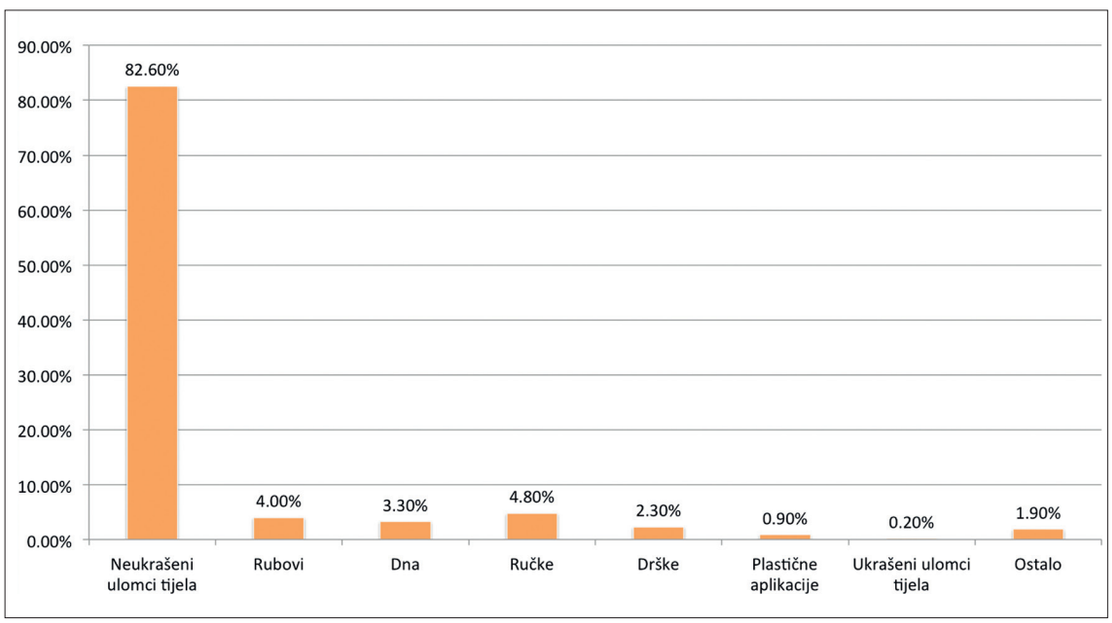
[33] See the attribution of horseshoe-shaped appliques / handgrips in Urem 2012.

ci rubova – 247 g (4%); ulomci dna – 204 g (3,3%); ručke – 293 g (4,8%); drške – 144 g (2,3%); plastične aplikacije – 54 g (0,9%); ukrašeni ulomci – 13 g (0,2%). Ulomci oblo-ženi kalcijevim karbonatom težili su 114 g (1,9%).

up 5066 g (82.6%). The other sherds are: frag-ments of rims 247 g (4%), fragments of bottoms 204 g (3.3%), handles 293 g (4.8%), handgrips 144 g (2.3%), plastic appliques 54 g (0.9%) and decorated sherds 13 g (0.2%). The sherds cov-ered in calcium carbonate weigh 114 g (1.9%).



Slika / Figure 6: Postoci brojčanog udjela određenih dijelova tijela posuda u ukupnom broju ulomaka pronađenih u sondi 2 (izradio F. Franković). / Percentages, by number, of specific parts of the vessel's body in the total number of potsherds recovered from trench 2 (made by F. Franković).



Slika / Figure 7: Postoci masenog udjela određenih dijelova tijela posuda u ukupnoj masi ulomaka pronađenih u sondi 2 (izradio F. Franković). / Percentages, by mass of specific parts of the vessel's body in the total mass of potsherds recovered from trench 2 (made by F. Franković).

b) Sonda 3

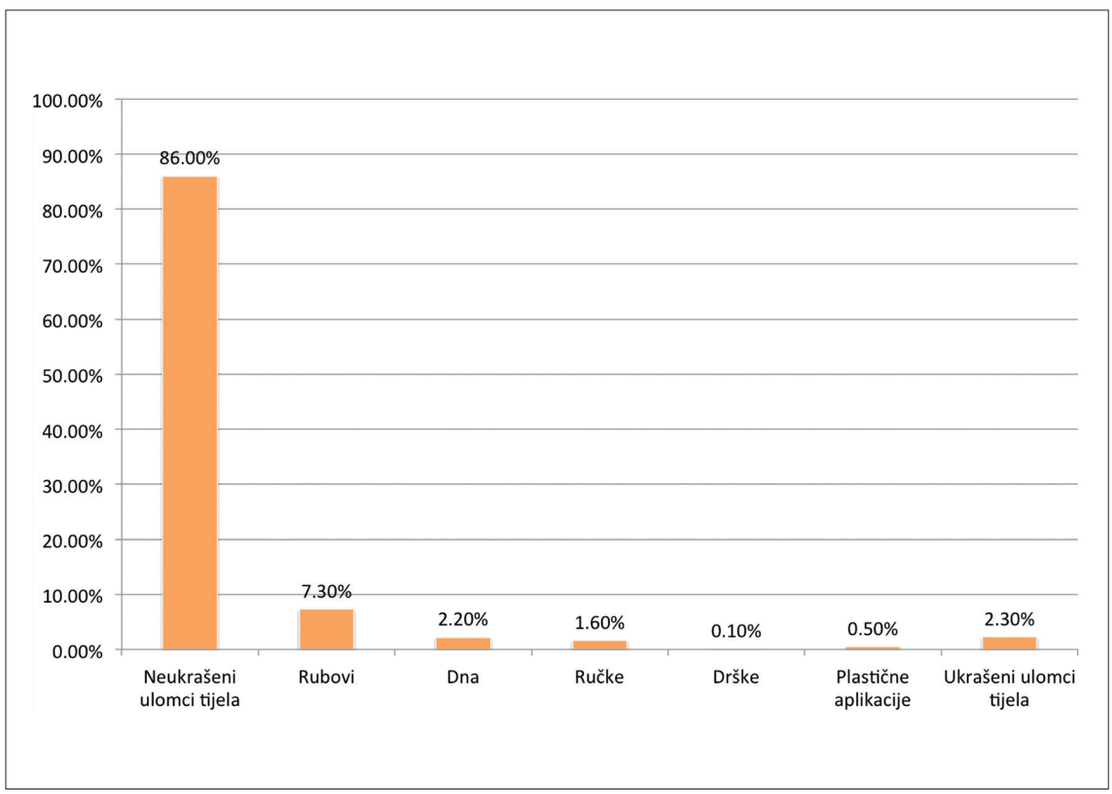
U sondi 3 udjeli u ukupnom broju od 642 ulomka iznosili su (sl. 8): ulomci tijela – 552 (86%); ulomci rubova – 47 (7,3%); ulomci dna – 14 (2,2%); ulomci ručki – 10 (1,6%); 1 drška (0,1%); 3 plastične aplikacije (0,5%); ukrašeni ulomci 15 (2,3%). Dva su primjerka plastičnih aplikacija (plastične trake) ukrašena utiskivanjem.

Što se udjela u ukupnoj masi od 11.743 g tiče, masa pojedinih skupina iznosila je (sl. 9): ulomci tijela – 9127 g (77,7%); ulomci ruba – 1150 g (9,8%); ulomci dna – 571 g (4,9%); ulomci ručki – 351 g (3%); drške – 93 g (0,8%); plastične aplikacije – 90 g (0,8%) te ukrašeni ulomci – 361 g (3,0%).

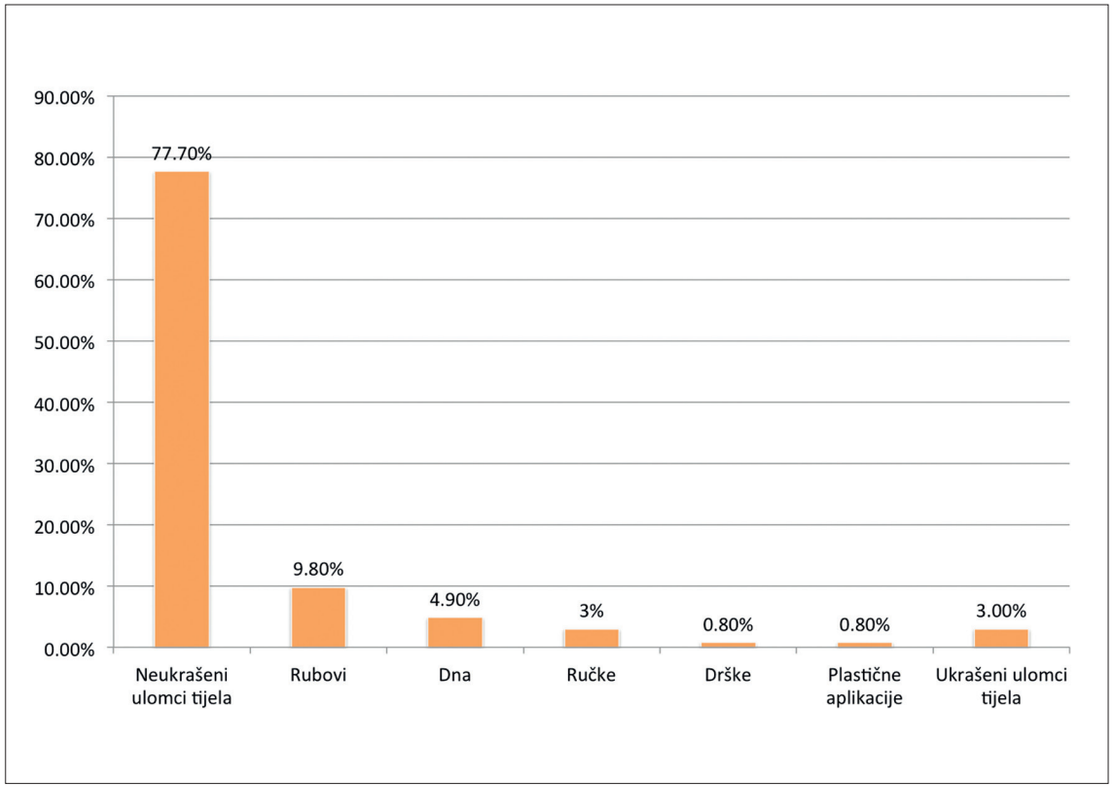
b) Trench 3

In trench 3, of the total number of 642 potsherds (Fig. 8), there are 552 (86%) fragments of vessels' bodies, 47 rim fragments (7.3%), 14 bottom fragments (2.2%), 10 handle fragments (1.6%), 1 handgrip (0.1%), 3 plastic appliques (0.5%), and 15 decorated sherds (2.3%). Two plastic appliques (plastic bands) are decorated with impressions.

As for the fractions of the total mass of 11743 g, the masses of specific groups are as follows (Fig. 9): body fragments – 9127 g (77.7%), rim fragments – 1150 g (9.8%), bottom fragments – 571 g (4.9%), handle fragments – 351 g (3%), handgrips – 93 g (0.8%), plastic appliques – 90 g (0.8%), and decorated sherds –361 g (3%).



Slika / Figure 8: Postoci brojčanog udjela određenih dijelova tijela posuda u ukupnom broju ulomaka pronađenih u sondi 3 (izradio F. Franković). / Percentages, by number, of specific parts of the vessel's body in the total number of potsherds recovered from trench 3 (made by F. Franković).



Slika / Figure 9: Postoci masenog udjela određenih dijelova tijela posuda u ukupnoj masi ulomaka pronađenih u sondi 3 (izradio F. Franković). / Percentages, by mass, of specific parts of the vessel's body in the total mass of potsherds recovered from trench 3 (made by F. Franković).

DIJAGNOSTIČKI ULOMCI IZ SONDE 2

U svrhu standarizacije terminologije, velik dio nazivlja preuzet je iz radova D. Urem[34] i K. Buršić-Matijašić[35] kako bi se ujednačili nazivi za tipove pojedinih dijelova posuda, ali i same posude.[36] Ponovno valja istaknuti da kod velikog broja dijagnostičkih ulomaka, najčešće zbog njihovih dimenzija, profi-

[34] Urem 2012.

[35] Buršić-Matijašić 1998.

[36] Posljednja objava materijala iz Monkodonje teži standardizaciji nazivlja za pojedine tipove rubova i dna, ali i čitavih keramičkih oblika (Hellmuth Kramberger 2017a, 77–302). S obzirom na to da se radi o objavi baziranoj na velikoj količini materijala, u cilju standardizacije strukovnog nazivlja za određene keramičke oblike u brončanom dobu Istre preporučuje se upotreba spomenute monografije. Analiza keramičkog materijala iz Romualdove pećine završena je prije izlaska spomenute publikacije pa se doneseni pregled ne temelji u potpunosti na objavi materijala iz Monkodonje.

DIAGNOSTIC POTSHERDS FROM TRENCH 2

In an attempt to standardize the terminology, many of the terms have been taken from works by Urem[34] and Buršić-Matijašić,[35] with a view to harmonizing the names of types of vessel body parts, and of vessels themselves.[36] It should be reiterated that the profiles have not been preserved well in a large number of diagnostic

[34] Urem 2012.

[35] Buršić-Matijašić 1998.

[36] The last publication dealing with the material discovered at Monkodonja aspired to standardize the terms employed not only for specific types of rims and bottoms, but also for integral pottery shapes (Hellmuth Kramberger 2017a, 77–302). Since this publication was based on a substantial quantity of material, the use of the monograph cited is recommended, with a view to standardizing the professional terminology for specific pottery shapes dating from the Istrian Bronze Age. The pottery material recovered from Romuald's Cave had been analysed before the monograph was published, and for this reason, the overview presented in this paper is not completely based on the published material from Monkodonja.

lacija nije dobro sačuvana pa nije bilo moguće detaljnije odrediti tip posude. Tipološka je analiza urađena u slučajevima gdje je to bilo moguće i radi se o manjini ulomaka koji se inače mogu smatrati dijagnostičkima.

1) Rubovi

Rubovi predstavljeni u ovome pregledu definirani su na temelju dvaju kriterija. Osnovni je kriterij odnos između smjera ruba posude i smjera stijenke posude (npr. ravan, izvučen, uvučen). Drugi je kriterij odnos debljine samog ruba prema debljini stijenke posude (npr. zadebljan, jednolik, sužen), ali i njegovo naknadno oblikovanje (npr. zaravnjen). Takva je obradu predložila K. Buršić-Matijašić u svrhu jasnijeg određenja samog tipa.[37] Dodatna kategorizacija može biti povezana s daljim tretmanom ruba u obliku ukrašavanja (urezivanja, inkrustacije, utiskivanja, pseudovrpčastog ukrašavanja).

U sondi 2 najbrojniji su izvučeni i ravni rubovi posuda. Neki od navedenih rubova imaju jasne paralele na lokalitetima, poput Monkodonje, Limske gradine i drugim lokalitetima na području Istre, ili pak odgovaraju tipovima posuda tipičnima za određene faze kako ih definira A. Cardarelli.[38]

Većina je izvučenih rubova iz sonde 2 jednolike debljine. Na temelju postojećih paralela valja izdvojiti nekoliko primjeraka. Izvučeni rub jednolike debljine (N-1, T. 5: 10) ima paralele u materijalu iz Monkodonje.[39] Ovaj rub nema posebnih obilježja, ali ga je na temelju paralela moguće nazvati loncem s glačanom površinom. Dva primjerka (N-4, T. 5: 7; N-20, T. 5: 6) izvučenih rubova, napravljenih od fine gline, crne su boje i polirane površine. Prema paralelama dostupnima kod Cardarellija, čini se da se radi o šalicama.[40] Vjerojatno je riječ o tipovima koje je moguće datirati u završno brončano doba II (1000. – 900. g. pr. Kr.), ali se pojavljuju i u

[37] Buršić-Matijašić 1998, 59.

[38] Cardarelli 1983.

[39] Buršić-Matijašić 1998, 59; T. 4: 74–77.

[40] Cardarelli 1983, 101, T. 22: 60, 62, 67.

potsherds, mostly due to their size; therefore, it was not possible to determine the precise type of the vessel. Where it was possible, a typological analysis has been performed. Such was the case in a small number of potsherds that could be considered as diagnostic.

1) Rims

Rims contained in this overview have been identified on the basis of two criteria. The main criterion has been the relation between the direction of the vessel's rim and the direction of the vessel's wall (e.g. straight, everted, inverted). The second criterion has been the relation between the thickness of the rim and the thickness of the vessel's wall (e.g. thickened, uniform, thinned), and its additional shaping (e.g. flattened). This method of processing was suggested by Buršić-Matijašić in order to obtain a clearer identification of the type.[37] Additional categorization can be made with reference to subsequent decorative treatment of the rim (incisions, incrustation, impressions, pseudo-cord impressions).

In trench 2, everted and straight rims were the most numerous. For some of them, there are clear parallels at sites such as Monkodonja, Limska Gradina hillfort and other sites in Istria, or they correspond to vessel types characteristic of certain phases, as defined by Cardarelli.[38]

The thickness of most of the everted rims recovered from trench 2 is uniform. Based on the existing parallels, several finds should be singled out. Parallels for an everted rim of uniform thickness (N-1, Pl. 5: 10) can be found among the finds from Monkodonja.[39] This rim has no specific features, but on the basis of the parallels it can be described as a pot with polished surface. Two other specimens of everted rims (N-4, Pl. 5: 7; N-20, Pl. 5: 6) made of fine clay are black, and their surface is polished. Based on the parallels available in Cardarelli, it seems that they belonged to cups.[40] The relevant cup types can probably be dated to Final Bronze Age II (1000 – 900 BC), but they also appeared in the

[37] Buršić-Matijašić 1998, 59.

[38] Cardarelli 1983.

[39] Buršić-Matijašić 1998, 59; Pl. 4: 74–77.

[40] Cardarelli 1983, 101, Pl. 22: 60, 62, 67.

prvome stupnju željeznog doba (900. – 800. g. pr. Kr.).[41] Zabilježen je i jedan primjerak izvučenoga suženog ruba amfore (N-25). Postoje i blago izvučeni rubovi bez jasne paralele (N-16; N-19). Na jednom je blago izvučenom rubu vidljivo utiskivanje prstom (N-26, T. 5: 2).[42] Sličan izvučeni rub, ukrašen utiskivanjem, pronađen je u Monkodonji[43], što upućuje na dataciju u razvijeno rano ili stariju fazu srednjega brončanog doba.

Ravni su rubovi jednolike debljine česti (N-2, T. 5: 9; N-32; N-49; N-48, T. 5: 8). Dva od tih rubova (N-2, T. 5: 9; N-49) jednake su fakture, kao i jedan izvučeni rub iz sonde 2 (N-1, T. 5: 10). Ulomci imaju uglačanu površinu, a vjerojatno se radi o loncima. Iste fakture i obrade površine je i jedan ravan suženi rub (N-30). Jedan ravan jednoliki rub (N-32) vjerojatno je pithos, na što ukazuje i iznimno gruba faktura. Površina djeluje kao da je lagano uglačana, što bi se moglo povezati s drugim rubom grube fakture i uglačane površine (N-5). Upečatljiv je i ulomak finoga ravnoga jednolikog ruba crne boje (N-48, T. 5: 8) koji je zbog njegove profilacije moguće povezati s tipom šalice koju Cardarelli datira u prvi stupanj željeznog doba.[44] Uz rub je vidljiva i perforirana rupica koja je prema tragovima na stijenci probušena nakon pečenja, tj. sekundarno. Ovakve perforacije pojavljuju se i na materijalu iz Monkodonje.[45] Prema novim rezultatima istraživanja na Monkodonji, čini se da većina materijala pripada fazama razvijenog ranog i starijoj fazi srednjega brončanog doba.[46] To pokazuje široko potencijalno datiranje ovakvih perforacija pa ih ne treba uzeti kao kronološki indikativne.

Kod jednoga ravnoga zadebljanog ruba (N-6), vrlo vjerojatno lonca, ispod ruba se pojavljuje kanelura, a paralelu je ponov-

[41] Cardarelli 1983, 100.

[42] Buršić-Matijašić (1998, 97), prema Čoviću (1983b, 239), kaže da utiskivanja prstom nema nakon srednjega brončanog doba.

[43] Hellmuth Kramberger 2017b, 126, T. 32: 4.

[44] Cardarelli 1983, 101, T. 22: 66.

[45] Buršić-Matijašić 1998, T. 20.

[46] Hänsel, Mihovilić, Teržan 2015; Hellmuth Kramberger 2017a, 340.

incipient Iron Age (900 – 800 BC).[41] One everted and thinned amphora rim has also been found (N-25). For some of the slightly everted rims there are no clear parallels (N-16; N-19). Finger impressions are visible on one slightly everted rim (N-26, Pl. 5: 2).[42] A similar everted rim decorated with impressions has been discovered at Monkodonja,[43] suggesting it could be dated to the later Early Bronze Age, or the early phase of the Middle Bronze Age.

Rims of a uniform thickness have been found in great numbers (N-2, Pl. 5: 9; N-32; N-49; N-48, Pl. 5: 8). Two of them (N-2, Pl. 5: 9; N-49) are of the same fabric as an everted rim discovered in trench 2 (N-1, Pl. 5: 10). The surface of these sherds is polished, and they probably belonged to pots. A straight thinned rim shares the same fabric and surface treatment (N-30). A straight uniform rim (N-32) is probably part of a pithos, as suggested by its very coarse fabric. Its surface seems to be slightly polished, which could associate it with another rim of coarse fabric and polished surface (N-5). There is also a distinctive fragment of a fine, straight and uniform rim, black in colour (N-48, Pl. 5: 8). Due to its profile, it can be attributed to the type of cup Cardarelli has dated to the incipient Iron Age.[44] According to the traces on the wall, the small perforation visible near the rim was made after the firing, i.e. as a secondary treatment. Such perforations can be found on the finds from Monkodonja.[45] According to recent results of the excavation at Monkodonja, it would appear that the majority of the material recovered belongs to various phases of the Early Bronze Age and to the early phase of the Middle Bronze Age.[46] This indicates that there is a wide range of potential dates for such perforations, and because of that, they should not be considered as chronologically indicative.

[41] Cardarelli 1983, 100.

[42] Buršić-Matijašić (1998, 97), according to Čović (1983b, 239), claimed that there had been no finger impressions after the Middle Bronze Age.

[43] Hellmuth Kramberger 2017b, 126, Pl. 32: 4.

[44] Cardarelli 1983, 101, Pl. 22: 66.

[45] Buršić-Matijašić 1998, Pl. 20.

[46] Hänsel, Mihovilić, Teržan 2015; Hellmuth Kramberger 2017a, 340.

no moguće pronaći na Monkodonji.[47] Zbog iznimno loše sačuvanosti, kod dijela ravnih rubova nije moguće donijeti detaljniji osvrt (N-14; N-15; N-22).[48]

U sondi 2 zabilježeno je i nekoliko uvučenih rubova, koji se uglavnom vežu uz zdjele. Prvi je rub uvučeni zaravnjeni rub, ukrašen urezivanjem na rubu (N-18, T. 5: 5).[49] Urezane su crte ispunjene inkrustacijom. Drugi je rub (N-27, T. 5: 3) moguće jasno odrediti kao rub konične zdjele s neprofiliranim rubom te izdvojenim i nenaglašenim ramenom, prema klasifikaciji (tip I.aI) D. Urem.[50] Treći uvučeni rub (N-29, T. 5: 4) također omogućuje detaljniju analizu. Riječ je o uvučenom i lagano zaravnjenom rubu zdjele koji je ukrašen pseudovrpčastim ukrasom. Svojim motivom i tehnikom ukrašavanja ovaj ulomak odgovara tipu zdjele koji Cardarelli datira u prvi stupanj željeznog doba.[51] Slične je datacije vjerojatno i uvučeni rub jednake debljine i crne boje, čija je površina ukrašena glačanjem (N-31). U kontekstu rubova valja spomenuti i jedan ulomak tijela dobro očuvane profilacije (N-23, T. 6: 2) koji omogućuje povlačenje paralele s tipom šalice koju Cardarelli datira u završno brončano doba II.[52]

In the case of a straight thickened rim (N-6), which probably belonged to a pot, there is a flute below the rim, and a parallel for such a rim can be found at Monkodonja.[47] For some of the straight rims, a more detailed description is impossible because of their poor state of preservation (N-14; N-15; N-22).[48]

Several inverted rims have also been found in trench 2; they are primarily attributed to bowls. The first among them is an inverted flattened rim decorated with incisions along its edge (N-18, Pl. 5: 5).[49] The incised lines are filled with incrustation. The second rim (N-27, Pl. 5: 3) can be clearly identified as the rim of a conical bowl with a non-profiled rim and a separate and unemphasized shoulder, according to Urem's classification (type I.aI).[50] The third inverted rim (N-29, Pl. 5: 4) also allows a more detailed analysis. This inverted and slightly flattened bowl rim is decorated with a pseudo-cord decoration. The motif and decoration technique on this sherd correspond to the type of bowl Cardarelli has dated to the incipient Iron Age.[51] An inverted black rim of uniform thickness with polished surface (N-31) probably shares the same dating. Within the context of rims, a fragment of a body should be mentioned (N-23, Pl. 6: 2) – its profile is well-preserved, and it can be compared to the type of cup Cardarelli has dated to Final Bronze Age II.[52]

2) Dna

Dna su podijeljena na osnovu dvaju kriterija. Prvi je kriterij oblik stajaće plohe (npr. ravno, prstenasto), a drugi je kriterij odnos, tj. prijelaz stajaće plohe prema vanjskoj stijenci posude (npr. običan prijelaz, prijelaz s blago naglašenom stajaćom plohom, prijelaz s naglašenom stajaćom plohom).

Većina je dna ravna, a među njima se brojčano ističu obična ravna dna. U sondi 2

2) Bottoms

Bottoms have been classified according to two criteria. The first is the shape of the standing surface (e.g. flat, ring-shaped), and the second criterion is the relation, that is, transition, between the standing surface and the external wall of the vessel (e.g. regular transition, transition with slightly emphasized standing surface, transition with emphasized standing surface).

[47] Buršić-Matijašić 1998, T. 1: 6.

[48] N-14, N-22 i N-45 imaju suženi rub, a N-15 jednolik.

[49] Za primjere ukrašavanja različitih tipova ruba utiskivanjem i urezivanjem, vidjeti paralele s Limske gradine kod Urem 2012, T. 41.

[50] Urem 2012, 74.

[51] Cardarelli 1983, 101, T. 22: 166–167.

[52] Cardarelli 1983, T. 22: 62.

[47] Buršić-Matijašić 1998, Pl. 1: 6.

[48] N-14, N-22 and N-45 have thinned rims, while N-15 has a uniform rim.

[49] For examples of impression and incision decoration on various types of rims, see parallels from the Limska Gradina hillfort in Urem 2012, Pl. 41.

[50] Urem 2012, 74.

[51] Cardarelli 1983, 101, Pl. 22: 166–167.

[52] Cardarelli 1983, Pl. 22: 62.

zabilježena su isključivo obična ravna dna koja ne omogućuju detaljniju analizu tipa posude kojem su pripadala (N-8; N-10; N-11; N-21; N-33; N-35; N-36; N-37; N-44). Jedino dno pronađeno u sondi 2, koje nije obično ravno dno, ono je na blago izraženoj prstenastoj nozi (N-28, T. 6: 3) proizvedeno od fine keramike crno-sive boje.

3) Ručke

U sondi 2 ukupno je pronađeno 7 ručki (N-3, T. 5: 11; N-7; N-13; N-17; N-39, T. 6: 5; N-46; N-47). Tome broju treba pridružiti i tri aplikacije (N-12, T. 6: 1; N-38, T. 6: 7; N-40) koje se u funkcionalnom smislu mogu smatrati drškama. Od ukupno 7 zabilježenih ručki, četiri su trakaste (N-7; N-17; N-46; N-47). Dijelove običnih trakastih ručki predstavljaju primjerci N-17 i N-47, dok primjerci N-7 i N-46 predstavljaju trakaste ručke s centralnim užljebljenjem zbog kojeg njihov presjek izgleda kao slovo B. Paralele pronalazimo u ručkama s Monkodonje[53] i Limske gradine.[54]

Uz trakaste pojavljuje se i jedan primjerak (N-3, T. 5: 11) koljenasto profilirane ručke, kako je naziva D. Urem,[55] trokutaste ručke sedlastog presjeka, kako je naziva K. Buršić-Matijašić[56], ili trokutaste ručke s pločicom prema Hellmuth Kramberger.[57] Ovaj je tip ručke karakterističan za srednje brončano doba Istre i sjevernog Jadrana, ali se prvi put pojavljuje već na kraju ranoga brončanog doba.[58] Ručke ovoga tipa u različitim oblicima mogu se pojavljivati na različitim tipovima posuda.[59] Ovaj je primjerak iz Romualdove pećine vjerojatno moguće pripisati tipu pithosa za koji je ovakav tip ručke specifičan (pithos tipa V prema Hellmuth

[53] Buršić-Matijašić 1998, T. 22: 37; Hellmuth Kramberger 2017a, 243–244, Sl. 214.

[54] Urem 2012, T. 1: 4.

[55] Urem 2012, 93, T. 10: 8.

[56] Buršić-Matijašić 1998, 68.

[57] Hellmuth Kramberger 2017a, 244–248.

[58] Hänsel, Mihovilić, Teržan 1999, 85–89.

[59] Hellmuth Kramberger 2017a, 244–248.

The majority of bottoms are flat, and among them the greatest share consists of regular flat bottoms. In trench 2, only regular flat bottoms have been found, which do not allow a detailed analysis of the type of vessel they belonged to (N-8; N-10; N-11; N-21; N-33; N-35; N-36; N-37; N-44). The only bottom from trench 2 which is not a regular flat bottom is a bottom standing on a slightly emphasized ring-shaped foot (N-28, Pl. 6: 3), made of fine black-grey pottery.

3) Handles

A total of 7 handles have been recovered from trench 2 (N-3, Pl. 5: 11; N-7; N-13; N-17; N-39, Pl. 6: 5; N-46; N-47). In addition, there are three appliques (N-12, Pl. 6: 1; N-38, Pl. 6: 7; N-40) which in functional terms can be considered to be hand-grips. Of the total number of 7 handles, 4 are strap handles (N-7; N-17; N-46; N-47). Specimens N-17 are N-47 are parts of regular strap handles, while specimens N-7 and N-46 are strap handles with a central groove, resulting in a B-shaped cross-section. Parallels for such handles can be found at Monkodonja[53] and Limska Gradina hillfort.[54]

In addition to strap handles, the trench also contained one knee-shaped handle (N-3, Pl. 5: 11) as described by Urem,[55] triangular handle with a saddle-like cross-section as described by Buršić-Matijašić,[56] or a triangular handle with a plate according to Hellmuth Kramberger.[57] This handle type is characteristic of the Middle Bronze Age in the Istrian and Northern Adriatic, and it appeared for the first time as early as the end of the Early Bronze Age.[58] Different forms of such handles could be found on various types of vessels.[59] The one found in Romuald's Cave can probably be attributed to a pithos, of which this type of handle is characteristic (the pithos of type V according to Hellmuth Kramberger).[60]

[53] Buršić-Matijašić 1998, Pl. 22: 37; Hellmuth Kramberger 2017a, 243–244, Fig. 214.

[54] Urem 2012, Pl. 1: 4.

[55] Urem 2012, 93, Pl. 10: 8.

[56] Buršić-Matijašić 1998, 68.

[57] Hellmuth Kramberger 2017a, 244–248.

[58] Hänsel, Mihovilić, Teržan 1999, 85–89.

[59] Hellmuth Kramberger 2017a, 244–248.

[60] Hellmuth 2014, Fig. 4; Hellmuth Kramberger 2017a, 176–178, 401, Fig. 280b: 67.

Kramberger).[60] Zaobljenost unutrašnje stijenke također upućuje na to da se vjerojatno radi o ovom tipu posude. Pronađen je i jedan primjerak ručke O presjeka (N-13) i jedan primjerak robusne ručke D presjeka koja završava koljenom (N-39, T. 6: 5). Potonja ručka čini se dosta netipičnom, ali paralelu je moguće pronaći u jednoj ručki iz Monkodonje.[61]

The roundness of the interior wall also indicates that it probably originates from a pithos. A handle with an O-shaped cross-section has also been found (N-13), as well as a robust handle of D-shaped cross-section which ends in a knee (N-39, Pl. 6: 5). The last of the handles mentioned appears rather uncharacteristic, but a parallel can be found in a handle discovered at Monkodonja.[61]

4) Aplikacije

Od aplikacija prije svega je potrebno spomenuti prethodno navedene aplikacije koje su funkcionalno mogle služiti kao drške. U statističkoj obradi sonde 2 spomenuto je da male dimenzije dovode u pitanje njihovu stvarnu ulogu drški, međutim, od svih primjeraka predstavljenih u ovom pregledu ovi primjerci najbolje odgovaraju definiciji drške (N-12, T. 6: 1; N-38, T. 6: 7; N-40). Plastična je aplikacija u obliku klina (N-12, T. 6: 1) zastupljena jednim primjerkom. Paralele je moguće pronaći na keramici iz Monkodonje,[62] ali u tome slučaju nije potpuno jasno radi li se samo o završecima potkovičastih plastičnih aplikacija ili o plastičnoj aplikaciji u obliku klina. Drugi primjerak, koji je okarakteriziran kao drška (N-40), vjerojatno je završetak potkovičaste drške, tj. aplikacije. Valja naglasiti da razlika između potkovičaste aplikacije i drške nije uvijek jasno određena[63] i da atribucija kategorije zapravo ovisi o dimenzijama aplikacije. Ovdje treba navesti i još jedan primjerak završetka potkovičaste aplikacije, također pronađen unutar sonde 2 (N-38, T. 6: 7). Potkovičaste aplikacije u različitim oblicima mogu se povezati s antropomorfnim načinom ukrašavanja posuda koji je karakterističan za istarske gradine u razvijenoj fazi ranog i starijoj fazi srednjega brončanog doba.[64]

4) Appliques

As regards applications, first of all there are those, mentioned above, which could serve the function of hand-grips. In the statistical analysis of trench 2, it has been mentioned that their small size poses questions over their real function as hand-grips, but of all the specimens presented in this overview, these correspond best to the function of hand-grips (N-12, Pl. 6: 1; N-38, Pl. 6: 7; N-40). A single plastic applique shaped like a wedge has been found (N-12, Pl. 6: 1), for which parallels can be seen in the pottery from Monkodonja,[62] but it is unclear whether these are actually ends of horseshoe-shaped plastic appliques or plastic appliques shaped like a wedge. The second sherd described as a hand-grip (N-40) is probably the end of a horseshoe-shaped hand-grip, or applique. It should be emphasized that the difference between a horseshoe applique and hand-grip is not always clear[63] and that the attribution to a category depends on the size of the applique. In this context, another specimen of the end of a horseshoe applique – also discovered in trench 2 – should be mentioned (N-38, Pl. 6: 7). Horseshoe appliques of various shapes can be associated with those anthropomorphic vessel decorations characteristic of Istrian hillforts in the advanced phase of the Early Bronze Age and the early phase of the Middle Bronze Age.[64]

[60] Hellmuth 2014, Sl. 4; Hellmuth Kramberger 2017a, 176–178, 401, Sl. 280b: 67.

[61] Buršić-Matijašić 1998, T. 17: 310.

[62] Buršić-Matijašić 1998, T. 43.

[63] Različita upotreba termina kod Urem 2012.

[64] Hellmuth 2012; 2015.

[61] Buršić-Matijašić 1998, Pl. 17: 310.

[62] Buršić-Matijašić 1998, Pl. 43.

[63] The terms used in Urem 2012 differ.

[64] Hellmuth 2012; 2015.

Pronađena su i dva primjerka plastičnih traka (N-34; N-43, T. 6: 6), a paralele za neukrašenu (N-34) ponovno su vidljive na Monkodonji.[65] Primjerak (N-43, T. 6: 6) je ukrašen utiskivanjem prstiju s paralelama na Monkodonji[66] i Limskoj gradini.[67]

Spomenuti treba i ulomak ukrašen plitkim urezivanjem (N-42, T. 6: 4) u motivu riblje kosti koji upućuje na dataciju u završno brončano doba – prvi stupanj željeznoga doba.

Two plastic straps have also been found (N-34; N-43, Pl. 6: 6). Parallels for the undecorated one (N-34) can be found at Monkodonja.[65] The decorated strap (N-43, Pl. 6: 6) is decorated with finger impressions, and parallels for such straps are present at Monkodonja[66] and Limska Gradina hillfort.[67]

Another sherd to be mentioned here is a fragment decorated with shallow fishbone-shaped incisions (N-42, Pl. 6: 4). The sherd suggests the site can be dated to the Final Bronze Age / incipient Iron Age period.

DIJAGNOSTIČKI ULOMCI IZ SONDE 3

1) Rubovi

U sondi 3 najbrojniji su izvučeni i ravni rubovi. Od izvučenih je rubova velik broj onih koji, zbog manjka profilacije, ne nude veći broj informacija o krajnjem obliku posude. Spomenuti valja jače (N-91; N-108; N-116; N-126, T. 3: 1) i blaže izvučene jednolike rubove (N-70, T. 5: 1; N-71, T. 3: 7; N-84; N-92) bez jasnog tipa, blago izvučene rubove koji vjerojatno pripadaju zdjeli (N-111) i šalici (N-127) te jedan primjerak blago izvučenog ruba (N-69, T. 4: 13) koji podsjeća na zdjele s mogućom datacijom u mlađe brončano doba.[68]

Od većih je grupa rubova potrebno istaknuti izvučene rubove amfora koji su zabilježeni u većem broju (N-52, T. 3: 10; N-65; N-109; N-112, T. 4: 4; N-117, T. 4: 6; N-125,[69] T. 3: 4). Amfore su poznate iz Limske gradine.[70] Drugu veću skupinu čine izvučeni rubovi lonaca s ukrašenim rubom (N-60, T. 4: 1; N-78 + N-83,[71] T. 3: 2; N-119, T. 4: 5; N-129, T. 3: 6). Rubovi su ukrašeni utiskivanjem prstom

[65] Buršić-Matijašić 1998, T. 41; T. 42.

[66] Buršić-Matijašić 1998, 90, T. 45; Hellmuth Kramberger 2017b, 98, T. 4: 5.

[67] Urem 2012, T. 3: 3, 8; T. 31: 2.

[68] Cardarelli 1983, 94–95, T. 19: 69.

[69] Ovaj je primjerak ukrašen s unutrašnje strane žljebljenim motivom koncentričnih kružnica. Za više detalja, vidjeti dio o ukrašenim ulomcima unutar sonde 3.

[70] Urem 2012, 82–83.

[71] Radi se o dva ulomka istog ruba koji se spajaju.

DIAGNOSTIC POTSHERDS FROM TRENCH 3

1) Rims

In trench 3, the most numerous rims were everted and straight. Among the everted rims, there are many that, due to a lack of profile, offer little information about the shape of the vessel. Some more everted (N-91; N-108; N-116; N-126, Pl. 3: 1) and less everted (N-70, Pl. 5: 1; N-71, Pl. 3: 7; N-84; N-92) uniform rims of unclear type can be mentioned, as well as slightly everted rims which could belong to a bowl (N-111) and a cup (N-127), and a slightly everted rim (N-69, Pl. 4: 13) reminiscent of bowls that could be dated to the Late Bronze Age.[68]

As regards numerous groups of rims, everted amphora rims should be mentioned, recovered in high numbers (N-52, Pl. 3: 10; N-65; N-109; N-112, Pl. 4: 4; N-117, Pl. 4: 6; N-125,[69] Pl. 3: 4). Amphorae have also been discovered at Limska Gradina hillfort.[70] The second large group consists of everted pot rims with decorated edges (N-60, Pl. 4: 1; N-78 + N-83,[71] Pl. 3: 2; N-119, Pl. 4: 5; N-129, Pl. 3: 6). These are decorated with finger impressions (N-60, Pl. 4: 1; N-119, Pl. 4:

[65] Buršić-Matijašić 1998, Pl. 41; Pl. 42.

[66] Buršić-Matijašić 1998, 90, Pl. 45; Hellmuth Kramberger 2017b, 98, Pl. 4: 5.

[67] Urem 2012, Pl. 3: 3, 8; Pl. 31: 2.

[68] Cardarelli 1983, 94–95, Pl. 19: 69.

[69] This shard is decorated on the inside with grooved concentric circles. For more details, see the section on decorated potshards in trench 3.

[70] Urem 2012, 82–83.

[71] These are two fragments of the same rim that can be adjoined.

(N-60, T. 4: 1; N-119, T. 4: 5; N-129,[72] T. 3: 6) i urezivanjem kosih paralelnih crta (N-78 + N-83, T. 3: 2).

Tri ulomka izvučenih rubova omogućuju da se odredi tip posude. Ulomak N-55 (T. 3: 9) izvučeni je rub koji se širi prema trbuhu. Najbolja je paralela lonac koji donosi Cardarelli te ga datira u mlađe brončano doba,[73] kao i slični lonac s gradine Sv. Duh pokraj Novigrada (S. Spirito di Cittanova).[74] Ulomak N-85 (T. 3: 3) lagano je izvučen i zaravnjen rub koji pripada pithosu, a ulomak N-122 primjerak je izvučenog ruba čiju paralelu nalazimo u materijalu iz Monkodonje.[75]

Ravni rubovi pojavljuju se u nekoliko varijanti. Mogu biti jednolike debljine (N-53; N-61, T. 4: 2; N-77; N-79; N-89; N-94; N-113; N-131),[76] zadebljani (N-66, T. 4: 12; N-67, T. 4: 11; N-73; N-118; N-135), suženi (N-68, T. 4: 14; N-74, T. 4: 3; N-137) i zaravnjeni (N-93). Od ukupnog broja ravnih rubova kod jako malog broja bilo je moguće pronaći odgovarajuće paralele, definirati tip posude ili ponuditi detaljnije informacije o dataciji. Valja izdvojiti ravni rub (N-61, T. 4: 2) s tragovima urezivanja, kakvi su zabilježeni i kod izvučenih rubova unutar iste sonde. Ovom ulomku valja pribrojiti i dva ulomka zadebljanog ruba, ukrašenog utiskivanjem (N-67, T. 4: 11; N-103). Ulomak ravnoga zadebljanog ruba lonca N-66 (T. 4: 12) sadrži i obrnuto okrenutu potkovičastu aplikaciju te je pjeskovito smeđe fakture koja se može povezati s loncima (N-80; N-96, T. 4: 7). Dva ruba mogu se definirati kao zdjele (N-93; N-106), a valja im pridružiti ulomak blago suženoga ravnog ruba (N-68, T. 4: 14) koji paralelu ima u tipu zdjele koja se može datirati u početak mlađega brončanog doba.[77]

Uz velik broj izvučenih i ravnih rubova, u sondi 3 pronađeno je i nekoliko pojedinačnih primjeraka drugih tipova. Pronađen je

[72] Utiskivanje na rubu nije tipično pa rub djeluje valovito.

[73] Cardarelli 1983, 94–95, T. 19: 76B.

[74] Cardarelli 1983, 108, 111, T. 27: 8.

[75] Buršić-Matijašić 1998, T. 1: 1, 2, 3.

[76] Ulomci N-53 i N-57 vjerojatno su lonci.

[77] Cardarelli 1983, 94–95, T. 19: 9.

5; N-129,[72] Pl. 3: 6) and with incised parallel slanting lines (N-78 + N-83, Pl. 3: 2).

There are three fragments of everted rims which allow the vessel type to be identified. Potsherd N-55 (Pl. 3: 9) is an everted rim which widens towards the belly. The best parallels for this are a pot described by Cardarelli and dated to the Late Bronze Age,[73] and a similar pot from the S. Spirito di Cittanova hillfort.[74] Potsherd N-85 (Pl. 3: 3) is a slightly everted and flattened rim that belonged to a pithos, while N-122 is an example of an everted rim such as can be found among the material from Monkodonja.[75]

Straight rims come in several varieties. Their thickness can be uniform (N-53; N-61, Pl. 4: 2; N-77; N-79; N-89; N-94; N-113; N-131)[76]; they can be thickened (N-66, Pl. 4: 12; N-67, Pl. 4: 11; N-73; N-118; N-135), thinned (N-68, Pl. 4: 14; N-74, Pl. 4: 3; N-137) and flattened (N-93). Of the total number of straight rims, there are very few for which we can establish satisfactory parallels, identify the type of vessel they belonged to, or offer more detailed information as to their dating. A straight rim with traces of incising along the edges (N-61, Pl. 4: 2) should be mentioned; such traces have been recorded on everted rims discovered in the same trench. There are also two sherds of a thickened rim decorated with impressions (N-67, Pl. 4: 11; N-103). A sherd of straight thickened pot rim, N-66 (Pl. 4: 12), also features an inverted horseshoe applique. Its sandy brown fabric allows its attribution to pots (N-80; N-96, Pl. 4: 7). Two of the rims can be identified as elements of bowls (N-93; N-106), and another fragment of a slightly thinned straight rim (N-68, Pl. 4: 14) has a parallel in a type of bowl that can be dated to the beginning of the Late Bronze Age.[77]

In addition to a great number of everted and straight rims, there were also several specimens of other types of rim in trench 3. Only one inverted and flattened rim (N-54, Pl. 3: 8) belonging to

[72] Impressions on the rim are not characteristic, and the rim appears wavy.

[73] Cardarelli 1983, 94–95, Pl. 19: 76B.

[74] Cardarelli 1983, 108, 111, Pl. 27: 8.

[75] Buršić-Matijašić 1998, Pl. 1: 1, 2, 3.

[76] Potshards N-53 and N-57 probably belonged to pots.

[77] Cardarelli 1983, 94–95, Pl. 19: 9.

i samo jedan primjerak (N-54, T. 3: 8) uvučenog i zaravnjenog ruba koji pripada zdjeli. Valja spomenuti i jedan prebačeni rub (N-63, T. 3: 5), ukrašen pseudovrpčastom dekoracijom koja ga datira u početak željeznog doba. Naposljetku, ovdje valja spomenuti i ulomak potencijalnog izljeva posude (N-123).

2) Dna

Kao i u slučaju sonde 2, gotovo sva dna iz sonde 3 su ravna (10 od 11 primjeraka). Najveći je broj običnih ravnih dna (N-50; N-90; N-96, T. 4: 7; N-104; N-110; N-136; N-138). Od običnih ravnih dna valja izdvojiti primjerak N-110, koji vjerojatno pripada tanjuru, i primjerak N-96 (T. 4: 7) s vidljivim tragovima gorenja s donje strane kod kojeg je moguće posude pjeskovite smeđe fakture izravno povezati s loncima za kuhanje (također, ulomak N-80).

Tu su i ravna dna s blago naglašenom stajaćom površinom (N-51; N-58, T. 4: 10; N-80) i ravna dna s jasno naglašenom stajaćom površinom (N-72, T. 4: 8; N-121). Ulomak N-59 jest ravno dno s izvučenom stajaćom površinom, a ulomak N-57 (T. 4: 9) jedini je primjer dna koje ne pripada skupini ravnih, već se radi o dnu na debeloj i izraženoj prstenastoj nozi.

3) Ručke

Među ručkama u sondi 3 opet su najbrojnije trakaste ručke (N-76; N-81; N-95; N-139). U 3 slučaja riječ je o spojevima trakastih ručki s tijelom posude (N-76; N-81; N-95), a jedan je od njih ukrašen glačanjem (N-76). Samo je jedan primjerak sačuvan gotovo u cijelosti (N-139). Paralele su jednake kao i u slučaju sonde 2, a zastupljene su u velikom broju na Monkodonji.[78]

S više od jednog primjerka zastupljene su još samo ručke O presjeka (N-124, T. 1: 14; N-130), dok su ostali tipovi zastupljeni sa po jednim primjerkom. Ističu se koljena-

[78] Buršić-Matijašić 1998, 72–73; Hellmuth Kramberger 2017a, 243–244, Sl. 214.

a bowl has been recovered. Another sherd to be mentioned here is a downward-pointing everted rim (N-63, Pl. 3: 5), decorated with pseudocord decoration dating it to the beginning of the Iron Age. Finally, one sherd also worth mentioning is a fragment of a potential spout (N-123).

2) Bottoms

As in the case of trench 2, almost all bottoms recovered from trench 3 are flat (10 out of 11 finds). The majority are regular flat bottoms (N-50; N-90; N-96, Pl. 4: 7; N-104; N-110; N-136; N-138). Among the regular flat bottoms, sherd N-110 should be singled out, as it probably belonged to a plate, and sherd N-96 (Pl. 4: 7), with visible traces of burning on the lower side, which allows the vessel of the sandy brown fabric to be identified as a cooking pot (and also sherd N-80).

There are also flat bottoms with slightly emphasized standing surface (N-51; N-58, Pl. 4: 10; N-80), and flat bottoms with clearly emphasized standing surface (N-72, Pl. 4: 8; N-121). Potsherd N-59 is a flat bottom with everted standing surface, while potsherd N-57 (Pl. 4: 9) is the only example of a bottom which is not flat, but rather a bottom standing on a thick and emphasized ring-shaped foot.

3) Handles

Among the handles recovered from trench 3, strap handles are the most numerous (N-76; N-81; N-95; N-139). Three of the sherds are actually joints of the strap handles to the vessels' bodies (N-76; N-81; N-95), one of which is decorated by polishing (N-76). There is only one handle which has been preserved almost entirely (N-139). The parallels for these finds are the same as in the case of trench 2, and they were present in large numbers at Monkodonja.[78]

The only other type of handle represented by more than one find are handles with an O-shaped cross-section (N-124, Pl. 1: 14; N-130),

[78] Buršić-Matijašić 1998, 72–73; Hellmuth Kramberger 2017a, 243–244, Fig. 214.

sto profilirana ručka (N-62; T. 2: 7), kakva je pronađena i unutar sonde 2, ručka tipa *cothon* (N-64, T. 1: 6) te ručka peterokutnog presjeka (N-98, T. 1: 6). Ručka tipa *cothon* datira se u rano željezno doba. Važno je spomenuti da su ručke peterokutnog presjeka pronađene na Limskoj gradini, gdje se datiraju u rano željezno doba.[79] Ručku peterokutnog presjeka s gradine kod Kaštela pokraj Buja (Castelliere di Castel Venere) prikazuje Cardarelli,[80] a premda se ne radi o identičnom tipu ručke, važno je napomenuti kako se i ovaj primjerak datira između 10. i 9/8. st. pr. Kr., tj. druge polovice završnoga brončanog doba i prvog stupnja željeznog doba.[81]

Jednim je primjerkom (N-75, T. 1: 9) zastupljena ručka trokutastog presjeka s paralelama na Gradini nad Limskim kanalom.[82] Primjerci s Gradine nad Limskim kanalom imaju znatno izraženiji trokutasti presjek, a bolju paralelu predstavljaju ručke s gradine Sv. Duh pokraj Novigrada (S. Spirito di Cittanova).[83] Ovaj je tip ručke moguće datirati na kraj mlađega brončanog doba i početak završnoga brončanog doba.[84] Primjerak dugmaste drške (N-101, T. 1: 1) nema jasnih paralela, a zbog dimenzija nije moguće potpuno jasno odrediti radi li se o drški ili isključivo o dugmastoj aplikaciji.

while other types of handles are represented by only one find each. Among them, there is a knee-shaped handle (N-62; Pl. 2: 7) like the one found in trench 2, a *cothon*-type handle (N-64, Pl. 1: 6), and a handle with a pentagonal cross-section (N-98, Pl. 1: 6). The *cothon*-type handle has been dated to the Early Iron Age. It should be mentioned that handles with a pentagonal cross-section have been discovered at the Limska Gradina hillfort, where they have been dated to the Early Iron Age.[79] A handle with a pentagonal cross-section from the Castelliere di Castel Venere hillfort has been presented by Cardarelli,[80] and although this is not an identical type of handle, it is important to note that this find has also been dated to the period between the 10th and 9th/8th c. BC, that is, to the second half of the Final Bronze Age and the Incipient Iron Age.[81]

One handle with triangular cross-section (N-75, Pl. 1: 9) with parallels at the Limska Gradina hillfort has been found.[82] Specimens recovered from the Limska Gradina hillfort feature a much more pronounced triangular cross-section, so a better parallel is offered by the handles discovered at the S. Spirito di Cittanova hillfort.[83] This type of handle can be dated to the end of the Late Bronze Age and the beginning of the Final Bronze Age.[84] There are no clear parallels for a button-shaped hand-grip (N-101, Pl. 1: 1), and it is impossible, due to its size, to establish whether this was a hand-grip or only a button-shaped applique.

4) Aplikacije i ukrašeni ulomci

Iz sonde 3 potječe značajan broj ukrašenih ulomaka važnih za dataciju. Ulomci su ukrašeni različitim tehnikama, poput urezivanja, kaneliranja, pseudovrpčastog ukrasa te različitih oblika plastičnih aplikacija.

[79] Urem 2012, 14; T. 8: 12; T. 16: 13.
[80] Cardarelli 1983, 117, 32B: 17.
[81] Cardarelli 1983, 112.
[82] Urem 2012, 80, Prilog 3: 4B, 5; T. 5A: 1.
[83] Cardarelli 1983, 114, T. 29A: 9.
[84] Cardarelli 1983, 108.

4) Appliques and decorated sherds

A significant number of decorated potsherds relevant to the dating of the site have been recovered from trench 3. These sherds are decorated using various techniques, such as incising, fluting, pseudo-cord decoration, and plastic appliques of diverse shapes.

[79] Urem 2012, 14; Pl. 8: 12; Pl. 16: 13.
[80] Cardarelli 1983, 117, 32B: 17.
[81] Cardarelli 1983, 112.
[82] Urem 2012, 80, Annex 3: 4B, 5; Pl. 5A: 1.
[83] Cardarelli 1983, 114, Pl. 29A: 9.
[84] Cardarelli 1983, 108.

a) Urezivanje

Urezivanje na stijenkama posuda pojavljuje se na materijalu u nekoliko varijanti koje se razlikuju u širini i dubini urezivanja te motivima. Dva primjerka N-56 (T. 1: 7) i N-97 (T. 1: 5) ukrašena su urezivanjem kratkih i dubokih linija po čitavoj vanjskoj površini posude. Iako se ova dva ulomka ne spajaju, boja vanjske i unutrašnje stijenke, tretman površine, debljina stijenke, vrsta i veličina inkluzija te izvedba motiva upućuju da se radi o ulomcima iste posude. Taj je zaključak iznimno važan zbog razumijevanja stratigrafskih odnosa unutar sonde 3 (vidjeti dalje u tekstu).

Tri preostala ulomka, ukrašena urezivanjem, važna su zbog datacije. Ulomak N-87 (T. 2: 4) ukrašen je plitkim urezivanjem. Na ulomku su vidljive kose linije koje se spajaju u vrhu. Zbog očuvanosti, nije jasno radi li se o cik-cak motivu ili motivu riblje kosti. U svakom slučaju, ovakav tip ukrašavanja, prema Cardarelliju, tipičan je za završno brončano doba – prvi stupanj željeznog doba.[85] Druga dva ulomka (N-88, T. 2: 5; N-99, T. 1: 3) ukrašena su istim načinom urezivanja, a motiv su ovoga puta paralelne ravne linije. I u ovome je slučaju datacija završno brončano doba – prvi stupanj željeznog doba.[86] Isti motivi ostaju u prvome stupnju željeznog doba i izvode se pseudovrpčastim ukrasom premda i urezivanje ostaje u upotrebi. Generalno se čini da se radi o ukrasu specifičnom za kraj završnoga brončanog doba i prvi stupanj željeznog doba.[87]

b) Kaneliranje i žljebljenje

Kaneliranje se javlja na znatnom broju ulomaka, kao i u slučaju sonde 2. Ulomci N-82 (T. 1: 8), N-102 (T. 1: 4), N-107, N-113, N-114 (T. 1: 10) i N-115 (T. 1: 12) ukrašeni su plitkim i širokim kanelurama. U ovom slučaju ne radi se o izvođenju posebnih motiva kaneliranjem, već isključivo o kanelurama koje, uz dekorativnu, mogu imati i funkcionalnu ulogu.

[85] Cardarelli 1983, 98–99, T. 21: 141, 162.

[86] Cardarelli 1983, 98–99, T. 21: 138, 141.

[87] Cardarelli 1983, 110, 115, T. 30A, B.

a) Incising

Several variants of incisions on the vessels' walls are present on the material recovered, varying among them in the width and depth of the incisions and in motif. Two sherds, N-56 (Pl. 1: 7) and N-97 (Pl. 1: 5), are decorated with short and deep incised lines all over the external surface of the vessel's wall. Although these two sherds cannot be adjoined, the colour of their internal and external surfaces, surface treatment, wall thickness, type and size of inclusions, and the rendering of motifs, suggest that they belonged to the same vessel. This conclusion is very important for our understanding of stratigraphic relations within trench 3 (which see below).

The remaining three sherds decorated with incising are important from the point of view of dating. Potsherd N-87 (Pl. 2: 4) is decorated with shallow incisions. The sherd features visible slanting lines that come together at the top. The poor state of preservation does not allow a clear position on whether this is a zig-zag motif or a fishbone motif. In any case, according to Cardarelli, this type of decoration is characteristic of the Final Bronze Age / incipient Iron Age.[85] Two other potsherds (N-88, Pl. 2: 5; N-99, Pl. 1: 3) are decorated with the same method of incising, but this time the motif consists of straight parallel lines. In this case, too, the sherd has been dated to the Final Bronze Age / incipient Iron Age.[86] The same motifs were present during the incipient Iron Age, when they were made using pseudocord technique, although incising also continued to be used. Overall, it seems that this type of decoration is characteristic of the end of the Final Bronze Age and the incipient Iron Age.[87]

b) Fluting and grooving

Fluting is present on a significant number of potsherds, just as in trench 2. Sherds N-82 (Pl. 1: 8), N-102 (Pl. 1: 4), N-107, N-113, N-114 (Pl. 1: 10) and N-115 (Pl. 1: 12) are decorated with shallow and wide flutings. In this case, fluting was not employed to render any specific motif. Rather, all the flutes could have both decorative and functional purpose.

[85] Cardarelli 1983, 98–99, Pl. 21: 141, 162.

[86] Cardarelli 1983, 98–99, Pl. 21: 138, 141.

[87] Cardarelli 1983, 110, 115, Pl. 30A, B.

Tri su ulomka ukrašena tehnikom žljebljenja u motivu koncentričnih kružnica. Kod ulomka N-86 (T. 2: 1) tijelo je posude ukrašeno koncentričnim kružnicama s vanjske strane. Cardarelli datira žljebljene koncentrične kružnice s centralnom bradavicom u mlađe brončano doba i početak završnoga brončanog doba (1300. – 1000. g. pr. Kr.).[88] Najnovija objava keramičkog materijala iz Monkodonje jasno pokazuje zastupljenost ovog motiva već na prijelazu iz razvijene faze ranoga brončanog doba u stariju fazu srednjega brončanog doba.[89] Valja naglasiti kako ni jedan primjerak iz sonde 3 nema vidljive ostatke centralne bradavice, što i ne mora biti toliko neobično uzmu li se u obzir paralele iz Monkodonje kod kojih centralna bradavica također ne postoji.[90] Centralna bradavica na keramici generalno izostaje jer sličan slučaj nalazimo i kod potkovičastih aplikacija ispod kojih se ne pojavljuje, kao što je očekivano s obzirom na paralele s nekih drugih lokaliteta.[91]

Sličan ukras pronalazimo i na unutrašnjoj strani izvučenog ruba amfore (N-125, T. 3: 4). U ovom slučaju također ne postoji izražena centralna bradavica. Ulomcima N-86 (T. 2: 1) i N-125 (T. 3: 4) treba pridružiti i ulomak N-120 (T. 1: 11) s blago zakrivljenim, paralelno žljebljenim linijama, za koje nije potpuno jasno pripadaju li kružnicama ili ne. Međutim, sličnu paralelu pronalazimo i na Monkodonji.[92]

Three potsherds are decorated with grooved concentric circles. In the case of sherd N-86 (Pl. 2: 1), the body of the vessel is decorated on its external side with concentric circles. Cardarelli has dated grooved concentric circles with a central boss to the Late Bronze Age and the beginning of the Final Bronze Age (1300 – 1000 BC).[88] The most recent publication of the pottery finds from Monkodonja clearly shows that this motif had been present as early as the transition between the advanced phase of the Early Bronze Age and the late phase of the Middle Bronze Age.[89] It should be emphasized that none of the finds from trench 3 contains any visible trace of a central boss, which is not so unusual, given that parallel finds from Monkodonja feature no central boss, either.[90] Generally, the central boss is often missing in pottery. A similar case can be seen among horseshoe appliques, where there are no central bosses, although they could be expected, given the parallel finds discovered at some other sites.[91]

A similar decoration can also be found on the interior side of an everted amphora rim (N-125, Pl. 3: 4). In this case there is no pronounced central boss, either. In addition to potsherds N-86 (Pl. 2: 1) and N-125 (Pl. 3: 4), this group should also include potsherd N-120 (Pl. 1: 11), featuring slightly curved parallel grooved lines, for which it cannot be determined with certainty whether they belong to circles or not. A similar find has also been discovered at Monkodonja.[92]

c) Plastične aplikacije

Plastične aplikacije pronađene u sondi 3 pojavljuju se u nekoliko oblika. Ponovno, kao i u sondi 2, nalazimo potkovičaste aplikacije (N-100, T. 1: 2). Tu su i aplicirane plastične trake ukrašene utiskivanjem prstima (N-134, T. 1: 13) i utiskivanjem štapića[93] (N-132, T. 2: 2).

c) Plastic appliques

Plastic appliques discovered in trench 3 come in several shapes. As in trench 2, there are horseshoe-shaped appliques (N-100, Pl. 1: 2), and also applied plastic strips decorated with finger impressions (N-134, Pl. 1: 13) and impressions of a small rod[93] (N-132, Pl. 2: 2).

[88] Cardarelli 1983, 108, 114, T. 29A: 3, 4, 5.

[89] Hellmuth Kramberger 2017b, 106; T. 12: 11.

[90] Buršić-Matijašić 1998, T. 56.

[91] Buršić-Matijašić 1998, 97.

[92] Buršić-Matijašić 1998, T. 65: 849

[93] Prema postojećim paralelama ima široko datiranje (Cardarelli 1983, 110, 116, T. 31A: 4).

[88] Cardarelli 1983, 108, 114, Pl. 29A: 3, 4, 5.

[89] Hellmuth Kramberger 2017b, 106; Pl. 12: 11.

[90] Buršić-Matijašić 1998, Pl. 56.

[91] Buršić-Matijašić 1998, 97.

[92] Buršić-Matijašić 1998, Pl. 65: 849.

[93] On the basis of the available parallels, it can be dated to a broad period (Cardarelli 1983, 110, 116, Pl. 31A: 4).

d) Drugi oblici ukrašavanja

Od drugih oblika ukrašavanja pojavljuje se motiv ubadanja štapićem u obliku triju uzastopnih uboda kružnog oblika (N-128, T. 2: 3). Ovakav tip ubadanja pojavljuje se kod Cardarellija u završnome brončanom dobu II.[94] Međutim, Cardarelli donosi još dva lokaliteta na kojima se pojavljuje ovaj motiv. Na gradini Sv. Duh pokraj Novigrada (S. Spirito di Cittanova) ulomci s ovim ukrasom datiraju se između kraja mlađega brončanog doba i početka završnoga brončanog doba I,[95] dok se primjerak s Limske gradine[96] datira od mlađega brončanog do željeznog doba.[97] Spomenuti treba i ulomak ukrašen glačanjem (N-105) kod kojeg se glačanje pojavljuje s unutrašnje strane u obliku širokih paralelnih linija.

d) Other decoration techniques

Among other decoration techniques, there is puncturing with a small stick, with three successive punctures forming a circular shape (N-128, Pl. 2: 3). This type of puncturing can be found in Cardarelli's Final Bronze Age II.[94] However, Cardarelli cites two other sites where this motif has been found. At the S. Spirito di Cittanova hillfort, potsherds thus decorated have been dated to the period between the end of the Late Bronze Age and the beginning of Final Bronze Age I,[95] while the find from the Limska Gradina hillfort[96] has been dated to between the Late Bronze Age and the Iron Age.[97] A sherd decorated by polishing (N-105) should also be mentioned; polishing is present on the inside, in the shape of wide parallel lines.

PROBLEMI STRATIGRAFIJE I KRONOLOGIJE

a) Sonda 2

Već je u tekstu navedeno kako u sondi 2 ne postoji jasna stratigrafija budući da se radi o zapuni iz ranijih Malezovih istraživanja. Ipak, datiranje pojedinih ulomaka keramike može nam reći nešto o dataciji slojeva iz kojih je originalno potekao materijal. Mali broj ulomaka iskopanih u sondi 2 zapravo pruža detaljnije informacije o dataciji slojeva. Na najraniju dataciju upućuje nekoliko primjeraka. Plastične trake, ukrašene utiskivanjem prstima, K. Buršić-Matijašić datira u srednje brončano doba i prelazak u mlađe brončano doba,[98] a Cardarelli u prvi dio mlađega brončanog doba.[99] S obzirom na novu dataciju materijala iz Monkodonje, pretpostaviti treba raniju dataciju za primjerak iz sonde 2 te ga datirati između razvijene faze ranoga brončanog doba i starije faze srednjega brončanog doba. O toj data-

[94] Cardarelli 1983, 100–101, T. 22: 171.
[95] Cardarelli 1983, 108, 114, T. 29A: 8.
[96] Vidjeti i Urem 2012, T. 9, 11.
[97] Cardarelli 1983, 110, 114, T. 29B: 17.
[98] Buršić-Matijašić 1998, 95.
[99] Cardarelli 1983, 94–95, T. 19: 35.

ISSUES PERTAINING TO STRATIGRAPHY AND CHRONOLOGY

a) Trench 2

It has been mentioned above that trench 2 contained no clear stratigraphy, given that it was dug in the filled-in earth resulting from an earlier excavation by Malez. Nonetheless, dating of individual sherds can tell us something about the dates of the layers from which the material originated. A small number of potsherds recovered from trench 2 actually provide detailed information about the dates of various layers. The earliest dates are indicated by several finds. The plastic straps decorated with finger impressions have been dated by Buršić-Matijašić to the Middle Bronze Age and to the turn of the Late Bronze Age,[98] and by Cardarelli to the first phase of the Late Bronze Age.[99] In view of the recent dating of the material from Monkodonja, we should assume that the earlier dates for the find from trench 2 are correct and thus date it to the period between the advanced phase of

[94] Cardarelli 1983, 100–101, Pl. 22: 171.
[95] Cardarelli 1983, 108, 114, Pl. 29A: 8.
[96] See also Urem 2012, Pl. 9, 11.
[97] Cardarelli 1983, 110, 114, Pl. 29B: 17.
[98] Buršić-Matijašić 1998, 95.
[99] Cardarelli 1983, 94–95, Pl. 19: 35.

ciji svjedoči i koljenasto profilirana ručka (N-3, T. 5: 11) koja se prvi put pojavljuje u ranome brončanom dobu, a pronalazimo je u velikom broju na lokalitetu Monkodonja. Ovaj primjerak vjerojatno se veže uz pithos tipa V prema A. Hellmuth Kramberger.[100] Na spomenutu fazu vjerojatno upućuju i završeci potkovičastih aplikacija, pronađeni u sondi 2 (N-38, T. 6: 7; N-40, T. 6: 8). S obzirom na paralele na istočnoj obali Jadrana i na Balkanu, potkovičaste plastične aplikacije i ručke mogu se također široko datirati od ranoga brončanog doba pa do kasnoga brončanog doba.[101] Iako ih Cardarelli povezuje s mlađim brončanim dobom,[102] moguće ih je vezati uz tip posuda s antropomorfnom aplikacijom, specifičnima za razvijeno rano brončano doba i stariju fazu srednjega brončanog doba u Istri.[103]

Dva primjerka (N-4, T. 5: 7; N-20, T. 5: 6) rubova šalica upućuju na završno brončano doba II, a radi se o oblicima koji se pojavljuju i u prvom stupnju željeznog doba. Na završno brončano doba II mogao bi upućivati i ulomak tijela šalice (N-23, T. 6: 2), s jasno izraženom profilacijom.[104] Ulomak ruba šalice (N-48, T. 5: 8), prema Cardarelliju, moguće je datirati u prvi stupanj željeznog doba,[105] a u istu fazu treba svrstati i uvučeni rub zdjele sa pseudovrpčastim ukrasom[106] te drugi uvučeni rub (N-31) ukrašen glačanjem.

Prema keramici iz sonde 2 moguće je izdvojiti tri zasebna horizonta. S obzirom na velik broj paralela s lokaliteta Monkodonja, prvi horizont treba datirati u razdoblje između razvijenog ranog i starije faze srednjega brončanog doba (1850. – 1450. g. pr. Kr.). Drugi je horizont vjerojatno završno brončano doba (1150. – 900. g. pr. Kr.) koje je zastupljeno s tek malim brojem primje-

[100] Hellmuth 2014, Sl. 4; Hellmuth Kramberger 2017a, 176–178, 401, Sl. 280b: 67.

[101] Vidjeti: Batović 1983, 363, sl. 24: 3; T. 51: 9; Čović 1983a, 127, 176, T. 13: 4, 21; Urem 2012, 95.

[102] Cardarelli 1983, 94–95, T. 19: 76b.

[103] Hellmuth 2012; 2015.

[104] Cardarelli 1983, 100–101, T. 22: 62.

[105] Cardarelli 1983, 100–101, T. 22: 66.

[106] Cardarelli 1983, T. 22: 166, 167.

the Early Bronze Age and the late phase of the Middle Bronze Age. Such a dating is further evidenced by the knee-shaped handle (N-3, Pl. 5: 11), which appeared for the first time in the Early Bronze Age, and it has been recovered in large numbers from the Monkodonja site. This specimen probably derives from a pithos of type V according to Hellmuth Kramberger.[100] The ends of horseshoe-shaped appliques discovered in trench 2 (N-38, Pl. 6: 7; N-40, Pl. 6: 8) are probably also indicative of this phase. Given the parallels that exist on the eastern Adriatic coast and in the Balkans, horseshoe-shaped appliques and handles can be dated to a wide period ranging between the Early Bronze Age and the Late Bronze Age.[101] Although Cardarelli associates them with the Late Bronze Age,[102] they can also be associated with the type of vessels with anthropological applique that are characteristic of the advanced phase of the Early Bronze Age and the early phase of the Middle Bronze Age in Istria.[103]

Two cup rims (N-4, Pl. 5: 7; N-20, Pl. 5: 6) suggest their dating to Final Bronze Age II, but the same shapes appear in the incipient Iron Age, too. A fragment of the body of a cup with clear profiling (N-23, Pl. 6: 2) could also be dated to Final Bronze Age II.[104] A fragment of the rim of a cup (N-48, Pl. 5: 8) can be dated to the incipient Iron Age according to Cardarelli,[105] and an inverted bowl rim with a pseudo-cord decoration[106] and another inverted rim decorated by polishing (N-31) should be classified to the same phase.

Based on the pottery finds recovered from trench 2, we can distinguish among three separate horizons. In view of the great number of parallels from the site of Monkodonja, the first horizon should be dated to the period between the advanced Early Bronze Age and the early phase of the Middle Bronze Age (1850 – 1450 BC). The second horizon probably originates

[100] Hellmuth 2014, Fig. 4; Hellmuth Kramberger 2017a, 176–178, 401, Fig. 280b: 67.

[101] See Batović 1983, 363, Fig. 24: 3; Pl. 51: 9; Čović 1983a, 127, 176, Pl. 13: 4, 21; Urem 2012, 95.

[102] Cardarelli 1983, 94–95, Pl. 19: 76b.

[103] Hellmuth 2012; 2015.

[104] Cardarelli 1983, 100–101, Pl. 22: 62.

[105] Cardarelli 1983, 100–101, Pl. 22: 66.

[106] Cardarelli 1983, Pl. 22: 166, 167.

raka. Treći horizont predstavljaju ulomci prvog stupnja željeznog doba (900. – 800. g. pr. Kr.) koji su zastupljeni najvećim brojem dijagnostičkih ulomaka. Kako se većina ulomaka povezanih sa završnim brončanim dobom zapravo datira u njegovu drugu podfazu, tj. završno brončano doba II, te se većina tih oblika pojavljuje i kasnije u prvom stupnju željeznog doba, moguće je horizonte 2 i 3 spojiti u jedan te ih smatrati jednim horizontom završnoga brončanog doba II – prvog stupnja željeznog doba[107] s datacijom između 1000. i 800. g. pr. Kr.

b) Sonda 3

Pri iskopavanju unutar sonde 3 iskopane su jedinice podijeljene u 5 slojeva. Iskopane slojeve ni prilikom iskopavanja nije bilo moguće jasno razlikovati zbog homogenosti zemlje. Analiza keramike iz otkopnih slojeva 1 – 5 pokazuje sličnu sliku. Nezavisna analiza keramičkih datuma i njezina usporedba sa stratigrafijom pokazala je poremećenost otkopnih slojeva.

Najraniju potencijalnu dataciju keramičkog materijala mogli bi pružiti primjerci žljebljenih koncentričnih kružnica (N-86, T. 2: 1; N-120, T. 1: 11; N-125, T. 3: 4) koje se na materijalu iz Monkodonje pojavljuju već između razvijene faze ranoga brončanog doba i starije faze srednjega brončanog doba.[108] Nešto su starija istraživanja svrstavala ove motive u srednje brončano doba[109] s mogućom zastupljenošću i u kasnijim razdobljima (mlađe brončano doba i početak završnoga brončanog doba).[110] Kao i u slučaju sonde 2, koljenasto profiliranu ručku (N-62, T. 2: 7) valja datirati u razdoblje između razvijenog ranog te starije faze srednjega brončanog doba u Istri. I u sondi 3, periodu između razvijenoga ranog brončanog doba i starije faze srednjega brončanog

[107] Na ovu dataciju upućuje i ulomak ukrašen urezivanjem u motivu riblje kosti (N-42, T. 6: 4).

[108] Hellmuth Kramberger 2017b, 106; T. 12: 11.

[109] Cardarelli 1983, 109, T. 26: 10–12; Čović 1983b, 239; T. 35: 4; Buršić-Matijašić 1998, 102.

[110] Cardarelli 1983, 108, 114, T. 29A: 1, 3, 4, 5.

from the Final Bronze Age (1150 – 900 BC) and is represented by just a small number of finds. The third horizon is represented by potsherds from the incipient Iron Age (900 – 800 BC), with the greatest number of diagnostic potsherds. In view of the fact that the majority of sherds associated with the Final Bronze Age have actually been dated to its second subphase, i.e. to Final Bronze Age II, and that most of these shapes can also be found later, in the incipient Iron Age, horizons 2 and 3 can be merged into one and treated as a single horizon of Final Bronze Age II / incipient Iron Age,[107] datable to between 1000 and 800 BC.

b) Trench 3

During the excavation of trench 3, the excavated units were divided into 5 layers. During the dig, the layers could not be distinguished clearly due to the homogeneity of the soil. A similar picture has been obtained by the analysis of pottery finds recovered from excavated layers 1–5. An independent analysis of pottery dates and their comparison with the stratigraphy has revealed that the excavated layers had been disturbed.

The earliest potential dates for pottery finds could be provided by the sherds with grooved concentric circles (N-86, Pl. 2: 1; N-120, Pl. 1: 11; N-125, Pl. 3: 4), which in the Monkodonja material appeared as early as between the advanced phase of the Early Bronze Age and the early phase of the Middle Bronze Age.[108] Earlier research dated such motifs to the Middle Bronze Age,[109] with possible appearance in subsequent periods, too (in the Late Bronze Age and the beginning of the Final Bronze Age).[110] As in trench 2, the knee-shaped handle (N-62, Pl. 2: 7) should be dated to the period between the advanced Early Bronze Age and the early phase of the Middle Bronze Age in Istria. In trench 3, too, horseshoe-shaped appliques that could represent anthropomorphic decoration on vessels should be dated to the period between the

[107] Such dating is also indicated by the potshard decorated with incised fishbone motif (N-42, Pl. 6: 4).

[108] Hellmuth Kramberger 2017b, 106; Pl. 12: 11.

[109] Cardarelli 1983, 109, Pl. 26: 10–12; Čović 1983b, 239; Pl. 35: 4; Buršić-Matijašić 1998, 102.

[110] Cardarelli 1983, 108, 114, Pl. 29A: 1, 3, 4, 5.

doba treba pripisati potkovičaste aplikacije koje potencijalno predstavljaju antropomorfni ukras na posudama.[111]

U početak mlađega brončanog doba može se datirati rub zdjele N-68 (T. 4: 14). Dataciju u mlađe brončano doba sugerira i izvučeni rub lonca N-55 (T. 3: 9) kakav nalazimo na gradini Sv. Duh pokraj Novigrada.[112] U kraj mlađega brončanog doba možda je moguće datirati ručku trokutastog presjeka, a dataciju je moguće proširiti i na početak završnoga brončanog doba.[113] Budući da se velik dio ove atribucije, prema Cardarelliju, veže uz relativno zastarjele faze, datume treba uzeti s rezervom.

Ulomci s urezanim ravnim linijama i motivom riblje kosti (N-87, T. 2: 4; N-88, T. 2: 5; N-99, T. 1: 3) datiraju u završno brončano doba – prvi stupanj željeznoga doba,[114] a peterokutna drška također bi se mogla datirati između završnoga brončanog doba i prvog stupnja željeznog doba (1150. – 800. g. Pr. Kr.).[115] Uz početak ranoga željeznog doba veže se i ručka cothon tipa (N-64, T. 2: 6). U prvi stupanj željeznog doba treba datirati i prebačeni rub (N-63, T. 3: 5), ukrašen pseudovrpčastom dekoracijom.

Otkopni sloj 1 pokazuje potencijalnu dataciju u mlađe brončano doba (N-55, T. 3: 9), ali se ta datacija temelji samo na jednom ulomku. Zbog činjenice da datacija ulomka nije pouzdana i da se radi samo o jednom primjerku, treba se suzdržati od pokušaja jasnog datiranja ovog sloja. Također, treba navesti da se radi o površinskom sloju i da je moguća i kontaminacija čitavog sloja. Čitavi sloj 2 moguće je podijeliti u dvije razine. Gornja razina pokazuje širok raspon keramičkih datuma. Iako potkovičasta aplikacija (N-66, T. 4: 12) i koljenasto profilirana ručka upućuju na razvijeno rano brončano doba i stariju fazu srednjega brončanog doba, pronalazak ručke cothon tipa i ruba ukrašenog pseudovrpčastim ukrasom (N-

[111] Hellmuth 2012; 2015.

[112] Cardarelli 1983, 108, 111, T. 27B: 8.

[113] Cardarelli 1983, 108, 114, T. 29A: 9.

[114] Cardarelli 1983, 98–99, T. 21: 138, 141, 162.

[115] Cardarelli 1983, 112, 117, T. 32B: 17.

advanced Early Bronze Age and the early phase of the Middle Bronze Age.[111]

The bowl rim N-68 (Pl. 4: 14) can be dated to the beginning of the Late Bronze Age. Such dating, to the Late Bronze Age, is also suggested by the everted pot rim N-55 (Pl. 3: 9), such as has been found at the S. Spirito di Cittanova hillfort.[112] A handle with triangular cross-section could perhaps be dated to the end of the Late Bronze Age, but the dating could be extended to the beginning of the Final Bronze Age.[113] Since this attribution relies to a large extent on the relatively outdated phases according to Cardarelli, the dates should be taken with reservation.

Potsherds with incised straight lines and fishbone motif (N-87, Pl. 2: 4; N-88, Pl. 2: 5; N-99, Pl. 1: 3) originate from the Final Bronze Age / incipient Iron Age,[114] and the pentagonal handle could also be dated to the period between the Final Bronze Age and the incipient Iron Age (1150 – 800 BC).[115] The *cothon*-type handle (N-64, Pl. 2: 6) is also associated with the beginning of the Early Iron Age. The downward-pointing everted rim decorated with pseudo-cord decoration (N-63, Pl. 3: 5) should also be dated to the incipient Iron Age.

Excavation layer 1 could potentially be dated to the Late Bronze Age (N-55, Pl. 3: 9), but the dating is based on only one potsherd. Due to the fact that the dating of the sherd is not reliable and that there is only one find, we should refrain from attempting to clearly date this layer. Furthermore, it should be noted that this was a surface layer, and as such it could be contaminated in its entirety. Layer 2 can be divided into two levels. The upper level contained a wide range of pottery dates. Although a horseshoe-shaped applique (N-66, Pl. 4: 12) and the knee-shaped handle are indicative of the advanced Early Bronze Age and the early phase of the Middle Bronze Age, the discovery of a handle of the *cothon* type and a rim decorated with pseudo-cord decoration (N-62, Pl. 2: 7; N-64, Pl. 2: 6; N-63, Pl. 3: 5) within the same quadrant suggests that

[111] Hellmuth 2012; 2015.

[112] Cardarelli 1983, 108, 111, Pl. 27B: 8.

[113] Cardarelli 1983, 108, 114, Pl. 29A: 9.

[114] Cardarelli 1983, 98–99, Pl. 21: 138, 141, 162.

[115] Cardarelli 1983, 112, 117, Pl. 32B: 17.

62, T. 2: 7; N-64, T. 2: 6; N-63, T. 3: 5) unutar istog kvadranta ukazuje na ispremiješanost ovog sloja te upućuje na široku dataciju između razvijenoga ranoga brončanog doba i prvog stupnja željeznog doba (1850. – 800. g. pr. Kr.). Sličnu situaciju pronalazimo i kod donje razine sloja 2, gdje ulomci ukrašeni žljebljenim koncentričnim kružnicama (N-86, T. 2: 1; N-120, T. 1: 11; N-125, T. 3: 4) ukazuju na raniji datum,[116] a ulomci N-87 (T. 2: 4) i N-88 (T. 2: 5), pronađeni u kvadrantu A3, upućuju na završno brončano doba – prvi stupanj željeznog doba. Dvije razine sloja 2 moguće je povezati preko dva spojiva ulomka (N-78 i N-83, T. 3: 2) istog ruba lonca koji su pronađeni u kvadrantu C3 gornje razine i kvadrantu B3 donje razine sloja 2.

Ispod sloja 2 nalazio se sloj koji je pri iskopavanju označen kao sloj 2 ili 3. Ovaj je sloj također moguće podijeliti na dvije iskopne razine, gornju i donju. Potkovičaste aplikacije unutar gornje razine upućivale bi na dataciju u razvijeno rano brončano doba ili stariju fazu srednjega brončanog doba, ali peterokutna ručka (N-98, T. 1: 6), pronađena unutar kvadranta B1 na istoj razini, upućuje na završno brončano doba – prvi stupanj željeznog doba. Međutim, puno je važniji ulomak N-97 (T. 1: 5), ukrašen urezanim kratkim vertikalnim crtama. Radi se o ulomku iste posude, kao i kod ulomka N-56 (T. 1: 7) (vidjeti prethodno u tekstu) koji je pronađen na samom vrhu sloja 1. Ova dva ulomka ukazuju na to da sve iskopne razine između površinskog sloja i gornje razine sloja 2/3 treba pripisati istoj depozicijskoj epizodi i da se zapravo radi o jednom sloju. Široki keramički datumi između slojeva 1 i 2/3 dodatno potvrđuju ispremiješanost slojeva.

Donja razina sloja 2/3 pokazuje datume između razvijenoga ranog i završnoga brončanog doba (N-120, T. 1: 11; N-125, T. 3: 4). Neposredno ispod tog sloja nalazi se sloj 4/5 u kojem je pronađen jedan ulomak (N-99, T. 1: 3) s datacijom u završno brončano

[116] Hellmuth Kramberger 2017a, 282–283; 2017b, 106, T. 12: 11.

the layer had been disturbed and that possible dates fall within a wide range between the advanced Early Bronze Age and the incipient Iron Age (1850 – 800 BC). In the lower level of layer 2, the situation was similar: potsherds decorated with grooved concentric circles (N-86, Pl. 2: 1; N-120, Pl. 1: 11; N-125, Pl. 3: 4) are indicative of earlier dating,[116] and potsherds N-87 (Pl. 2: 4) and N-88 (Pl. 2: 5) recovered from quadrant A3 suggest dating to the Final Bronze Age / incipient Iron Age. The two levels of the layer can be linked together through two adjoining sherds (N-78 and N-83, Pl. 3: 2) of the same pot rim, discovered in quadrant C3 of the upper level, and quadrant B3 of the lower level, of layer 2.

Under layer 2, there was a layer which was marked as layer 2 or layer 3 during the excavation. This layer can also be divided into two excavation levels, the upper and lower levels. The horseshoe-shaped appliques found in the upper level would suggest dating to the advanced Early Bronze Age or the early phase of the Middle Bronze Age, but the pentagonal handle (N-98, Pl. 1: 6) discovered in quadrant B1 of the same level indicates dating to the Final Bronze Age / incipient Iron Age. However, potsherd N-97 (Pl. 1: 5), decorated with incised short vertical lines, is much more important. It belongs to the same vessel as sherd N-56 (Pl. 1: 7) (see above), found at the very top of layer 1. The two sherds suggest that all the excavated levels of the surface layer, and the upper levels of layer 2/3, should be attributed to the same deposition episode, and that they actually form a single layer. The wide range of pottery dates in layers 1 and 2/3 corroborate the view that the layers had been mixed together.

The lower level of layer 2/3 contained material dated to the period between the advanced Early Bronze Age and the Final Bronze Age (N-120, Pl. 1: 11; N-125, Pl. 3: 4). Immediately under this layer there was layer 4/5, which contained one potsherd (N-99, Pl. 1: 3) dated to the Final Bronze Age / incipient Iron Age. Given that in this case earlier layers are located above the later ones, which cannot be in an undisturbed stratigraphic sequence, the conclusion should

[116] Hellmuth Kramberger 2017a, 282–283; 2017b, 106, Pl. 12: 11.

doba – prvi stupanj željeznog doba. Kako se u tom slučaju stariji slojevi nalaze iznad mlađih, što u neporemećenoj stratigrafskoj sekvenci nije moguće, valja zaključiti da unutar prvih 5 slojeva sonde 3 nema jasne stratigrafije.

Bez obzira na izostanak jasne stratigrafije, keramički materijal, kao i u slučaju sonde 2, može pružiti neke informacije o nekadašnjim slojevima. Dijagnostički ulomci široko se datiraju između razvijene faze ranoga brončanog i prvog stupnja željeznog doba (1850. – 800. g. pr. Kr). S obzirom na velik broj paralela s materijalom iskopanim na lokalitetu Monkodonja, pretpostavlja se da se datacija jednog dijela materijala poduda-ra s datacijom slojeva na samom lokalitetu. Prema posljednjim rezultatima istraživanja, faze najintenzivnijeg naseljavanja lokaliteta Monkodonja treba datirati u razdoblje između razvijenoga ranog i starije faze srednjega brončanog doba u Istri (1850. – 1450. g. pr. Kr.).[117] Sukladno tomu, najranije slojeve s keramičkim materijalom iz Romualdove pećine treba datirati u ovu fazu.

Dio materijala može se pripisati i prijelaznoj fazi s mlađeg na završno brončano doba (1200. – 1100. g. pr. Kr.) kako je definira Cardarelli,[118] o čemu svjedoči i C^{14} datum 3150 ± 46 godina prije sadašnjosti, dobiven iz ljudskih osteoloških ostataka.[119] Valja napomenuti da su i te kosti, pronađene u slojevima između 1 i 2/3, sigurno pronađene izvan njihova originalnog konteksta. U ranijim izvještajima navedeno je kako stratigrafski položaj ljudskih kosturnih ostataka, prisutni kosturni elementi i stanje očuvanosti pripisuju nalaze istome razdoblju.[120] Stratigrafski odnosi više se ne mogu uzeti kao valjani argument za ovu tvrdnju, ali nema razloga da se osteološke nalaze ne pripiše istom razdoblju i poveže s fazom mlađe – završno brončano doba. Nažalost, bez jasnijih stratigrafskih podataka, ili sa-

be drawn that there is no clear stratigraphy within the first 5 layers of trench 3.

Despite the fact that there is no clear stratigraphy, just as in trench 2, here too pottery material can offer some information about former layers. Diagnostic potsherds have been dated to a broad period between the advanced phase of the Early Bronze Age and the incipient Iron Age (1850 – 800 BC). In view of the large number of parallels with the material discovered at the site of Monkodonja, the assumption is warranted that dates of part of the material correspond to dates of the layers at the site itself. Based on the latest research results, phases of the most intensive settling of the site of Monkodonja should be dated to the period between the advanced Early Bronze Age and the early phase of the Middle Bronze Age in Istria (1850 – 450 BC).[117] Correspondingly, the earliest layers containing pottery in Romuald's Cave should be dated to this phase.

Some of the finds could perhaps be attributed to the transitional phase between the Late Bronze Age and the Final Bronze Age (1200 – 1100 BC), as defined by Cardarelli,[118] evidenced also by the C^{14} date of 3150 ± 46 years before present, obtained from human osteological remains.[119] It should be mentioned that the bones, recovered from layers between 1 and 2/3, have certainly been found outside their original context. Earlier reports stated that the stratigraphic position of human skeletal remains, the skeletal elements present and their state of preservation, all attribute the finds to the same period.[120] The stratigraphic relations cannot be considered to be a valid argument for such a statement any longer, but there is no reason for the osteological finds not to be attributed to the same period and associated with the Late/Final Bronze Age. Unfortunately, without clear stratigraphic data or information about the original context of the human remains, it is impossible to establish whether the site was settled over a long period, or whether it was used for burial purposes during the abovementioned period.[121]

[117] Hänsel, Teržan, Mihovilić 2007; Hänsel, Mihovilić, Teržan 2015, 424–452; Hellmuth Kramberger 2017a, 340.

[118] Cardarelli 1983, 92.

[119] Janković *et al*. 2016, 12.

[120] Janković *et al*. 2016, 12.

[117] Hänsel, Teržan, Mihovilić 2007; Hänsel, Mihovilić, Teržan 2015, 424–452; Hellmuth Kramberger 2017a, 340.

[118] Cardarelli 1983, 92.

[119] Janković *et al*. 2016, 12.

[120] Janković *et al*. 2016, 12.

[121] Some potshards also suggest that the cave was inhabited

znanja o originalnom kontekstu ljudskih ostataka, nije moguće ustvrditi radi li se o dužem periodu nastanjivanja ili o potencijalnom korištenju lokaliteta u pogrebne svrhe tijekom spomenutog perioda.[121]

Drugu jasno definiranu fazu predstavljali bi nalazi datirani u završno brončano doba II (1000. – 900. g. pr. Kr.) i prvi stupanj željeznog doba (900. – 800. g. pr. Kr.). S obzirom na to da većina materijala s ovom datacijom zapravo pokriva obje faze, ova je faza definirana kao završno brončano doba II – prvi stupanj željeznog doba (1000. – 800. g. pr. Kr.). Paralele između keramičkog materijala, pronađenog unutar obje sonde, ukazuje na to da su dvije spomenute faze, iako nisu zabilježene u zatvorenim slojevima, dovoljno zastupljene da se mogu smatrati fazama naseljavanja Romualdove pećine.

Naposljetku, valja spomenuti da neki ulomci imaju tragove recentnih lomova, ali njihov spoj nije pronađen. Većinom je riječ o ulomcima tijela posuda iz različitih slojeva sonde te je moguće da pri iskopavanju nisu prikupljeni. Postoji i mogućnost da se radi o ulomcima koji su se nalazili u profilu, da su pri iskopavanju prelomljeni te da se drugi dio ulomka i dalje nalazi u profilu. Međutim, recentni lomovi bez spoja potvrđeni su čak i u slučaju očitih dijagnostičkih ulomaka koji vjerojatno nisu previđeni pri iskopavanju (N-52, T. 3: 10). Ipak, radi se o jednom ulomku ruba amfore koji potječe iz čišćenja površinskog sloja te je moguće da nije prikupljen. Napomenuti treba i mogućnost da su ovi ulomci polomljeni prilikom ranijih istraživanja. Ova mogućnost i prethodno izneseni argumenti, potkrijepljeni dobivenom analizom keramičkih ostataka, ukazuju da se i u ovom slučaju možda radi slojevima uništenima ranijim istraživanjima u pećini. Svakako, napomenuti treba i životinjsku aktivnost zabilježenu u sondi 3 koja je zasigurno djelovala na stratigrafske odnose gornjih slojeva sonde 3.[122]

[121] Pojedini ulomci sugeriraju naseljavanje pećine u ovoj fazi. Međutim, radi se samo o sporadičnim primjercima čiju kronološku pripadnost nije moguće jasno odrediti.

[122] Vidjeti Janković *et al*. 2016, 9, 12.

The second clearly-defined phase consists of finds dated to Final Bronze Age II (1000 – 900 BC) and the incipient Iron Age (900 – 800 BC). In view of the fact that the majority of material dated to this period covers both phases, the period has been identified as the Final Bronze Age / incipient Iron Age period (1000 – 800 BC). Parallels among pottery material found in both trenches indicate that the two phases, although not recorded in closed layers, are represented sufficiently to be considered phases of settlement of Romuald's Cave.

Finally, it is worth mentioning that some sherds display traces of recent breakage, but the corresponding pieces have not been found. Those are mostly fragments of vessels' bodies recovered from various layers of the trench, which may have been omitted during the excavation. It is also possible that these sherds were found in the profile, that they were broken during the dig, and that the other part of the sherd is still in the profile. However, recent breakage with no corresponding pieces has been identified even in the cases of obvious diagnostic potsherds which could hardly have been omitted during the excavation (N-52, Pl. 3: 10). Still, this single fragment of amphora rim was discovered during the cleaning of the surface layer, and it is possible that the corresponding piece has not been collected. It is also possible that these sherds had been broken during earlier excavations. This possibility, together with arguments presented above and supported by the results obtained from analysis of the pottery remains indicate that, in this case, too, layers could have been disturbed by earlier investigations of the cave. The animal activity recorded in trench 3 should also be mentioned here, as it has definitely impacted the stratigraphic relations in the upper layers of trench 3.[122]

during this phase. However, these are only sporadic finds whose chronological attribution cannot be clearly established.

[122] See Janković *et al*. 2016, 9, 12.

ZAKLJUČAK

Keramički materijal opisan u ovome pregledu jasno se uklapa u sliku brončanog i ranoga željeznog doba u Istri. Ovi nalazi posebno dobivaju na značaju u kontekstu rezultata novih istraživanja na području Istre, primarno s lokaliteta Monkodonja. Iako u slojevima brončanog i ranoga željeznog doba u Romualdovoj pećini nema jasnih stratigrafskih odnosa, prezentirani materijal važan je za poznavanje spomenutih razdoblja u Istri. Uzevši u obzir da je najveći broj paralela zabilježen na lokalitetima koji se nalaze u neposrednoj blizini Romualdove pećine, poput Limske gradine, nalazi bi mogli pomoći analizama keramičkog materijala i na mikroregionalnoj razini. S druge strane, brojne paralele na nešto širem području sjevernoga Jadrana jasno stavljaju horizonte naseljavanja Romualdove pećine u nešto širi kulturni kontekst.

CONCLUSION

The pottery finds presented in this overview clearly fit in to the picture of the Bronze Age and the Early Iron Age in Istria. These finds are particularly important within the context of recent investigations in Istria, primarily at the site of Monkodonja. Although in Romuald's Cave the layers originating from the Bronze and Early Iron ages contain no clear stratigraphy, the material presented is important for the understanding of these periods in Istria. In view of the fact that the largest number of parallels have been observed at sites located in the immediate vicinity of Romuald's Cave, such as the Limska Gradina hillfort, the material discovered can contribute to analyses of pottery at a micro-regional level. On the other hand, numerous parallels in the wider region of the northern Adriatic clearly set the horizons of the settlement of Romuald's Cave in a somewhat wider cultural context.

KATALOG

Sonda 2

N-1: Ulomak izvučenoga jednolikog ruba sivo-bež boje i uglačane površine. Vrlo vjerojatno dio zdjele srednje grube fakture. Visina 3,5, širina 4, debljina 0,8.[123]

N-2: Ulomak ravnoga jednolikog ruba sivo-bež boje, uglačanog s obje strane. Vrlo vjerojatno dio lonca. Visina 3,4, širina 3,9, debljina 0,9.

N-3: Koljenasto profilirana ručka crvenkasto-smeđe boje. Debljina 1,2, širina 7,8.

N-4: Ulomak blago izvučenoga jednolikog ruba crne boje. Glačanje vidljivo s unutrašnje i vanjske strane. Visina 2,1, širina 3,1, debljina 0,9.

N-5: Ulomak ravnoga jednolikog ruba pithosa grube fakture. S vanjske strane smeđe boje, s unutrašnje smeđe, a u presjek je crn. Visina 2,7, širina 3,2, debljina 2,6.

N-6: Ulomak ravnoga zadebljanog ruba s dvije istaknute kanelure paralelne s rubom. Visina 2,9, širina 2,6, debljina 1,2.

[123] Sve su dimenzije izražene u centimetrima.

CATALOGUE

Trench 2

N-1: Fragment of an everted uniform rim of grey-beige colour, with polished surface. Most probably part of a bowl of the medium-coarse fabric. Height 3.5, width 4.0, thickness 0.8[123]

N-2: Fragment of a straight uniform rim of grey-beige colour, polished on both sides. Most probably part of a pot. Height 3.4, width 3.9, thickness 0.9

N-3: Knee-shaped handle of a reddish-brown colour. Thickness 1.2, width 7.8

N-4: Fragment of a slightly everted uniform rim of black colour. Polishing can be observed on both sides. Height 2.1, width 3.1, thickness 0.9

N-5: Fragment of a straight uniform rim of a pithos, of coarse fabric. On the outside it is brown, on the inside brown, and the cross-section is black. Height 2.7, width 3.2, thickness 2.6

N-6: Fragment of a straight thickened rim with two emphasized flutes parallel to the rim. Height 2.9, width 2.6, thickness 1.2

[123] All the dimensions are in centimetres.

N-7: Ulomak trakaste ručke crvenkasto-sive boje. Slično kao N-46. Duljina 4,2, širina 3,2, debljina 1,2.

N-8: Ulomak običnoga ravnog dna. Iznutra smeđe boje, a izvana crvene. Duljina 2,2, širina 1,7, debljina 1,0.

N-9: Ulomak tijela posude s prijelazom iz trbuha u vrat. Iznutra crvene boje, a izvana tamnosmeđe. Visina 5,1, širina 4,4, debljina 1,1.

N-10: Ulomak običnoga ravnog dna narančasto-smeđe boje. Dužina 3,9, širina 3,8, debljina 1,7.

N-11: Ulomak običnog ravnog dna tamnosmeđe boje. Dužina 3.1, širina 2.2, debljina 1.5

N-12: Ulomak tijela smeđe boje s klinastom plastičnom aplikacijom. Duljina 7,5, širina 5,6, debljina 1,4.

N-13: Ulomak odlomljene ručke O presjeka. Izvana smeđe boje, a iznutra crne. Duljina 3,9, širina 2,4, debljina 1,9.

N-14: Ulomak ravnoga suženog ruba crne boje i glačane površine. Visina 2,1, širina 2,0, debljina 1,3.

N-15: Ulomak ravnoga jednolikoga ruba tamnosmeđe boje. Visina 2,4, širina 2,4, debljina 0,8.

N-16: Ulomak izvučenoga jednolikog ruba tamnosmeđe boje. Visina 1,6, širina 2,4, debljina 0,8.

N-17: Ulomak trakaste ručke. S vanjske je strane tamnocrvene boje, a presjek je siv. Duljina 2,7, širina 1,9, debljina 0,8.

N-18: Ulomak uvučenoga zadebljanog ruba zdjele smeđe boje. Rub je zaravnjen i ukrašen urezivanjem. Urezane linije su na rubu ispunjene inkrustacijom. Visina 1,7, širina 1,4, debljina 0,8.

N-19: Ulomak lagano izvučenog zadebljanog ruba crvenkasto-smeđe boje. Visina 2.7, širina 2.0, debljina 0.5.

N-20: Ulomak izvučenoga jednolikog ruba crne boje. Površina je glačana s unutrašnje i vanjske strane. Visina 2,5, širina 3,5, debljina 0,9.

N-21 i N-44: Tri ulomka istoga običnoga

N-7: Fragment of a strap handle, of reddish-grey colour. Similar to N-46. Length 4.2, width 3.2, thickness1.2

N-8: Fragment of a regular flat bottom, brown on the inside, and red on the outside. Length 2.2, width 1.7, thickness 1.0

N-9: Fragment of a vessel body, with the transition from the belly to the neck. Red on the inside, dark brown on the outside. Height 5.1, width 4.4, thickness 1.1

N-10: Fragment of an ordinary flat bottom of orange-brown colour. Length 3.9, width 3.8, thickness 1.7

N-11: Fragment of an ordinary flat bottom of dark-brown colour. Length 3.1, width 2.2, thickness 1.5

N-12: Fragment of a brown body with a wedge-shaped plastic applique. Length 7.5, width 5.6, thickness 1.4

N-13: Fragment of a broken-off handle with O-shaped cross-section. Brown on the outside, black on the inside. Length 3.9, width 2.4, thickness 1.9

N-14: Fragment of a black straight thinned rim, with polished surface. Height 2.1, width 2.0, thickness 1.3

N-15: Fragment of a straight uniform rim of dark-brown colour. Height 2.4, width 2.4, thickness 0.8

N-16: Fragment of an everted uniform rim of dark-brown colour. Height 1.6, width 2.4, thickness 0.8

N-17: Fragment of a strap handle. Dark red on the outside, grey in cross-section. Length 2.7, width 1.9, thickness 0.8

N-18: Fragment of an inverted thickened bowl rim of brown colour. The rim is flattened and decorated with incisions. The incised lines along the rim are filled with incrustation. Height 1.7, width 1.4, thickness 0.8

N-19: Fragment of a slightly everted thickened rim of reddish-brown colour. Height 2.7, width 2.0, thickness 0.5

N-20: Fragment of a black everted uniform rim. The surface is polished on both inside and outside. Height 2.5, width 3.5, thickness 0.9

N-21 and N-44: Three fragments of an ordi-

ravnog dna tamnosive boje. Dužina 6,8, širina 5,0, debljina 1,1.

N-22: Ulomak ravnog blago suženog ruba posude. S vanjske je strane narančasto-smeđe boje, a s unutarnje tamnosmeđe. Visina 2,6, širina 1,9, debljina 0,9.

N-23: Ulomak tijela posude crne boje s prelaskom trbuha u vrat. Visina 3,3, širina 2,3, debljina 0,6.

N-24: Polovica potencijalno sekundarno obrađenog ulomka keramike. Na vanjskim stranama crvene boje, u presjeku crne boje. Duljina 5,8, širina 3,0, debljina 1,1.

N-25: Ulomak suženoga izvučenog ruba amfore. Na površini je narančaste boje, a u presjeku sive. Duljina 2,9, širina 1,9, debljina 1,2.

N-26: Blago izvučeni jednoliki rub tamnosmeđe boje, s tragovima utiskivanja prstiju na rubu. Visina 3,6, širina 4,2, debljina 1,1.

N-27: Uvučeni suženi rub konične zdjele crne boje. Visina 2,6, širina 4,8, debljina 0,7.

N-28: Ulomak prstenastog dna tamnosmeđe boje. Prsten nije jako naglašen. Duljina 3,5, širina 3,4, debljina 0,5.

N-29: Ulomak uvučenog, jednolikog i zaravnjenog ruba kalotaste zdjele. Ukrašen je pseudovrpčastim ukrasom s vanjske strane, u obliku dvije paralelne linije koje teku uz sam rub i sa pseudovrpčastim motivom riblje kosti ispod njih. Ulomak je tamnosmeđe boje. Visina 2,7, širina 2,6, debljina 0,9.

N-30: Ulomak izvučenoga blago suženog ruba. Ulomak je sive boje. Visina 1,6, širina 1,3, debljina 0,5.

N-31: Ulomak izvučenoga jednolikog ruba. Ulomak je smeđe boje. Visina 1,4, širina 2,5, debljina 0,4.

N-32: Ulomak ravnoga jednolikog ruba pithosa. Smeđe je boje izvana i iznutra, a crnog presjeka. Visina 6,1, širina 6,3, debljina 1,5.

N-33: Ulomak običnoga ravnog dna. Iznutra i u presjeku crne boje, a izvana crvenkasto-crne. Visina 1,6, širina 3,3, debljina 1,1.

N-34: Ulomak tijela pithosa s ravnom plastičnom aplikacijom. Crvenkasto-smeđe boje na vanjskim stranama, a u presjeku

nary flat bottom of dark-grey colour. Length 6.8, width 5.0, thickness 1.1

N-22: Fragment of a straight, slightly thinned vessel rim. Orange-brown on the outside, dark brown on the inside. Height 2.6, width 1.9, thickness 0.9

N-23: Fragment of a black vessel body with the transition from the belly to the neck. Height 3.3, width 2.3, thickness 0.6

N-24: Half of a potentially secondarily-processed pottery sherd. Red on the outside, black in cross-section. Length 5.8, width 3.0, thickness 1.1

N-25: Fragment of a thinned everted amphora rim. The surface is orange, the cross-section grey. Length 2.9, width 1.9, thickness 1.2

N-26: Slightly everted uniform rim of dark-brown colour with traces of finger impressions on the rim. Height 3.6, width 4.2, thickness 1.1

N-27: Inverted thinned rim of a black conical bowl. Height 2.6, width 4.8, thickness 0.7

N-28: Fragment of a ring-shaped bottom of dark-brown colour. The ring is not particularly emphasized. Length 3.5, width 3.4, thickness 0.5

N-29: Fragment of the inverted, uniform and flattened rim of a hemispherical bowl. On the outside, it is decorated with pseudo-cord decoration forming two parallel lines along the rim itself, and a pseudo-cord fishbone motif underneath. The sherd is dark brown. Height 2.7, width 2.6, thickness 0.9

N-30: Fragment of a slightly thinned rim. The sherd is grey. Height 1.6, width 1.3, thickness 0.5

N-31: Fragment of an everted uniform rim. The sherd is brown. Height 1.4, width 2.5, thickness 0.4

N-32: Fragment of the straight uniform rim of a pithos. Brown on the outside and inside, with black cross-section. Height 6.1, width 6.3, thickness 1.5

N-33: Fragment of an ordinary flat bottom. Black on the inside and in cross-section, reddish-black on the outside. Height 1.6, width 3.3, thickness 1.1

N-34: Fragment of the body of a pithos, with a flat plastic applique. Reddish-brown on the outside, with black cross-section. Length 4.1, width 2.9, thickness 1.5

crn. Duljina 4,1, širina 2,9, debljina 1,5.

N-35: Ulomak običnoga ravnog dna. Na vanjskim stranama smeđe boje, a u presjeku crn. Visina 3,2, širina 4,5, debljina 1,1.

N-36: Ulomak običnoga ravnog dna. Na vanjskim stranama smeđe boje, a u presjeku crn. Visina 3,2, širina 5,6, debljina 1,0.

N-37: Ulomak običnoga ravnog dna. S vanjske je strane crne boje, a s unutarnje crvene. Boja presjeka je crna. Visina 2,2, širina 3,8, debljina 1,3.

N-38: Dio tijela posude s plastičnom aplikacijom. Vjerojatno je riječ o donjem kraju kraka potkovičaste aplikacije, tj. drške. S vanjske je strane ulomak crvene boje, a s unutrašnje i u presjeku crne. Duljina 4,3, širina 3,7, debljina 1,0.

N-39: Ulomak robusne ručke smeđe boje. Duljina 5,1, širina 3,2, debljina 2,0.

N-40: Ulomak tijela posude s plastičnom aplikacijom. Vjerojatno se radi o donjem dijelu potkovičaste aplikacije, tj. drške. Vanjska je boja crvenkasto-smeđa, unutarnja tamnosmeđa, a presjek je smeđe boje. Duljina 4,1, širina 6,1, debljina 1,3.

N-41: Ulomak tijela posude s tragovima bojenja crnom bojom. Boja je vanjske površine bež-smeđa, unutarnje crna, a boja presjeka crna. Širina 3,3, dužina 2,9, debljina 0,6.

N-42: Ulomak tijela posude s plitko urezanim motivom riblje kosti. Dužina 3,2, širina 2,9, debljina 0,4.

N-43: Ulomak tijela posude s plastičnom aplikacijom ukrašenom utiskivanjem prsta. Ulomak je smeđe boje. Duljina 4,9, širina 3,5, debljina 1,3.

N-45: Ulomak ravnoga suženog ruba. Crne je boje i grube fakture. Visina 1,9, širina 1,9, debljina 1,4.

N-46: Ulomak trakaste ručke crvenkasto-sive boje. Vidljivo centralno užljebljenje. Sličan kao N-7. Duljina 3,0, širina 2,2, debljina 1,3.

N-47: Slabo očuvani ulomak trakaste ručke uglačane tamnosmeđe površine i sivog presjeka. Duljina 3,2, širina 2,4, debljina 1,1.

N-48: Ulomak ravnoga jednolikog ruba. Crne je boje. Površina je ulomka uglačana s

N-35: Fragment of an ordinary flat bottom. Brown on the outside, with black cross-section. Height 3.2, width 4.5, thickness 1.1

N-36: Fragment of an ordinary flat bottom. Brown on the outside, with black cross-section. Height 3.2, width 5.6, thickness 1.0

N-37: Fragment of an ordinary flat bottom. Black on the outside, red on the inside, with black cross-section. Height 2.2, width 3.8, thickness 1.3

N-38: Part of a vessel's body with a plastic applique. Possibly the lower part of one arm of a horseshoe-shaped applique, or a hand-grip. The sherd is red on the outside, and black on the inside and in cross-section. Length 4.3, width 3.7, thickness 1.0

N-39: Fragment of a robust brown handle. Length 5.1, width 3.2, thickness 2.0

N-40: Fragment of the body of a vessel, with a plastic applique. Possibly the lower part of a horseshoe-shaped applique, or a hand-grip. Reddish-brown on the outside, dark brown on the inside, with brown cross-section. Length 4.1, width 6.1, thickness 1.3

N-41: Fragment of the body of a vessel with traces of black paint. The outside surface is beige-brown in colour, the inside is black, with black cross-section. Length 2.9, width 3.3, thickness 0.6

N-42: Fragment of the body of a vessel with a fishbone motif rendered with shallow incisions. Length 3.2, width 2.9, thickness 0.4

N-43: Fragment of the body of a vessel with a plastic applique decorated with finger impressions. The sherd is brown. Length 4.9, width 3.5, thickness 1.3

N-45: Fragment of a straight thinned rim, black and of a coarse fabric. Height 1.9, width 1.9, thickness 1.4

N-46: Fragment of a reddish-grey strap handle. A central groove is clearly visible. Similar to N-7. Length 3.0, width 2.2, thickness 1.3

N-47: Poorly-preserved fragment of a strap handle, with polished dark-brown surface and grey cross-section. Length 3.2, width 2.4, thickness 1.1

N-48: Fragment of a straight uniform rim of black colour. The surface is polished on both in-

unutarnje i vanjske strane, a sam ulomak je perforiran nakon pečenja. Visina 3,3, širina 2,5, debljina 0,5.

N-49: Ulomak ravnoga jednolikog ruba. Boja je sivo-bež. Vjerojatno pripada loncu. Visina 2,5, širina 2,0, debljina 0,8.

Sonda 3

N-50: Ulomak običnoga ravnog dna posude. Narančasto-smeđe boje izvana i u presjeku, a iznutra tamnosmeđe. Duljina 3,2, širina 3,1, debljina 0,9.

N-51: Ravno dno s blago naglašenom stajaćom površinom. Izvana i u presjeku smeđe boje, a iznutra crne. Visina 2,8, širina 3,8, debljina 1,7.

N-52: Izvučeni jednoliki rub amfore narančasto-smeđe boje izvana, a crne u presjeku. Duljina 4,7, širina 5,9, debljina 1,0.

N-53: Ulomak ravnog, jednolikog i zaravnjenog ruba. Vjerojatno pripada loncu. Tamnosmeđe boje izvana i iznutra, a u presjeku crn. Visina 4,6, širina 6,2, debljina 1,7.

N-54: Ulomak uvučenog, zadebljanog i zaravnjenog ruba zdjele crne boje. Visina 3,9, širina 5,5, debljina 0,8.

N-55: Ulomak izvučenoga suženog ruba lonca. Narančasto-smeđe boje s vanjskih strana, a crne boje u presjeku. Visina 6,0, širina 8,3, debljina 1,0.

N-56: Ulomak tijela ukrašen urezivanjem vertikalnih kratkih linija. Tamnosmeđe boje s crvenim mrljama na vanjskoj površini. U presjeku vidljive inkluzije kamena (oko 3 mm). Dio iste posude, kao i N-97, ali bez jasnog spoja. Duljina 6,6, širina 4,7, debljina 1,0.

N-57: Ulomak dna tamnosmeđe boje na debeloj prstenastoj nozi. Duljina 5,0, širina 3,3, debljina 1,9.

N-58: Ulomak ravnog dna, smeđe boje, s blago naglašenom stajaćom površinom. Duljina 9,4, širina 6,9, debljina 1,0.

N-59: Ulomak smeđeg dna s izvučenom stajaćom površinom. Duljina 4,9, širina 4,5, debljina 0,9.

side and outside, and the sherd was perforated after the firing. Length 3.3, width 2.5, thickness 0.5

N-49: Fragment of a straight uniform rim of grey-beige colour. Most probably belonged to a pot. Height 2.5, width 2.0, thickness 0.8

Trench 3

N-50: Fragment of an ordinary flat bottom of a vessel. Orange-brown on the outside and in cross-section, and dark brown on the outside. Length 3.2, width 3.1, thickness 0.9

N-51: Flat bottom with a slightly emphasized standing surface. Brown on the outside and in cross-section, black on the inside. Height 2.8, width 3.8, thickness 1.7

N-52: Everted uniform amphora rim, orange-brown on the outside, with black cross-section. Length 4.7, width 5.9, thickness 1.0

N-53: Fragment of a flat, uniform and flattened rim. Probably part of a pot. Dark brown on the outside and inside, with black cross-section. Height 4.6, width 6.2, thickness 1.7

N-54: Fragment of an inverted, thickened and flattened rim of a black bowl. Height 3.9, width 5.5, thickness 0.8

N-55: Fragment of an everted thinned pot rim. Orange-brown on the outside, with black cross-section. Height 6.0, width 8.3, thickness 1.0

N-56: Fragment of a body decorated with incised vertical short lines. The outside surface is dark brown with red stains. The cross-section reveals stone inclusions (around 3 mm). Part of the same vessel as N-97, but not clearly adjoining. Length 6.6, width 4.7, thickness 1.0

N-57: Fragment of a dark-brown bottom on a thick ring-shaped foot. Length 5.0, width 3.3, thickness 1.9

N-58: Fragment of a flat brown bottom, with a slightly emphasized standing surface. Length 9.4, width 6.9, thickness 1.0

N-59: Fragment of a brown bottom with an everted standing surface. Length 4.9, width 4.5, thickness 0.9

N-60: Fragment of an everted uniform rim deco-

N-60: Ulomak izvučenoga jednolikog ruba ukrašenog utiskivanjem prstom. Izvana je crvene boje, a iznutra crne. Crne mrlje vidljive po vanjskoj strani. Presjek je taman. Visina 6,6, širina 7,3, debljina 1,1.

N-61: Ulomak ravnoga jednolikog ruba, smeđe boje, s tragovima urezivanja na rubu. Visina 3,7, širina 4,2, debljina 1,3.

N-62: Koljenasto profilirana ručka narančasto-bež boje. Visina 4,2, širina 7,9, debljina 1,2.

N-63: Ulomak prebačenog ruba posude crne boje. Rub je jednolik i ukrašen pseudovrpčastim ukrasom. Visina 1,3, širina 5,0, debljina 0,6.

N-64: Ulomak tijela posude crne boje s ručkom cothon tipa. Visina 7,3, širina 11,1, debljina 0,7.

N-65: Ulomak izvučenog jednolikog ruba amfore, smeđe boje. Visina 2,8, širina 5,4, debljina 0,9.

N-66: Ulomak ravnoga zadebljanog ruba lonca. Na tijelu ispod ruba vidljiva je potkovičasta aplikacija, ali obrnuto okrenuta, u obliku slova U. Vanjske površine su crvene boje, a presjek je crne. Visina 5,2, širina 6,0, debljina 1,2.

N-67: Ulomak ravnog zadebljanog ruba posude na kojem su vidljivi tragovi utiskivanja prstom. Izvana i iznutra je smeđe boje, a crnog presjeka. Visina 2,1, širina 2,6, debljina 1,0.

N-68: Ulomak ravnoga suženog ruba posude, vjerojatno zdjele. Crne je boje. Visina 5,2, širina 3,2, debljina 0,9.

N-69: Ulomak izvučenoga suženog ruba sive posude. Visina 3,1, širina 2,7, debljina 0,8.

N-70: Ulomak izvučenoga jednolikog i zaravnjenog ruba posude. Izvana je smeđe boje, a iznutra i u presjeku crne. Visina 2,6, širina 3,5, debljina 0,9.

N-71: Ulomak izvučenoga jednolikog i zaravnjenog ruba posude tamnosmeđe boje i uglačane površine. Visina 4,3, širina 4,5, debljina 0,9.

N-72: Ulomak ravnog dna s naglašenom

rated with finger impressions. Red on the outside, black on the inside. On the outside, there are black stains. The cross-section is dark. Height 6.6, width 7.3, thickness 1.1

N-61: Fragment of a straight uniform rim of brown colour, with traces of incisions on the rim. Height 3.7, width 4.2, thickness 1.3

N-62: Knee-shaped handle of orange-beige colour. Height 4.2, width 7.9, thickness 1.2

N-63: Fragment of the downward-pointing everted rim of a black vessel. The rim is uniform and decorated with pseudo-cord decoration. Height 1.3, width 5.0, thickness 0.6

N-64: Fragment of the body of a black vessel, with a handle of *cothon* type. Height 7.3, width 11.1, thickness 0.7

N-65: Fragment of an everted uniform amphora rim of brown colour. Height 2.8, width 5.4, thickness 0.9

N-66: Fragment of a straight thickened pot rim. A horseshoe-shaped applique is visible below the rim, but it is turned upside down, in a U shape. The outside surface is red, and the cross-section black. Height 5.2, width 6.0, thickness 1.2

N-67: Fragment of a straight thickened rim of a vessel, with visible traces of finger impressions. Brown on the inside and outside, with black cross-section. Height 2.1, width 2.6, thickness 1.0

N-68: Fragment of a straight thinned rim of a vessel, probably a bowl. The sherd is black. Height 5.2, width 3.2, thickness 0.9

N-69: Fragment of an everted thinned rim of a grey vessel. Height 3.1, width 2.7, thickness 0.8

N-70: Fragment of an everted, uniform and flattened rim of a vessel. Brown on the outside, black on the inside and in cross-section. Height 2.6, width 3.5, thickness 0.9

N-71: Fragment of an everted, uniform and flattened rim of a dark-brown vessel, with a polished surface. Height 4.3, width 4.5, thickness 0.9

N-72: Fragment of a brown flat bottom with an emphasized standing surface. Length 6.3, width 4.5, thickness 0.9

N-73: Fragment of a straight thinned rim of a

stajaćom površinom smeđe boje. Duljina 6,3, širina 4,5, debljina 0,9.

N-73: Ulomak ravnog suženog ruba posude. Izvana je bež boje, a iznutra tamno sive. Visina 3.8, širina 4.4, debljina 1.2

N-74: Ulomak ravnoga suženog ruba. Sivocrne je boje s obje strane te uglačanih površina. Visina 4,8, širina 3,2, debljina 1,1.

N-75: Ulomak ručke trokutastog presjeka. Crne je boje. Duljina 2,9, širina 2,1, debljina 1,4.

N-76: Ulomak tijela posude crvenkasto-crne boje s početkom trakaste ručke. Duljina 4,8, širina 2,7, debljina 0,5.

N-77: Ulomak ravnog, jednolikog i blago zaravnjenog ruba. Ulomak je smeđe boje. Visina 5,2, širina 3,8, debljina 2,0.

N-78 i N-83: Dva ulomka izvučenoga jednolikog ruba lonca. Rub je ukrašen urezivanjem. Crvenkasto-smeđe boje izvana, a crnog presjeka. Visina 5,1, širina 11,4, debljina 1,2.

N-79: Ulomak ravnoga jednolikog ruba posude smeđe boje. Visina 2,6, širina 4,3, debljina 0,8.

N-80: Gotovo čitavo obično ravno dno lonca s tragovima gorenja s donje strane. Iznutra narančaste boje, a izvana smeđe s tragovima gorenja. U presjeku je smeđe boje. Promjer dna 9,3, debljina 1,6.

N-81: Ulomak tijela posude s početkom trakaste ručke tamnosive boje. Duljina 3,3, širina 2,2, debljina 0,6.

N-82: Ulomak tijela posude sa širokim plitkim kanelurama. Smeđe boje izvana i u presjeku, a iznutra narančaste. Duljina 5,3, širina 4,1, debljina 0,9.

N-84: Ulomak blago izvučenoga jednolikog ruba narančasto-smeđe boje. Visina 2,8, širina 5,2, debljina 1,0.

N-85: Ulomak blago izvučenoga jednolikog i zaravnjenog ruba pithosa crne boje. Visina 6,4, širina 8,3, debljina 1,7.

N-86: Ulomak tijela posude s motivom kaneliranih koncentričnih kružnica s vanjske strane posude. Vanjska je strana crna, unutarnja crvenkasto-smeđa, a presjek crn. Širina 4,1, duljina 4,6, debljina 1,2.

vessel. Beige on the outside, dark grey on the inside. Height 3.8, width 4.4, thickness 1.2

N-74: Fragment of a straight thinned rim. Grey-black on both sides, with polished surfaces. Height 4.8, width 3.2, thickness 1.1

N-75: Fragment of a black handle with triangular cross-section. Length 2.9, width 2.1, thickness 1.4

N-76: Fragment of the reddish-black body of a vessel, with the initial segment of a strap handle. Length 4.8, width 2.7, thickness 0.5

N-77: Fragment of a straight, uniform and slightly flattened rim. The sherd is brown. Height 5.2, width 3.8, thickness 2.0

N-78 and N-83: Two fragments of an everted uniform pot rim. The rim is decorated with incisions. It is reddish-brown on the outside, with black cross-section. Height 5.1, width 11.4, thickness 1.2

N-79: Fragment of a straight uniform rim of a brown vessel. Height 2.6, width 4.3, thickness 0.8

N-80: An almost whole ordinary flat pot bottom, with traces of burning on the lower side. Orange on the inside, brown with traces of burning on the outside. The cross-section is brown. Bottom diameter 9.3, thickness 1.6

N-81: Fragment of the body of a vessel with the initial segment of a strap handle, of a dark-grey colour. Length 3.3, width 2.2, thickness 0.6

N-82: Fragment of the body of a vessel, with wide shallow fluting. Brown on the outside and in cross-section, orange on the inside. Length 5.3, width 4.1, thickness 0.9

N-84: Fragment of a slightly everted uniform rim of orange-brown colour. Height 2.8, width 5.2, thickness 1.0

N-85: Fragment of a slightly everted, uniform and flattened rim of a black pithos. Height 6.4, width 8.3, thickness 1.7

N-86: Fragment of the body of a vessel, decorated with fluted motif of concentric circles on the outside. The outside surface is black, the inside is reddish-brown, and the cross-section is black. Length 4.6, width 4.1, thickness 1.2

N-87: Fragment of the body of a black vessel, with incised fishbone motif. Length 3.1, width 2.6, thickness 0.4

N-87: Ulomak tijela posude crne boje s urezanim motivom riblje kosti. Duljina 3,1, širina 2,6, debljina 0,4.

N-88: Ulomak tijela posude crne boje s urezanim paralelnim ravnim crtama. Duljina 1,9, širina 1,8, debljina 0,4.

N-89: Ulomak uglačanog, blago izvučenoga jednolikog ruba. S vanjske strane je tamnonarančaste boje, a s unutarnje i u presjeku tamnosive. Visina 2,4, širina 3,6, debljina 1,2.

N-90: Ulomak običnoga ravnog dna posude. S vanjske je strane crne boje, a s unutarnje crvene. Presjek je crne boje. Dužina 6,5, širina 3,6, debljina 1,0.

N-91: Ulomak izvučenoga jednolikog i zaravnjenog ruba. Površina je s obje strane crvenkasto-smeđa. Visina 1,9, širina 3,0, debljina 0,7.

N-92: Ulomak blago izvučenoga, gotovo ravnog ruba. Rub je jednolik i ukrašen utiskivanjem. Crvenkasto-smeđe boje izvana, a iznutra i u presjeku crne. Visina 3,5, širina 2,7, debljina 0,6.

N-93: Ulomak izvučenoga jednolikog i zaravnjenog ruba zdjele crne boje. Visina 1,5, širina 1,5, debljina 0,7.

N-94: Ulomak ravnoga jednolikog i zaravnjenog ruba. Izvana smeđe boje, a iznutra crne. Visina 1,7, širina 2,0, debljina 0,9.

N-95: Početak trakaste ručke. Površina je crvenkasto-crne boje, a presjek je crne. Duljina 2,5, širina 2,8, debljina 1,2.

N-96: Ulomak običnoga ravnog dna posude s tragovima gorenja. Izvana je bež boje s tragovima gorenja, a iznutra crne. Presjek je bež boje. Duljina 8,1, širina 2,6, debljina 1,1.

N-97: Ulomak tijela ukrašen urezivanjem kratkih vertikalnih linija. Tamnosmeđe je boje. U presjeku vidljive inkluzije kamena (oko 3 mm). Dio iste posude, kao i N-56. Duljina 5,0, širina 3,4, debljina 1,0.

N-98: Dio ručke peterokutnog presjeka. Izvana je smeđe boje, a u presjeku crne. Površina je uglačana. Duljina 4,1, promjer 1,6.

N-99: Ulomak tijela posude crne boje s tragovima urezivanja u obliku ravnih linija. Duljina 2,0, širina 2,2, debljina 0,4.

N-88: Fragment of the body of a black vessel with incised parallel straight lines. Length 1.9, width 1.8, thickness 0.4

N-89: Fragment of a slightly inverted uniform polished rim. The outside surface is dark orange, and the inside and cross-section are dark grey. Height 2.4, width 3.6, thickness 1.2

N-90: Fragment of an ordinary flat bottom of a vessel. Its outside surface is black, and the inside red. The cross-section is black. Length 6.5, width 3.6, thickness 1.0

N-91: Fragment of an everted, uniform and flattened rim, reddish-brown on both sides. Height 1.9, width 3.0, thickness 0.7

N-92: Fragment of a slightly everted, nearly straight rim. The rim is uniform and decorated with impressions. It is reddish-brown on the outside, and black on the inside and in cross-section. Height 3.5, width 2.7, thickness 0.6

N-93: Fragment of an everted, uniform and flattened rim of a black bowl. Height 1.5, width 1.5, thickness 0.7

N-94: Fragment of a straight, uniform and flattened rim. Brown on the outside, and black on the inside. Height 1.7, width 2.0, thickness 0.9

N-95: The initial segment of a strap handle. The surface is reddish-black, and the cross-section black. Length 2.5, width 2.8, thickness 1.2

N-96: Fragment of an ordinary flat bottom of a vessel, with traces of burning. The outside surface is beige with traces of burning, and the inside is black. The cross-section is beige. Length 8.1, width 2.6, thickness 1.1

N-97: Fragment of a body decorated with incised vertical short lines. The sherd is dark brown. The cross-section reveals stone inclusions (around 3 mm). Part of the same vessel as N-56. Length 5.0, width 3.4, thickness 1.0

N-98: Part of a handle of pentagonal cross-section. The outside is brown, and the cross-section black. The surface is polished. Length 4.1, diameter 1.6

N-99: Fragment of the body of a black vessel, with traces of incised straight lines. Length 2.0, width 2.2, thickness 0.4

N-100: Fragment of the body of a brown vessel, with a horseshoe-shaped applique. Length 5.5, width 7.2, thickness 0.9

N-100: Ulomak tijela posude smeđe boje s potkovičastom aplikacijom. Duljina 5,5, širina 7,2, debljina 0,9.

N-101: Ulomak tijela posude s dugmastom aplikacijom (drškom). Izvana crvenkasto-smeđe boje, iznutra i u presjeku tamnosmeđe. Duljina 9,3, širina 5,9, debljina 1,1.

N-102: Ulomak tijela posude smeđe boje s plitkim i širokim kanelurama. Duljina 9,4, širina 5,1, debljina 0,9.

N-103: Ulomak ravnoga zadebljanog ruba ukrašenog utiskivanjem. Crvenkasto-smeđe boje izvana, a tamnosmeđe iznutra i u presjeku. Visina 2,9, širina 3,6, debljina 0,7.

N-104: Obično ravno dno smeđe boje. Duljina 3,4, širina 5,2, debljina 0,9.

N-105: Ulomak tijela posude s tragovima glačanja s unutrašnje strane. Glačanje je izvedeno u obliku širokih paralelnih linija. Duljina 6,9, širina 4,7, debljina 0,8.

N-106: Ulomak ravnoga jednolikog ruba. Tamnosive je boje. Visina 1,6, širina 2,1, debljina 0,7.

N-107: Ulomak tijela posude s iznimno plitkim kanelurama. Površina je uglačana. Crvenkasto-smeđe boje. Duljina 9,2, širina 7,9, debljina 0,7.

N-108: Ulomak izvučenoga jednolikog ruba. Smeđe je boje. Visina 2,2, širina 2,4, debljina 0,6.

N-109: Ulomak izvučenoga jednolikog ruba amfore. Izvana je smeđe boje, a iznutra tamnosmeđe s crvenkastim mrljama. U presjeku je smeđe boje. Visina 3,6, širina 4,8, debljina 0,8.

N-110: Ulomak ravnog dna tanjura. Izvana i iznutra je crvene boje, a presjek je crn. Duljina 4,0, širina 4,2, debljina 1,1.

N-111: Ulomak blago izvučenoga jednolikog ruba. S unutarnje i vanjske strane je tamnosmeđe boje, a crnog presjeka. Visina 2,2, širina 2,2, debljina 1,0.

N-112: Dva ulomka izvučenoga jednolikog ruba amfore. Izvana je narančaste boje, iznutra tamnosmeđe, a u presjeku crne. Duljina 4,4, širina 10,1, debljina 1,3.

N-113: Ulomak ravnoga jednolikog ruba. Uglačane unutarnje i vanjske površine. Boja

N-101: Fragment of the body of a vessel with a button-shaped applique (hand-grip). Reddish-brown on the outside, dark brown on the inside and in cross-section. Length 9.3, width 5.9, thickness 1.1

N-102: Fragment of the body of a brown vessel, with shallow and wide fluting. Length 9.4, width 5.1, thickness 0.9

N-103: Fragment of a straight thickened rim decorated with impressions. The outside surface is reddish-brown, and the inside and cross-section are dark brown. Height 2.9, width 3.6, thickness 0.7

N-104: An ordinary flat brown bottom. Length 3.4, width 5.2, thickness 0.9

N-105: Fragment of the body of a vessel, with traces of polishing on the inside. The polishing is rendered as wide parallel lines. Length 6.9, width 4.7, thickness 0.8

N-106: Fragment of a straight uniform rim. It is dark grey in colour. Height 1.6, width 2.1, thickness 0.7

N-107: Fragment of the body of a vessel, with very shallow fluting. The surface is polished. Length 9.2, width 7.9, thickness 0.7

N-108: Fragment of an everted uniform rim of brown colour. Height 2.2, width 2.4, thickness 0.6

N-109: Fragment of an everted uniform amphora rim. It is brown on the outside, and dark brown with reddish stains on the inside. The cross-section is brown. Height 3.6, width 4.8, thickness 0.8

N-110: Fragment of a flat plate bottom. Both the outside and inside surfaces are red, the cross-section is black. Length 4.0, width 4.2, thickness 1.1

N-111: Fragment of a slightly everted uniform rim. It is dark brown on both the outside and the inside, with black cross-section. Height 2.2, width 2.2, thickness 1.0

N-112: Two fragments of an everted uniform amphora rim. Orange on the outside, dark brown on the inside, with black cross-section. Length 4.4, width 10.1, thickness 1.3

N-113: Fragment of a straight uniform rim. Both surfaces are polished, and of black-brown col-

je crno-smeđa. Visina 2,4, širina 2,7, debljina 1,2.

N-114: Ulomak tijela posude s plitkim i širokim kanelurama. Izvana je smeđe boje, a iznutra crne. Duljina 5,4, širina 4,3, debljina 0,9.

N-115: Ulomak tijela posude s plitkim i širokim kanelurama. Izvana bež-smeđe boje, a iznutra crne. Duljina 2,5, širina 2,3, debljina 0,9.

N-116: Ulomak izvučenoga jednolikog ruba. Tamnosive je boje. Visina 2,4, širina 2,2, debljina 0,5.

N-117: Ulomak izvučenoga jednolikog ruba. Smeđe je boje. Visina 3,7, širina 4,4, debljina 1,4.

N-118: Ulomak ravnog, blago zadebljanog ruba. Smeđe je boje. Visina 3,3, širina 2,1, debljina 1,0.

N-119: Ulomak izvučenoga jednolikog ruba smeđe boje. Rub je ukrašen utiskivanjem prstima. Visina 3,8, širina 5,3, debljina 0,8.

N-120: Ulomak tijela posude ukrašen kanelurama. Vidljiva blaga zakrivljenost kanelura te je vjerojatno riječ o kružnicama. Moguće je da pripada istoj posudi kao i N-86. Crne je boje izvana i u presjeku, a crvene iznutra. Duljina 4,7, širina 3,3, debljina 1,1.

N-121: Ulomak dna s izraženom stajaćom površinom. Duljina 3,4, širina 2,7, debljina 1,6.

N-122: Ulomak ruba. Orijentacija je ruba ravna, ali je na samom vrhu izvučen horizontalno prema van. Ulomak je crvenkasto-crne boje. Visina 3,5, širina 3,4, debljina 1,4.

N-123: Ulomak izljeva posude smeđe boje. Duljina 5,1, širina 2,8, debljina 0,7.

N-124: Dva ulomka ručke O presjeka koja na rubovima prelazi u D presjek. Ručka je tamnosmeđe boje. Duljina 6,1, promjer 1,9.

N-125: Ulomak izvučenoga jednolikog ruba amfore s kaneliranim koncentričnim kružnicama. Ulomak je crne boje. Duljina 3,6, širina 4,9, debljina 1,2.

N-126: Ulomak izvučenoga jednolikog i blago zaravnjenog ruba, vjerojatno lonca ili pithosa. Narančaste je boje. Visina 5,9, širina 8,2, debljina 1,4.

our. Height 2.4, width 2.7, thickness 1.2

N-114: Fragment of the body of a vessel with shallow and wide fluting. Brown on the outside, black on the inside. Length 5.4, width 4.3, thickness 0.9

N-115: Fragment of the body of a vessel with shallow and wide fluting. Beige-brown on the outside, and black on the inside. Length 2.5, width 2.3, thickness 0.9

N-116: Fragment of an everted uniform rim, of dark-grey colour. Height 2.4, width 2.2, thickness 0.5

N-117: Fragment of an everted uniform rim, of brown colour. Height 3.7, width 4.4, thickness 1.4

N-118: Fragment of a straight, slightly thickened rim, of brown colour. Height 3.3, width 2.1, thickness 1.0

N-119: Fragment of an everted uniform rim of brown colour. The rim is decorated with finger impressions. Height 3.8, width 5.3, thickness 0.8

N-120: Fragment of the body of a vessel decorated with fluting. The fluting is slightly curved, so it may have formed circles. It could belong to the same vessel as N-86. Its outside and cross-section are black, and the inside is red. Length 4.7, width 3.3, thickness 1.1

N-121: Fragment of a bottom with an emphasized standing surface. Length 3.4, width 2.7, thickness 1.6

N-122: Fragment of a rim. The rim orientation is straight, but at the very top it is horizontally everted. The sherd is reddish-black. Height 3.5, width 3.4, thickness 1.4

N-123: Fragment of a spout of brown colour. Length 5.1, width 2.8, thickness 0.7

N-124: Two fragments of a handle with O-shaped cross-section, turning into D-shaped cross-section at the ends. The handle is dark brown. Length 6.1, diameter 1.9

N-125: Fragment of an everted uniform amphora rim with fluted concentric circles. The sherd is black. Length 0.7, width 4.9, thickness 1.2

N-126: Fragment of an everted, uniform and slightly flattened rim, probably belonging to a pot or pithos. The sherd is orange. Height 5.9, width 8.2, thickness 1.4

N-127: Ulomak izvučenog, blago suženog ruba. Vjerojatno dio šalice crne boje. Visina 1,6, širina 1,3, debljina 0,7.

N-128: Ulomak tijela posude ukrašen ubadanjem štapićem. Duljina 5,3, širina 4,0, debljina 1,1.

N-129: Ulomak blago izvučenoga jednolikog ruba. Rub je oblikovan da djeluje blago valovito. Ulomak je tamnosmeđe boje. Visina 3,1, širina 4,0, debljina 0,6.

N-130: Dio ručke O presjeka tamnosive boje. Na kraju prelazi u trakastu. Duljina 4,2, promjer 1,8.

N-131: Ulomak ravnoga jednolikog i zaravnjenog ruba. Izvana je narančasto-smeđe boje, u presjeku sive, a iznutra tamnosmeđe. Visina 4,2, širina 2,6, debljina 0,7.

N-132: Ulomak tijela posude s apliciranom plastičnom trakom i utiskivanjem štapićem na njoj. Ulomak je narančasto-smeđe boje izvana i u presjeku, a iznutra tamnosmeđe. Duljina 4,5, širina 5,3, debljina 0,9.

N-133: Ulomak tijela posude sa širokim i plitkim kaneliranjem. Vanjska i unutarnja strana narančaste je boje, a presjek sive. Dužina 3,6, širina 3,4, debljina 0,8.

N-134: Ulomak tijela s apliciranom plastičnom trakom ukrašenom utiskivanjem nokta. Visina 3,3, širina 3,5, debljina 0,8.

N-135: Ulomak ravnog, blago zadebljanog ruba. Ulomak je smeđe boje. Visina 2,5, širina 3,4, debljina 0,8.

N-136: Ulomak debelog ravnoga dna. U presjeku i iznutra je tamnosmeđe boje, a nešto svjetlije smeđe boje s vanjske strane. Duljina 6,6, širina 2,9, debljina 1,0.

N-137: Mali ulomak ravnoga suženog ruba. Vjerojatno je dio zdjele tamnosive boje. Visina 1,7, širina 2,1, debljina 0,9.

N-138: Ulomak običnoga ravnog dna. Izvana i iznutra je narančasto-smeđe boje, a u presjeku crn. Slabo očuvan. Duljina 2,8, širina 2,7, debljina 1,7.

N-139: Oštećena trakasta ručka. S vanjske je strane narančasto-smeđe boje, a u presjeku tamnosmeđe. Duljina 4,6, širina 2,5, debljina 0,7.

N-127: Fragment of an everted, slightly thinned rim. Probably part of a black cup. Height 1.6, width 1.3, thickness 0.7

N-128: Fragment of the body of a vessel, decorated with impressions made with a small stick. Length 5.3, width 4.0, thickness 1.1

N-129: Fragment of a slightly everted uniform rim. The rim is shaped in such a way that it appears slightly wavy. The sherd is dark brown. Height 3.1, width 4.0, thickness 0.6

N-130: Part of a dark-brown handle with O-shaped cross-section. Towards the end, it turns into a strap handle. Length 4.2, diameter 1.8

N-131: Fragment of a straight, uniform and flattened rim. It is orange-brown on the outside, dark brown on the inside, and the cross-section is grey. Height 4.2, width 2.6, thickness 0.7

N-132: Fragment of the vessel of a body with applied plastic strap with stick impressions on the strap. The sherd is orange-brown on the outside and in cross-section, and dark brown on the inside. Length 4.5, width 5.3, thickness 0.9

N-133: Fragment of the body of a vessel, with wide and shallow fluting. The outside and inside surfaces are orange, and the cross-section is grey. Length 3.6, width 3.4, thickness 0.8

N-134: Fragment of a body with applied plastic strap, decorated with fingernail impressions. Height 3.3, width 3.5, thickness 0.8

N-135: Fragment of a straight, slightly thickened rim. The sherd is brown. Height 2.5, width 3.4, thickness 0.8

N-136: Fragment of a thick flat bottom. The cross-section and the inside are dark brown, and the outside somewhat lighter brown. Length 6.6, width 2.9, thickness 1.0

N-137: Small fragment of a straight thinned rim. Possibly part of a dark-brown bowl. Height 1.7, width 2.1, thickness 0.9

N-138: Fragment of an ordinary flat bottom. The outside and inside surfaces are orange-brown, and the cross-section is black. Poorly preserved. Length 2.8, width 2.7, thickness 1.7

N-139: Damaged strap handle. It is orange-brown on the outside, with a dark brown cross-section. Length 4.6, width 2.5, thickness 0.7.

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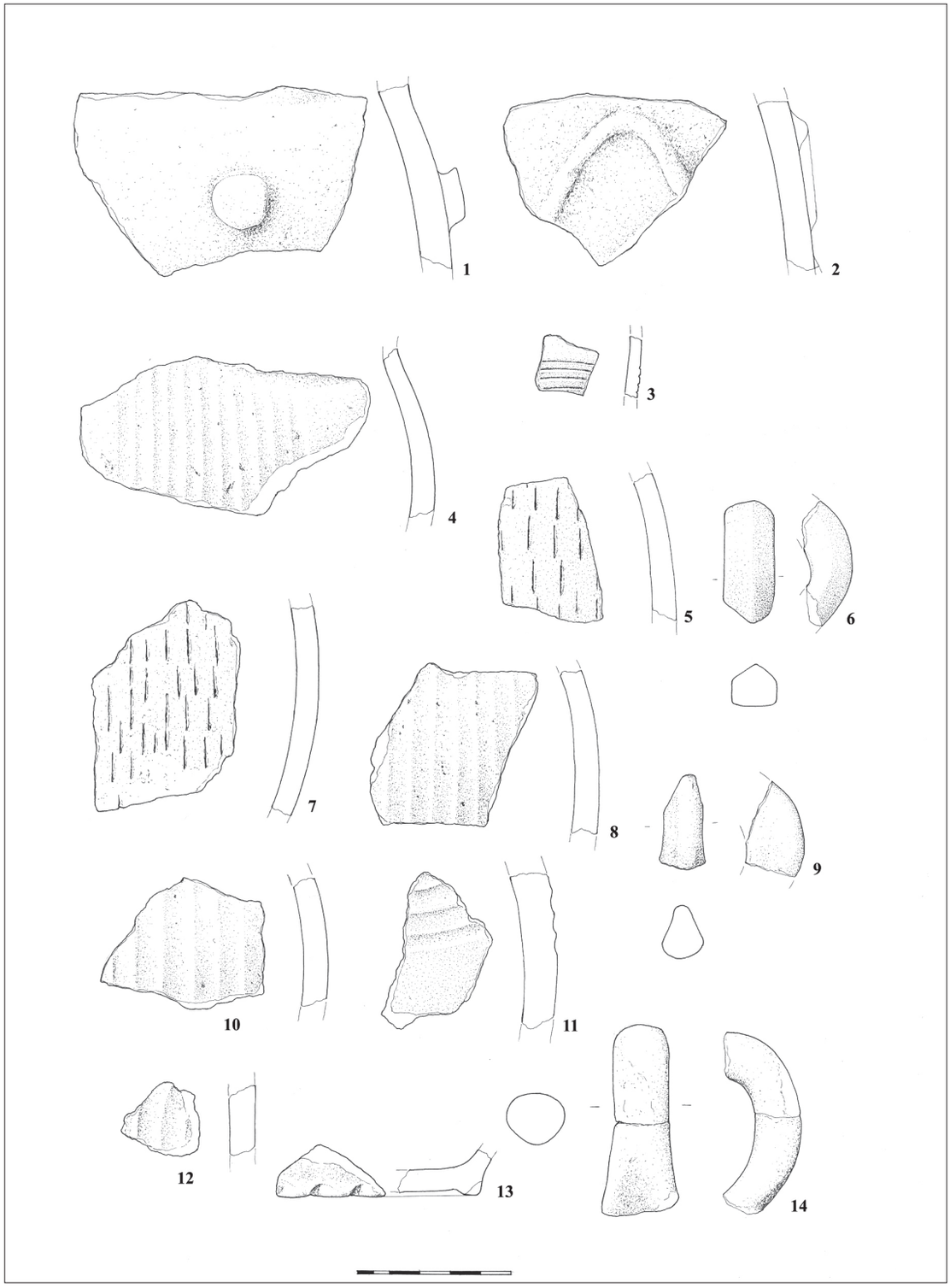

Tabla / Plate 1: 1 – Dugmasta aplikacija (N-101); 2 – Potkovičasta aplikacija (N-100); 3 – Urezivanje (N-99); 4 – Kaneliranje (N-102); 5 – Urezivanje (N-97); 6 – Ručka peterokutnog presjeka (N-98); 7 – Urezivanje (N-56); 8 – Kaneliranje (N-82); 9 – Ručka trokutastog presjeka (N-75); 10 – Kaneliranje (N-114); 11 – Žljebljenje (N-120); 12 – Kaneliranje (N-115); 13 – Aplicirana plastična traka ukrašena utiskivanjem nokta (N-134); 14 – Ručka (N-124) (izradila M. Galić).
/ 1. Button-shaped applique (N-101); 2. Horseshoe-shaped applique (N-100); 3. Incising (N-99); 4. Fluting (N-102); 5. Incising (N-97); 6. Handle with a pentagonal cross-section (N-98); 7. Incising (N-56); 8. Fluting (N-82); 9. Handle with a triangular cross-section (N-75); 10. Fluting (N-114); 11. Grooving (N-120); 12. Fluting (N-115); 13. Applied plastic strap decorated with fingernail impressions (N-134); 14. Handle (N-124) (made by M. Galić).

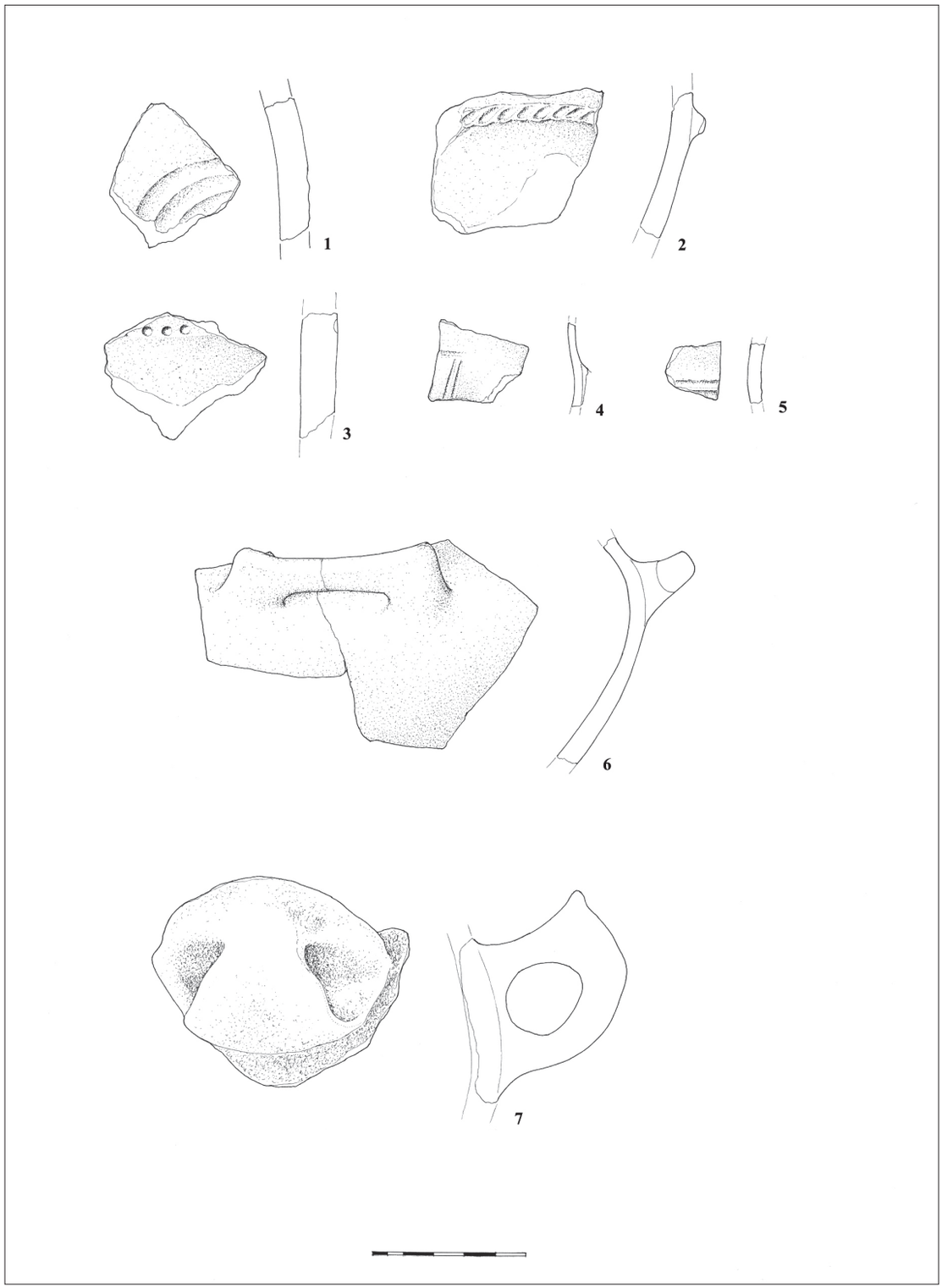

Tabla / Plate 2: 1 – Žljebljene koncentrične kružnice (N-86); 2 – Aplicirana plastična traka ukrašena utiskivanjem štapićem (N-132); 3 – Ubadanje (N-128); 4 – Urezivanje (motiv riblje kosti) (N-87); 5 – Urezivanje (N-88); 6 – Ručka cothon tipa (N-64); 7 – Koljenasto profilirana ručka (N-62). (izradila M. Galić). / 1. Grooved concentric circles (N-86); 2. Applied plastic strap decorated with impressions of a small stick (N-132); 3. Puncturing (N-128); 4. Incising (fishbone motif) (N-87); 5. Incising (N-88); 6. Handle of the *cothon* type (N-64); 7. Knee-shaped handle (N-62) (made by M. Galić).

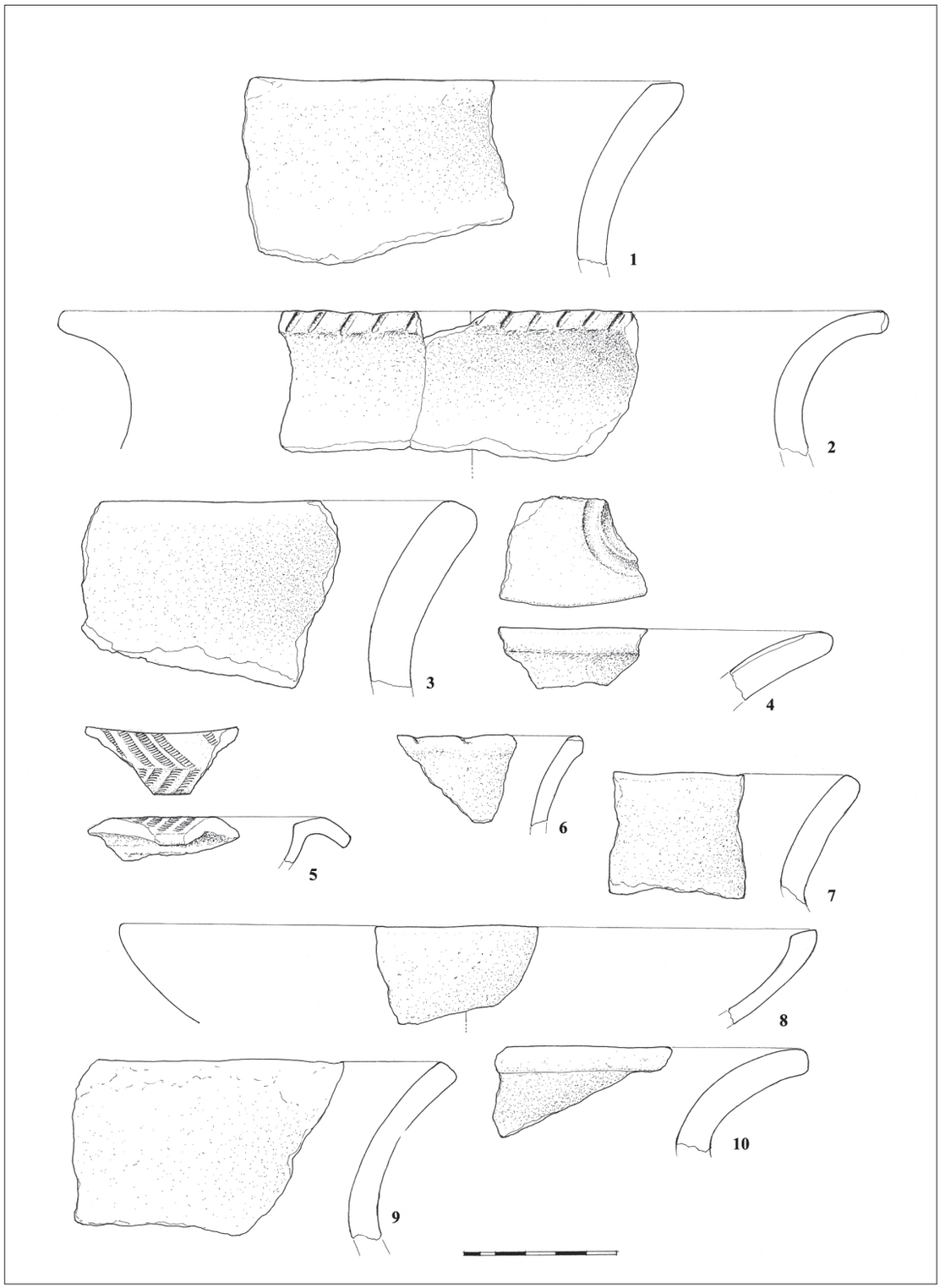

Tabla / Plate 3: 1 – Rub (N-126); 2 – Rub ukrašen urezivanjem (N-78 i N-83); 3 – Rub (N-85); 4 – Rub ukrašen motivom žljebljenih koncentričnih kružnica (N-125); 5 – Rub ukrašen pseudovrpčastim ukrasom (N-63); 6 – Rub (N-129); 7 – Rub (N-71); 8 – Rub (N-54); 9 – Rub (N-55); 10 – Rub (N-52) (izradila M. Galić). / 1. Rim (N-126); 2. Rim decorated with incisions (N-78 and N-83); 3. Rim (N-85); 4. Rim decorated with grooved motif of concentric circles (N-125); 5. Rim decorated with pseudo-cord decoration (N-63); 6. Rim (N-129); 7. Rim (N-71); 8. Rim (N-54); 9. Rim (N-55); 10. Rim (N-52) (made by M. Galić).

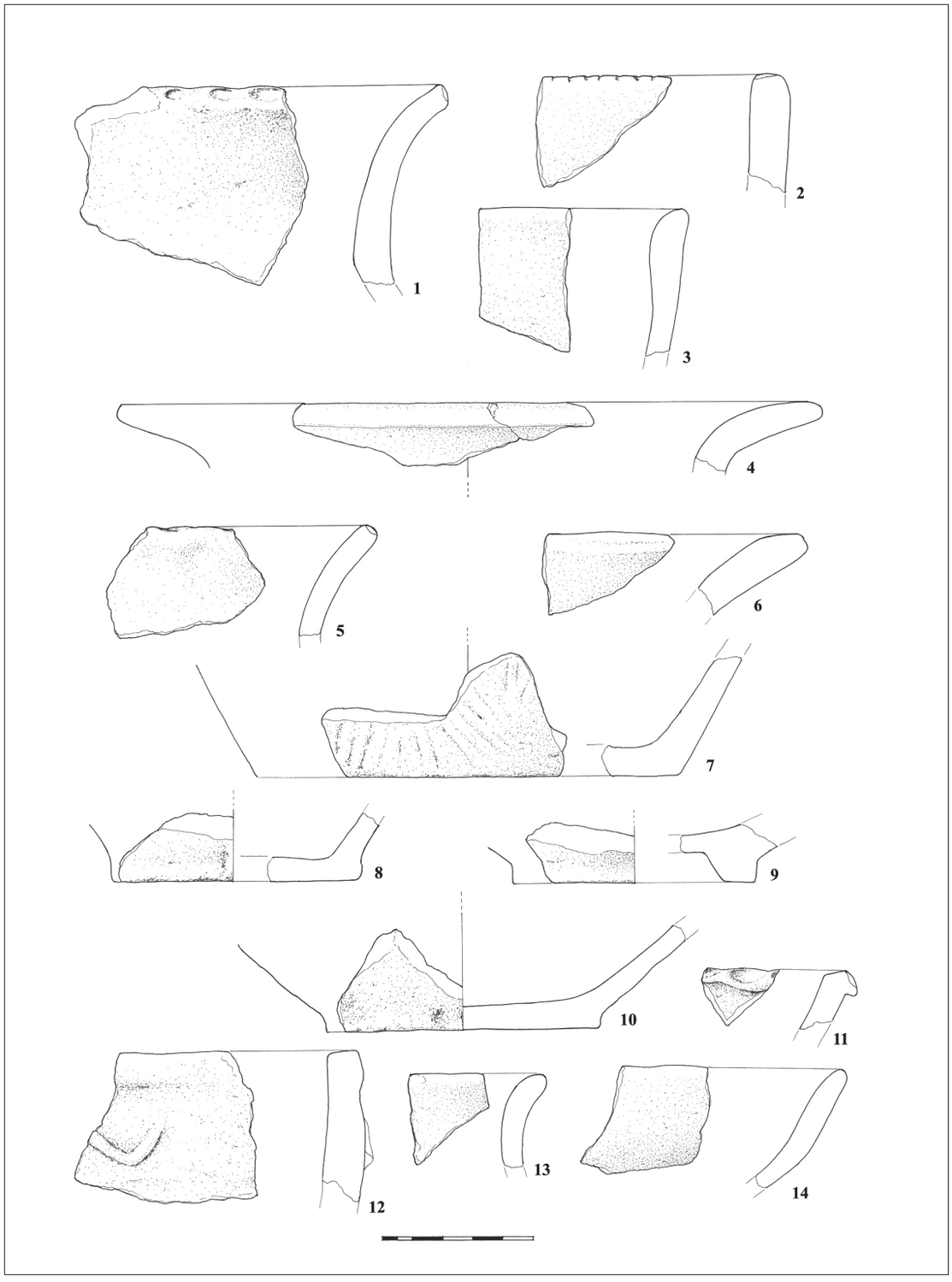

Tabla / Plate 4: 1 – Rub ukrašen utiskivanjem prstom (N-60); 2 – Rub ukrašen urezivanjem (N-61); 3 – Rub (N-74); 4 – Rub (N-112); 5 – Rub ukrašen utiskivanjem prstom (N-119); 6 – Rub (N-117); 7 – Dno (N-96); 8 – Dno (N-72); 9 – Dno na prstenastoj nozi (N-57); 10 – Dno (N-58); 11 – Rub ukrašen utiskivanjem prstom (N-67); 12 – Rub s potkovičastom aplikacijom (N-66); 13 – Rub (N-69); 14 – Rub (N-68) (izradila M. Galić). / 1. Rim decorated with finger impressions (N-60); 2. Rim decorated with incisions (N-61); 3. Rim (N-74); 4. Rim (N-112); 5. Rim decorated with finger impressions (N-119); 6. Rim (N-117); 7. Bottom (N-96); 8. Bottom (N-72); 9. Bottom on a ring-shaped foot (N-57); 10. Bottom (N-58); 11. Rim decorated with finger impressions (N-67); 12. Rim with a horseshoe-shaped applique (N-66); 13. Rim (N-69); 14. Rim (N-68) (made by M. Galić).

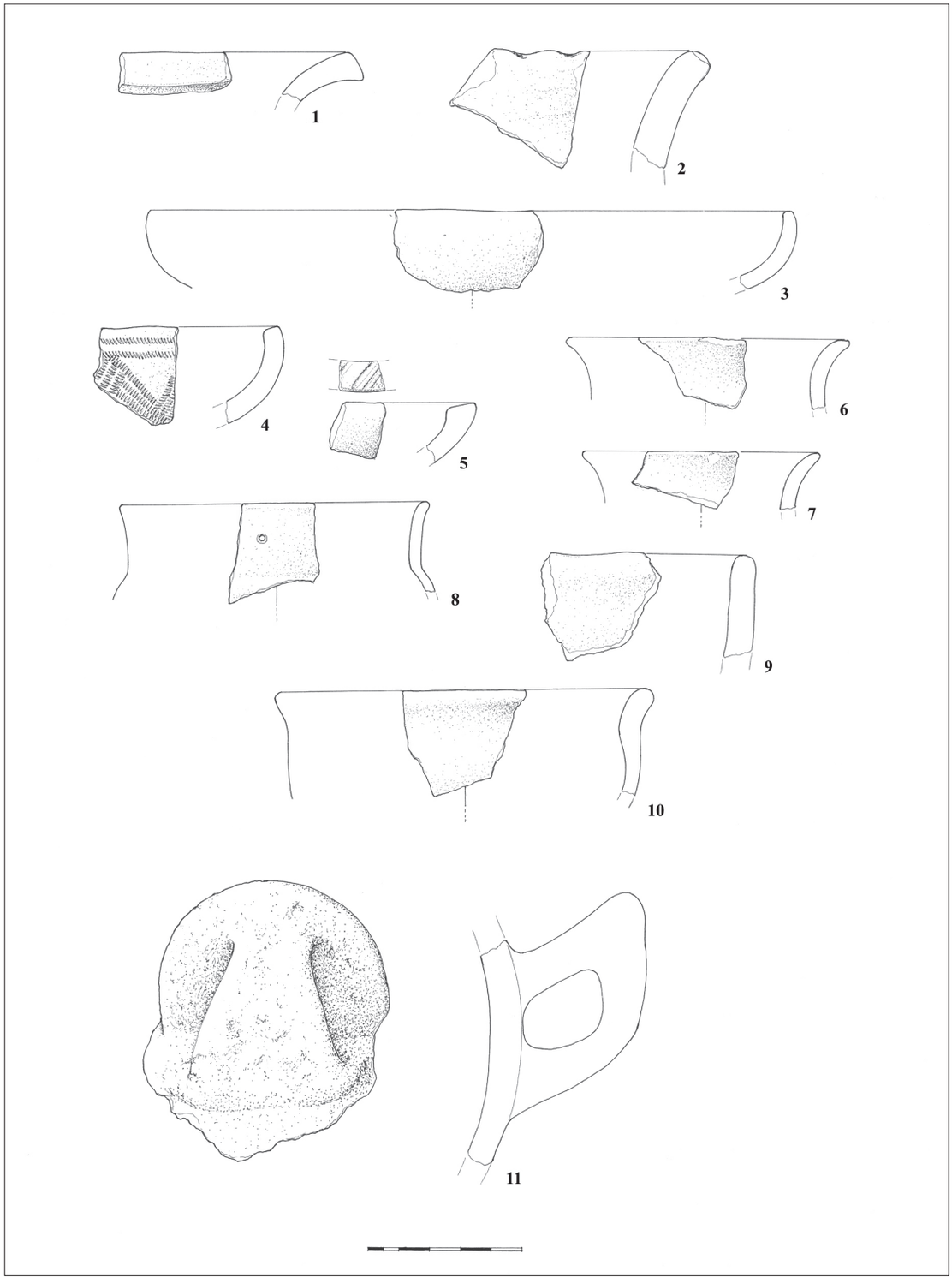

Tabla / Plate 5: 1 – Rub (N-70); 2 – Rub ukrašen utiskivanjem prstom (N-26); 3 – Rub (N-27); 4 – Rub ukrašen pseudovrpčastim ukrasom (N-29); 5 – Rub ukrašen urezivanjem i inkrustacijom (N-18); 6 – Rub (N-20); 7 – Rub (N-4); 8 – Rub s perforacijom (N-48); 9 – Rub (N-2); 10 – Rub (N-1); 11 – Koljenasto profilirana ručka (N-3) (izradila M. Galić). / 1. Rim (N-70); 2. Rim decorated with finger impressions (N-26); 3. Rim (N-27); 4. Rim decorated with pseudo-cord decoration (N-29); 5. Rim decorated with incisions and incrustation (N-18); 6. Rim (N-20); 7. Rim (N-4); 8. Rim with perforation (N-48); 9. Rim (N-2); 10. Rim (N-1); 11. Knee-shaped handle (N-3) (made by M. Galić).

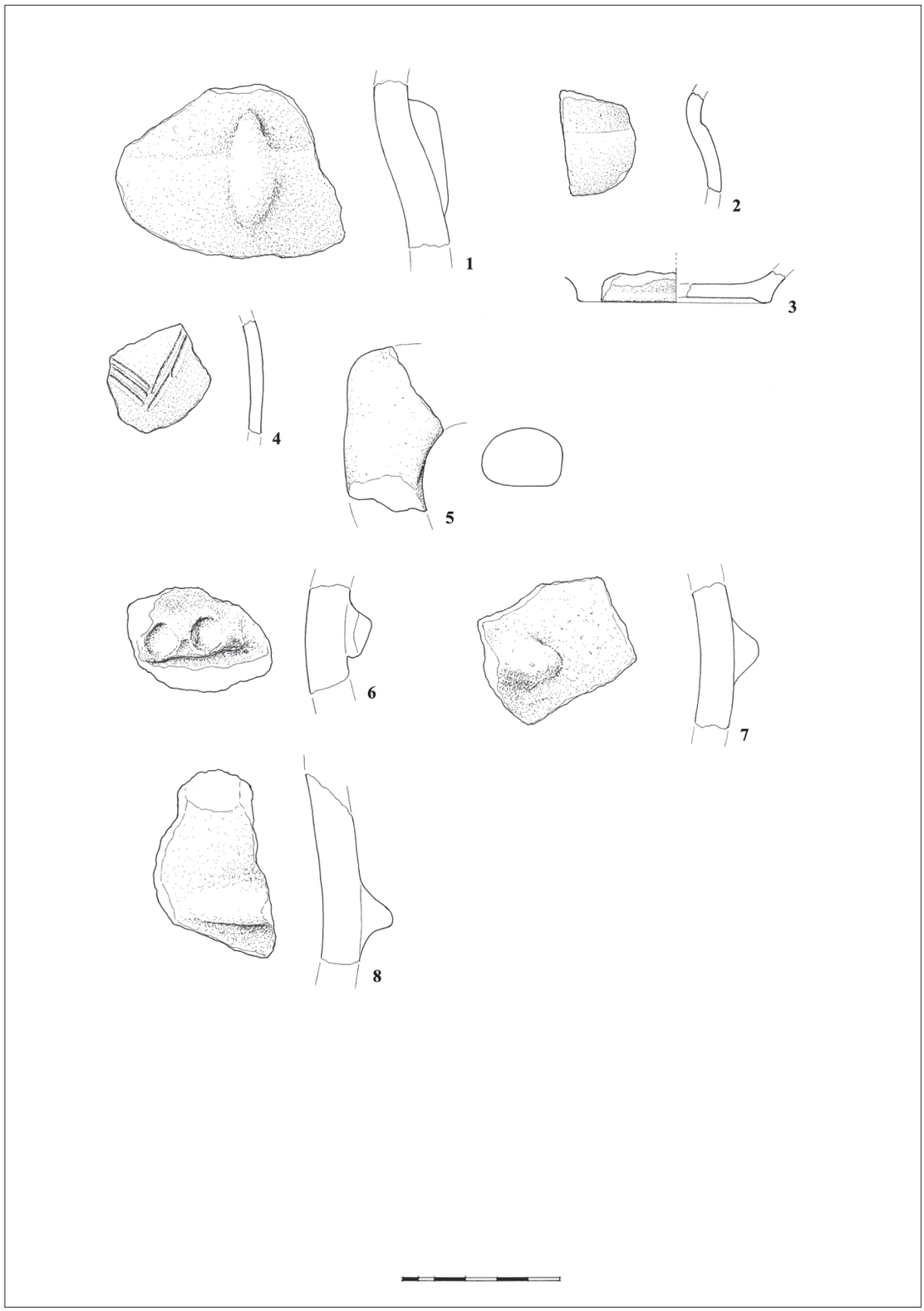

Tabla / Plate 6: 1 – Klinasta plastična aplikacija (N-12); 2 – Profilacija (N-23); 3 – Prstenasto dno (N-28); 4 – Urezivanje (N-42); 5 – Ručka (N-39); 6 – Plastična aplikacija ukrašena utiskivanjem prstom (N-43); 7 – Aplikacija (N-38); 8 – Aplikacija (N-40) (izradila M. Galić). / 1. Wedge-shaped plastic applique (N-12); 2. Profile (N-23); 3. Ring-shaped bottom (N-28); 4. Incising (N-42); 5. Handle (N-39); 6. Plastic applique decorated with finger impressions (N-43); 7. Applique (N-38); 8. Applique (N-40) (made by M. Galić).

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Coin circulation in the pre-Imperial period in north-west Croatia

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The paper will in the first place analyse in detail all pre-Imperial individual coin finds (that is, coins issued in or before 31 B.C.) recovered from the area of modern north-west Croatia, more or less corresponding to the area of the later province of Pannonia Savia. In the same time, the corresponding hoards, composed of the same types of coins, found in this region will also be discussed. The rich site of Segestica/Siscia, modern Sisak, has yielded the largest number of finds, but other lesser-known sites have also contributed to the general picture of coin circulation in the area, and the emphasis of this study will be precisely on those finds. The vast majority of coins are stray finds (i.e., fall under Reece's coin supply category),[1] while only a few specimens were recovered during archaeological excavations (i.e., fall under Reece's coin loss category).[2] The largest number of specimens are Roman Republican coins, as a result of their large concentration in Sisak, but Celtic (Iron Age) coinage is also represented in significant numbers, especially that of the Taurisci. The newly published data, however scanty, allows a revision of some current conclusions with respect to the distribution of certain coin types, as well as a balanced discussion on the coin circulation in this region in the given period.

Key Words: *coin circulation, Pannonia Savia, north-west Croatia, Celtic coinage, Iron Age coinage*

[1] Reece 2003, 141, 165, cf. 141–149.

[2] Reece 2003, 141, 165, cf. 149–165.

INTRODUCTION[3]

Since a full-scale analysis of pre-Imperial coin finds from Sisak was recently published,[4] I will here only briefly reproduce the conclusions from this study and focus on numismatic material from other sites in the area of the future Pannonia Savia.[5] In archaeological terms, this region represents an eastern extension of the Tauriscan Mokronog group.[6] The circulation at the all-important site of Sisak, it will be shown, differs significantly from the surrounding area, i.e. the region in which it is situated and which more or less gravitated towards it (present-day north-west Croatia and the immediately adjacent parts of Slovenia and Bosnia and Herzegovina). This important fact probably reflects a difference in the level of monetisation or, more generally, in coin use – and thus coin finds – between rural and urban sites, which is best documented in the analyses of respective coin uses in urban and rural monetary zones in the Roman world.[7] However, the period analysed in this study – roughly the period prior to the Roman conquest of Segestica/Siscia in 35 B.C. – certainly incorporates additional elements that determined the nature of these two noticeably different monetary zones occupying the area of the future Pannonia Savia: the great prehistoric urban centre of Segestica/Siscia (later Roman Siscia), which entered the Roman zone of influence as early as the late first half of the 2nd c. B.C.,[8] and the largely non-urbanised surrounding region that came under direct Roman rule only with the Augustan wars culminating in the capture of Segestica/Siscia itself more than a century later.[9] I will not discuss these additional elements, although some of them (e.g. the coinage of the Taurisci) will emerge naturally from the analysis of the coins themselves.

SEGESTICA/SISCIA[10]

It has been possible to analyse a total of 140 coins found in the area of modern Sisak. A great majority of the coins are Roman Republican specimens (99 pieces, 70,71%), followed by Celtic, i.e., Iron Age coins (27 pieces, 19,29%). Of the total number of the latter, 55,6% (i.e. 15 pieces) represent Tauriscan coinage, three more (11,1%) represent Norican coinage, and 18,5% (5 pieces) represent the coinage of the Scordisci. Twenty Celtic/Iron Age coins were made of silver (74,1%), and the remaining 7 pieces of billon or bronze (25,9%). No fewer than three quarters of the Celtic/Iron Age coins are tetradrachms (21 pieces, 77,8%), with the remaining 6 pieces (22,2%) representing smaller denominations. Almost all the Roman Republican coins found in Sisak are *denarii* (92 pieces, 92,93%), with an additional 4 *quinarii* (4,04%) and a single *victoriatus*; a single bronze *semis* and an *aureus* of Quintus Cornuficius were also found. The diversity of the coin assemblage from Sisak can be explained by mere fortuity, or, perhaps more plausibly, it reflects the "cosmopolitan" nature of the Late Iron Age settlement of Segestica/Siscia. Strong connections with the Scordisci can be discerned in the 1st c. B.C.; the coinage of the Taurisci is also well represented in Sisak, which is hardly surprising due to the proximity of the territory occupied by this people, and Sisak was certainly an important location with respect to the penetration of Roman Republican coinage into the western and central Balkans area, as well as Transdanubia and, perhaps, Dacia.

[3] This paper is a significantly expanded version – or rather an unabridged version – of Bilić, Nađ forthcoming.

[4] Bilić 2017.

[5] For a geographical definition of the region discussed in this paper see Dizdar 2011, 71 n. 1; 2013, 11 n. 1. Dizdar included, in his survey of the region, the Kordun and Banovina sub-regions; I have further added the Ogulin-Plaški vale, since it is a logical geographical continuation of the territories to its north-east, leaning against a bulwark formed by the Dinaric Alps.

[6] Dizdar 2011, 71–73, 89–90; 2013, 11–12; cf. Šašel-Kos 1997, 25.

[7] Howgego 1992, 20; Hollander 2007, 111, 134–135.

[8] Dzino 2010, 72–73.

[9] Mócsy 1974, 22; Domić-Kunić 2006, 93–95; Dzino 2010, 110–111.

[10] This is a short summary of the discussion in Bilić 2017.

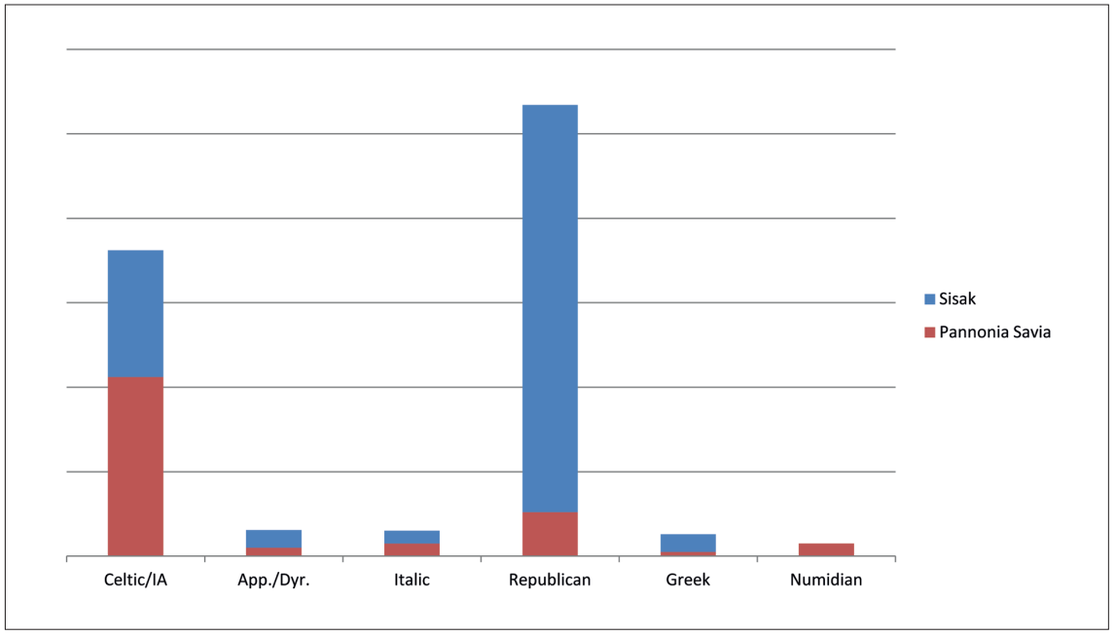


Chart 1: Comparison of the ratio of various types of pre-Imperial individual coin finds from Sisak and the surrounding region (north-west Croatia, i.e. Pannonia Savia)

Comparison with the corresponding data on Republican coinage from the two neighbouring sites of Emona (modern Ljubljana) and Celeia (modern Celje, both in present-day Slovenia) reveals the fact that the Republican coinage in Emona reflects the circulation of the late Augustan and succeeding periods, while that from Segestica/Siscia and Celeia reflect the circulation of the 1st c. B.C.[11] Several Republican coins have actually been recovered in archaeological excavations in Late Iron Age contexts, suggesting that they arrived in the area prior to the conquest of 35 B.C., and it is possible that this coinage in general indeed reflects the circulation of the 1st c. B.C. in Sisak, rather than that of the Imperial period. Furthermore, the structure of Celtic/Iron Age coins also reflects the circulation in the 1st c. B.C., with an occasional earlier type also present. In general, almost all finds suggest a context of the 1st century B.C.

It remains an open question whether the specimens of Celtic/Iron Age coinage, at least the chronologically later types, together with specimens of (at least later types of) Roman Republican coinage found outside a confirmed stratigraphic context, which comprises almost all coinage of this type, actually found in Sisak, remained in circulation after the conquest of 35 B.C. and really reflect the circulation of early or perhaps late Augustan or even later periods, rather than that of the period prior to the conquest.

Finally, it is important to emphasise that a mere eleven coins out of total 140 were recovered in proper archaeological excavations (7,86%). The bias towards the precious-metal coinage and higher denominations shown in the coins from Sisak reflects, I believe, precisely this fact, rather than a specific, less well monetised character of the settlement in comparison to, for example, Emona.

[11] For Emona and Celeia see Kos 1986, 26, 53–56.

THE FUTURE PANNONIA SAVIA (SISAK EXCLUDED)

Individual finds (see Table 1 at the end of the article)

In stark contrast to the situation in Sisak, the rest of the region analysed in this study shows a high predominance of "autochthon" Celtic/Iron Age coinage (45 pieces, 69.23%), with a relatively minor presence of Roman Republican coins (10 pieces, 15.38%).

Italian and Greek coins

The earliest example of Italian currency found in the region is a bar similar to those with the *ramo secco* pattern on their surface (cat. no. 1).[12] This piece was found in a mound that was actually part of the fortification system of the Trsište hill fort, which unfortunately cannot be dated with any precision.[13] Another bar fragment of the *aes formatum* type was found in 2008 in the River Kupa upstream of Karlovac, near the Vrlovka cave (cat. no. 2).[14]

These crude Italian (or, more precisely, Etruscan) ferruginous copper bars were already being produced in the 6th c., and also appear in hoards of the 3rd c.,[15] together with *aes signatum*, which are Roman oblong, quadrilateral or brick-shaped pieces of leaded tin bronze, carrying various depictions, without any marks of value, issued during the first half of the 3rd c. B.C.[16] Their appearance in the region, at Sisak and Trošmarija, and in the Kupa near Karlovac, must be associated with their presence in the so-called Mazin-type hoards, consisting of Carthaginian, Numidian and Egyptian and other Greek and Italic/Roman currency (*aes rude, aes formatum*, *ramo secco* and associated bars, *aes signatum*, *aes grave*).[17]

Several more 3rd- and 2nd-c. bronze coins found in the area of the future Pannonia Savia could be associated with the Mazin-type hoards (cat. nos. 3–7). Even though the Mamertini coinage (cat. no. 3, found in archaeological excavations but in an indeterminate context) was never documented in any of the actual hoards, it seems to belong to this group of coin types both chronologically and typologically. Sicilian (cat. no. 4) and Numidian (cat. nos. 5–7) coins, on the other hand, are well documented in the hoards of the Mazin type.

In concordance with the situation in Sisak, a small number of Apollonia and Dyrrachium coins have also been documented in the region (cat. nos. 8–9). Their normal area of circulation was to the east of the Požega Mountains, which is east of the region discussed here, but immediately adjacent to it. Both specimens are impossible to date more precisely than 280–49/48 B.C.,[18] although cat. no. 9 is an AE imitation, which perhaps allows a more precise dating. The drachms of Apollonia and Dyrrachium were indeed sometimes imitated by the Scordisci; they were made of poor quality silver, bronze or silvered bronze, with stylized representations and unintelligible inscriptions, and they usually imitated the coins issued in the third, i.e. the latest period of minting (80s or 70s B.C.–40s B.C).[19] Popović argues that they were in general produced in the Danubian area at the end of the 1st quarter of the 1st c. B.C., before the major input of the original coins of this type.[20] To summarise

[12] Brunšmid 1896–1897, 48 with n. 1; Mirnik 1987, 386; Balen-Letunić 1999–2000, 24. A *ramo secco* bar was also found at Sisak (Bilić 2017, cat. 32).

[13] Balen-Letunić 1999–2000, 24.

[14] 297.03g; 63x41x33mm, type IIa Bertol, Farac 2012; it was found by K. Zubčić of the Croatian Conservation Institute in an underwater archaeological survey. I would like to thank him for showing me the piece and allowing me to use the information here.

[15] Crawford 1985, 4, 282 App. 2; 2009, 195; Burnett *et al*. 1986, 127–128; Craddock, Meeks 1987, 195–196, cf. T. 3 on p. 194; Burnett 1989, 41; 2012, 302; *HNI* p. 45; Vecchi 2013, 7, 26–28; Murgan, Kemmers 2016, 277, 284–285.

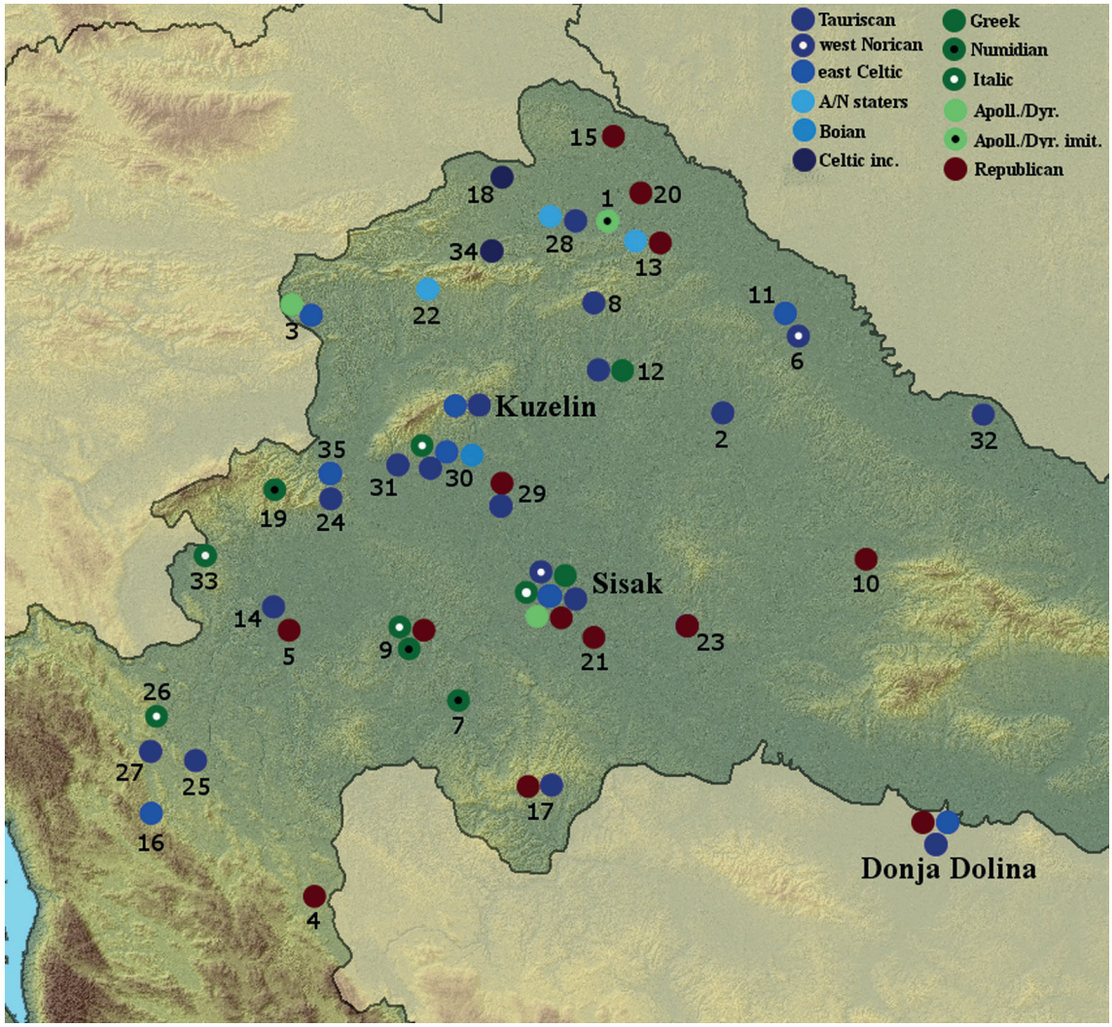
[16] Thomsen 1957, 55–59; *RRC* 3–12; Crawford 1985, 41; 2009, 195; Burnett *et al*. 1986, 128–129; Burnett 1989, 34–35, 40; 2012, 299, 302, 305; *HNI* p. 45; Vecchi 2013, 29–31; Murgan, Kemmers 2016, 277–278.

[17] Dukat, Mirnik 1976, 200; Mirnik 1987; Bertol, Farac 2012, 96–99; Bilić 2012, 367; 2014; Bertol 2014; Murgan, Kemmers 2016, 285.

[18] See the review of recent publications discussing the chronology of these issues in Ujes-Morgan 2012, 369–372.

[19] Göricke-Lukić 2004, 39, 41–45, cat. nos. 9–23.

[20] Popović 1987, 115; cf. Popović 1976, 16–17, where he offers a similar chronological framework and further associates the production of these imitations with contemporaneous imitations of Republican *denarii*.



Map 1: Individual pre-Imperial coin finds in north-west Croatia: 1 Bartolovec-Jalžabet, 2 Bjelovar, 3 Brezova Ravna, 4 Drežnik, 5 Dubovac, 6 Đurđevac, 7 Glina, 8 Kalnik, Veliki Kalnik, 9 Kirnigrad, 10 Končanica, 11 Kraljevec, 12 Križevci, 13 Ludbreg, 14 Mahično, 15 Međimurje, 16 Modruš, 17 Osječenica, 18 Petrijanec, 19 Plešivica-sedlo, 20 Prelog, 21 Prelošcica (Lonja), 22 Radoboj, 23 Repušnica, 24 Sv. Marija at Okić, 25 Tounj, 26 Trošmarija, 27 Vaganac (Ogulin), 28 Varaždin, 29 Ščitarjevo, 30 Zagreb, 31 Zagreb-Stenjevec, 32 Zvonimirovo-Veliko polje, 33 Vrlovka cave, 34 Cerje Tužno, 35 Samobor (©Wikimedia Commons, adapted by the author)

a conclusion reached in Bilić (2017), the appearance of the Apollonia-Dyrrachium coins in the region can be associated with the commercial relations between the local inhabitants and the Scordisci during the mid-1st c. B.C. A Macedonian coin from Križevci (cat. no. 10) probably arrived in the region in the same way, together with the Epirote and Macedonian bronzes from Sisak discussed in Bilić (2017).

Celtic/Iron Age coins

As noted earlier, the great majority of individual finds from the region are of Celtic/Iron Age coins. Although Tauriscan coinage predominates (26 specimens, 57.78% of all Celtic/Iron Age coins, cat. nos. 28–53), other Celtic/Iron Age currency, usually referred to as East Celtic coinage, is also present. A similar situation obtains with hoards: see below. An early imitation of Philip II's tdr, dating from the first half of

the 3rd c., was found in Zagreb (cat. no. 11),[21] and some later imitations of the Alexander-type coins of Philip III are known also from Zagreb (cat. no. 12)[22] and Modruš (cat. no. 13).[23] The latter example is very peculiar in its stylisation and has no real parallels elsewhere. A couple of characteristic imitations of Macedonian coins, called by Pink and Göbl *Baumreiter mit Bartkranzavers*, and by Preda and Popović *Crişeni-Berchieş A*,[24] were found near Klanjec (tdr, cat. no. 14)[25] and Đurđevac (d, cat. no. 15),[26] respectively. Preda and Popović both associate this coinage with north and west Transylvania, and, in its later phase, with south-east Pannonia.[27] Dembski, however, groups these coins among South Serbian types,[28] while Pink is inclined to associate them with Syrmia,[29] and Kolníková associates the drachms of this type (more precisely, of Popović's transitional phase between Preda's two periods) with the Scordisci and emphasizes that they appear at Němčice in the Lt B2–C2 period (late 4th – first half of the 2nd c. B.C., c. 320–150 B.C.).[30] In any case, they are not autochthonous to the region here discussed, and must have come from the east. Likewise, a coin of the Huşi-Vovrieşti type was perhaps found at Zagreb (cat. no. 16);[31] it represents primarily an eastern Dacian (Moldavian) occurrence issued from the end of the 3rd to the mid-2nd c. B.C.[32] Finally, a *Zickzackgruppe* (Sztálinváros/Dunaújváros) tdr was found at Kuzelin in proper archaeological excavations in 1991 (cat. no. 17). This type of coin was issued in the period from the late 3rd to the 1st half of the 2nd c. B.C. in Transdanubia.[33] In addition, a single Syrmian phase C (?) AE tdr was found at Repušnica, with two more AE drachms of the same phase found at Samobor, supporting the finds of Scordiscan coinage in Sisak (five specimens) and further testifying to the relations between the future Pannonia Savia region and that people during the mid-1st c. B.C., observed above.

Another interesting phenomenon occurring in the region is the presence of five imitations of staters of Alexander III (cat. nos. 21–24, plus a specimen from the nearby Slovenska Bistrica near Maribor),[34] none of which was found in Sisak. These imitations copy the so-called Athena/Nike stater with a helmeted head of Athena on the obverse and a winged Nike on the reverse. This type of coin was struck relatively frequently in the area occupied by the Boii,[35] but it is entirely possible that the Celtic/Iron Age peoples occupying the area of modern Croatia issued similar imitations. Such coins were indeed attributed by Castelin to the area of the "Middle and Lower Danube region";[36] Dembski, following Castelin,[37] argues that, in the late 3rd c., the original staters came to Moravia together with imitations produced by the tribes living further south;[38] Kolníková allows the possibility that this type of coin arrived at the site of Němčice from the Balkans,[39] while Jandrasits suggests the possibility that the Athena/Nike staters

[21] Forrer 1908, 146 Fig. 268; Pink 1939, 134 no. 3. According to J. Winkler, the coin was produced in the south-east Danubian region (Forrer 1969, 54 no. 171 (J. Winkler)).

[22] Forrer 1908, 176 Fig. 336; Pink 1939, 134 no. 3; cf. Pink 1939, nos. 586–588, Preda 1973, Pl. LXXIII.

[23] Pink 1939, 118, 140 no. 188; Preda 1973, 338 no. 67.

[24] Pink 1939, 58–60; Preda 1973, 97–104 with Fig. 8 on p. 101; Popović 1987, 54–60 with fig. 21 on p. 58.

[25] Mirnik 1990, 4.

[26] Pink 1939, 60, 139 no. 150.

[27] Cf. Allen 1987, 27, 50–51, 80 map 3; Torbágy 2000, 37; Ziegaus 2010, 229, 232, 254.

[28] Dembski 1998, 43, 99–100.

[29] Pink 1939, 58, criticised in Forrer 1969, 55 no. 182 (J. Winkler).

[30] Kolníková 2012, 57.

[31] Pink 1939, 39–40, 134 no. 3, Abb. 36; Preda 1973, 122 no. 48.

[32] Preda 1973, 445; Popović 1980a, 172, 174–175; 1980b, 13; 1983, 14–19; 1987, 60–61, 79; Wartenburg, Kagan 1999, 395–396 n. 1, 400–402; Rudnicki 2003, 18–20; Čižmář, Kolníková, Noeske 2008, 671; Kolníková 2012, 57; Munteanu, Chiriac 2016, 557. For this type of coinage in general see Preda 1973, 111–131, 444–445 and Munteanu, Chiriac 2016. See also below on the Narta hoard.

[33] Allen 1987, 29, 80 map 3; Dembski 1998, 46, 112; Torbágy 2000, 30; Ziegaus 2010, 215.

[34] Paulsen 1933, i.8; Kos 1977, 138–141 no. 29.

[35] Cf. Kos 1977, 48, 71; see also Kolníková 2006, 8 Tab. 2 for a list of finds from Central Europe.

[36] Castelin 1978, 121–122, cat. nos. 1206–1208.

[37] Castelin 1965, 6–7, 9, 109–110.

[38] Dembski 1972, 55. The Celts of the Czech Republic then started producing their own imitations, which are not easily distinguished from those arriving from the Balkans.

[39] Kolníková 2012, 12.

found in Boian territories are perhaps not (all) of local origin, but actually imports from the Balkan area, further dating them to 270–250 B.C.[40] Similar imitations found in the area of the modern Czech Republic and central Germany are dated to LtB2–C1 (320 – 200 B.C.),[41] which must be close to the date when they were produced in this region. Even though the number of coin finds – all found without a proper archaeological context – is rather low,[42] it is still possible to infer that the locally produced imitations of Alexander's staters circulated in the area of north-west Croatia in the 3rd century B.C. The great weight of three of the four staters (8.46, 8.34 and 8.21g) suggests their early date (Lt B2, 320–260 B.C.), while the heavily stylised and somewhat lighter specimen (7.84g) must be somewhat later, perhaps minted in the Lt C1 period (260–200 B.C.). In this context, a Boian Muschelstater found near Zagreb can be mentioned (cat. no. 25),[43] testifying to the contacts between the area inhabited by this people in Central Europe and our region.[44]

As already mentioned, Tauriscan coinage clearly predominates in the region, which is, as we will see later, supported by the evidence from hoards. It is necessary to discuss here the question of absolute chronology of Tauriscan coinage, which lately received a strong impetus from a number of dated finds. Thus, two mixed hoards containing proto-Tauriscan and Tauriscan coinage together with other types of coins – (1) Haimburg, where the VES· type tdrs were mixed with West Norican coinage, i.e. *Kugelreiter* tdrs, and (2) the River Ljubljanica, where the Samobor C tdr and 1/4dr were mixed with various Roman Republican coins – completely changed the chronology of minting of the coinage of the Taurisci. Thus, it is convincingly argued they started minting their coinage from at least the mid-2nd century B.C., or at the very end of the 1st half of the 2nd c.[45] The earliest types of Tauriscan coinage, the Varaždin A and, immediately afterwards, Varaždin B (derived from the somewhat earlier VES· type), were minted somewhere in the Varaždin area in the mid-2nd century B.C., either somewhat before, at or after 150 B.C.[46] Moreover, the Ljubljanica hoard proves that the Taurisci simultaneously minted both tdrs and 1/4drs in the earliest period of their minting, that is, with respect to SC 13 and 14, which developed from the Varaždin B type (cf. *TKN* p. 32, 99, 111 for SC13), and, following those, SC 16 (and, presumably, 23) coins, all minted c. 150 B.C.[47]

[40] Jandrasits 2014, 45.

[41] Čižmář, Kolníková, Noeske 2008, 667, 673. Alternative proposals: Polenz 1982, 57–58, 101–102, 116, 129, 138: LtB2 or transition to C1 (the grave at Dobian), 1st half of the 3rd c. or mid-3rd c. B.C.; Kolníková 2012, 12: Lt B2–C2, end of the 4th – 1st half of the 2nd c. B.C. (in archaeological contexts); Kolníková 2006, 7, 9, 2012, 12: late 4th – second half of the 3rd c. B.C., i.e. Lt B2. Torbágy (2013, 66) ascribes them to the Boii, dates them c. 250 B.C., and mentions they were still circulating in the late 3rd c. B.C.

[42] Gold coins were always carefully managed and their presence, even in low numbers, suggests a more widespread use (cf. Howgego 1992, 11). Their role in the 3rd c. economy, or whether there existed a monetary economy – however rudimentary – in this period at all, cannot be estimated on present evidence. It is much more likely that they acted as "special-purpose money", primarily used for "diplomatic exchange, tribute, dowries, ritual deposition, etc." (Wigg-Wolf 2008, 36). Aarts (2005, 212 with n. 15) believes that most single gold coins represent intentional deposition.

[43] According to Paulsen (1933, i.47 no. 1294, 123), this coin is of an early Muschelstater variant; according to Castelin (1976, 262–263), it is a late variant associated with his period C (Castelin 1965, 14–15). It could be dated, on the analogy of Paulsen no. 342 (Paulsen 1933, i.123), to the 2nd half of the 2nd c. (Rudnicki 2003, 11, citing Kolníková 1998, 23–24).

[44] In this context, it can be mentioned that two AE Đurđevac tdrs (Karwowski, Militký 2011, 132 T. 1; Militký 2016, 100) and a Samobor-type didrachm (Castelin 1972, 2 no. 2; cf. Kos 2012b, 20; but *TKN* p. 85, cf. Göbl 1992, 16 with Abb. 3.3, associates this coin with Norican coinage) were found at Oberleiserberg (Austria). Similar Tauriscan coins found in the area of the Boii include a SC tdr and a SC or Karlsteiner Art obols from Stradonice (Militký 2016, 90–91, nos. 1.1, 5–6), Đurđevac tdrs from Plzeň, Zbečno-Sýkořice, Malé Hradisko (*fourrée*), Klentnice (*fourrée*), Zohor and Bratislava-Rusovce (Militký 2016, 93–94, nos. 4.1, 7.1, 9.1, 10.1, 100–101 Tab. 3) and Samobor C tdr from Poštorná (Militký 2016, 94, no. 10.1).

[45] Kos, Šemrov 2003, 386–387; Kos 2007, 60–63; 2009, 311; 2012a, 355–356; Kos, Mirnik 2011, 102; Miškec 2012, 381, 383; Strobel 2014, 75–77. Strobel (2014, 77–78, cf. 89) actually dates the beginning of "Norican" coinage (the VES· tdrs) at or slightly after the turn of the 2nd c. B.C.

[46] Kos, Mirnik 2011, 102; Kos 2012a, 355–356; Miškec 2012, 381, 383. Gorini (2004, 59) dates the production of Varaždin A and B coins to between 180 and 160 B.C., cf. Gorini 2008, 99; 2009, 120.

[47] Kos, Šemrov 2003, 382, 385–387, cf. Kos 2007, 61–62, who dates SC 13, 14 and 16 to the 140s or somewhat earlier and Miškec 2012, 383, who actually dates SC 13 to c. 150 B.C., and SC 14 and 16 to the 140s B.C.; see also Kos 2010, 101 and Strobel 2014, 77.

A strong supporting argument for the inferences drawn from the Ljubljanica hoard is provided by the small silver coin found in a grave at Zvonimirovo-Veliko polje dated to the Lt C2 period (200–150 B.C.) (0.44g, cat. no. 31).[48] It is typologically associated with early Tauriscan tdrs and, furthermore, belongs to a group of small silver coins with depictions of a horse on both sides of the coin, which represent the earliest types of Taursican small silver coins.[49] It supports the late 2nd half of the 2nd c. B.C. as the date of the appearance of the earliest Tauriscan coins, and proves that they were, from the start, issued together with fractional coins.

When deliberating on the chronology of Tauriscan issues it is necessary to include the hoard from Pokupsko (hoard no. 12) in the discussion, even though it properly belongs to the second part of the study, since it gives an insight into the dating of the earliest issues of Đurđevac coins.[50] Three coins of the Samobor A type (derived from Varaždin A)[51] and three coins of Samobor B (derived, in their turn, from Samobor A or Varaždin A)[52] were found in this hoard, the former being contemporaneously minted from the start with SC 14, and in the course of time with other SC types, as well as with Samobor B and Đurđevac coins,[53] which dates the beginning of the minting of Samobor A coins (especially in the light of the transient nature of Varaždin A – and B, for that matter – coins),[54] to the early second half of the 2nd c. B.C.[55] Moreover, the Pokupsko hoard further comprised two Đurđevac coins, more precisely, the very earliest Đurđevac issues, derived directly from Samobor A (obv.) and Samobor B (rv.) dies.[56] Thus the entire hoard, together with the earliest Đurđevac issues, can be tentatively dated to the early second half of the 2nd c. B.C., probably the 140s.[57] At the other end of the time spectrum, Đurđevac tdrs were in use after 46 B.C. at Gomolava and c. 10 B.C.–10 AD in Dalmatia.[58] Thus their presence in coin circulation covers a long period from the mid-2nd c. B.C. to the mid-Augustan period, which is in stark opposition to other earlier East Norican types, while the area of their distribution is similarly much wider when compared to the latter, although the area of distribution of these other earlier East Norican types is not so reduced as generally believed.[59]

Roman Republican coins

The most prominent difference between coin finds from Sisak and those found in the region is not in the presence of Celtic/Iron Age coins in the former, but in an almost complete lack of Roman Republican coins in the latter. A mere ten such coins are documented (cat. nos. 56–65), compared to 99 pieces in Sisak, ca. 70% of all pre-Imperial coins found there. An in-depth analysis of

[48] I would like to thank M. Dizdar, the head of the excavations, for allowing me the opportunity to study and discuss this coin. For an in-depth study see Bilić, Dizdar 2016. Since coins of this period found in graves are extremely rare in the region (the only other example being cat. no. 45), they are treated here together with individual finds.

[49] *TKN* p. 46; Mackensen 1972, 9; 1975, 255; Kos 1979, 34.

[50] Mirnik 1998, 485, 488–489.

[51] *TKN* p. 31–32.

[52] *TKN* p. 31–32, 100.

[53] *TKN*, Synchronogramm Ostnoriker.

[54] Kos, Mirnik 2011, 102, cf. Gorini 2009, 120 for east Norican coinage in general. With respect to the transient nature of Varaždin A/B coins, the presence of a significantly later *Augentyp-Stamm* coin in the hoard from Križevljan looks suspicious (Kos, Mirnik 2011, 98 no. 35); if it is accepted as fact (which Kos, Mirnik 2011, 106 seriously doubt), it would testify to a far longer presence of Varaždin A/B coins (in circulation?) previous to their concealment.

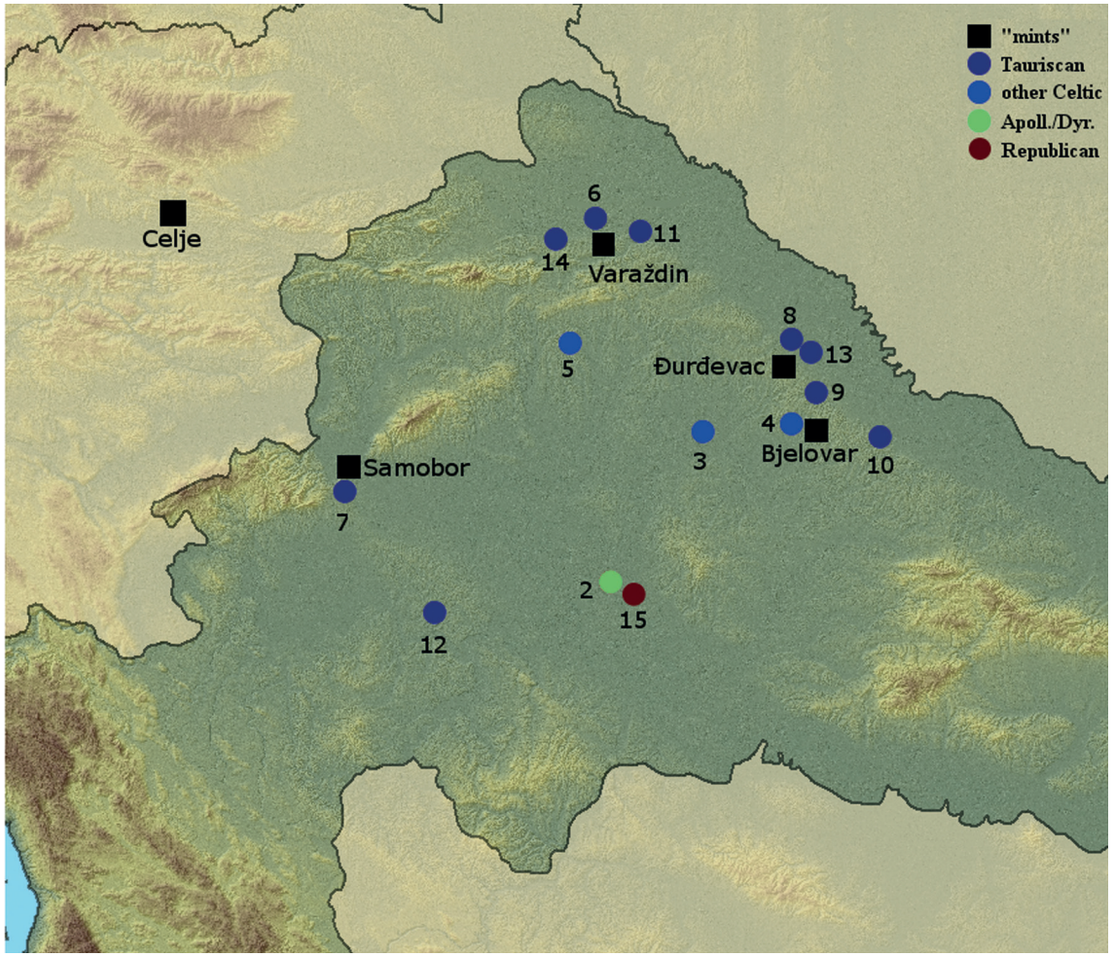
[55] Gorini (2004, 59) dates the production of Samobor A and B coins to between 170 and 150 B.C., while elsewhere (Gorini 2009, 120) he dates them to the period between 160 and 130 B.C.

[56] *TKN* p. 32–33, 102. P. Kos has recently informed me that Göbl's "earliest Đurđevac issues" (*TKN* 46–111/112) should be classified under Samobor A coins proper, on the basis of his study of the Samobor hoard itself; if this is true, then the hoard from Pokupsko contained only Samobor A and B coins and is useless in dating the Đurđevac coins (thus *pace* Kos 2009, 311).

[57] Kos (2009, 311), on the basis of the Pokupsko hoard, dates the beginning of the production of Đurđevac coins to the late 2nd c. B.C.; cf. Strobel 2014, 77. I do not see why "late", especially since he criticizes Gorini's (2005, 59) assessment of 20 years as the approximate duration of minting of specific groups of Tauriscan coinage (Kos 2009, 309 n. 15, 310). Gorini (2009, 120) dates the production of Đurđevac coins to the period between 160 and 130 B.C., recognising that they are derived from the Samobor A group.

[58] Bilić 2017, with references.

[59] Bilić 2012, 362–364.



Map 2: Pre-Imperial coin hoards from north-west Croatia. (The numbers refer to the list of hoards in Table 2 at the end of the article) (©Wikimedia Commons, adapted by the author)

these coins is thus not necessary, since they are merely an ephemeral phenomenon in the pre-Imperial coin pool in Pannonia Savia outside Sisak.

Hoards
(see Table 2 at the end of the article)

The hoards reflect the inferences drawn from the analysis of individual finds. Twelve out of 15 known finds represent hoards of Celtic/Iron Age coins (hoards nos. 3–14), while another (hoard no. 1) reflects the same horizon of circulation. In fact, the single known hoard of Republican coins is a heavily dispersed and poorly documented (now small) hoard from Sisak itself (hoard no. 15), while the remaining hoard (hoard no. 2) comes from the immediate vicinity of Sisak and represents a hoard of imitations (some AE, mostly AR) of the drachms of Apollonia and Dyrrachium. This hoard can be related to another AE imitation of this same coinage found at Bartolovec-Jalžabet (discussed above) and can similarly be associated with the commercial relations between the local inhabitants and the Scordisci during the mid-1st c. B.C.

A hoard of staters (ca. 10) of Alexander III from Croatia (Plavšić coll.) is mentioned in Gohl (hoard no. 1).[60] This hoard, if from

[60] Gohl 1922–1923, 6 (not from Zagreb, as in Vasić, Popović, Gaj-Popović 1975, 20 n. 16).

north-west Croatia, must be connected to several early imitations of the Athena/Nike staters discussed above, and certainly belongs to a similar chronological and cultural horizon. Unfortunately, the present circumstances of the hoard are hard to ascertain. The AMZ currently holds 28 staters of Alexander III from the Plavšić coll., but no find site is indicated for them. (Three of them are actually barbarian imitations: A8400, imitating Price 172, issued in Amphipolis (?) in ca. 330–320; A8401, imitating Price 3748, issued in Babylon (?) in ca. 331–325; A8402, imitating Price 2959, issued in Side in ca. 325–320.) Thus it does not seem possible to reconstruct the hoard, at least with the data we presently have.

Three of the Celtic/Iron Age hoards represent eastern or north-eastern intrusions into the region. First, the hoard from Narta consisted of 3 original Macedonian coins (?) and 33 coins of the *Huși-Vovrieşti* type (hoard. no. 3),[61] a primarily East Dacian issue, which we have already encountered as a stray find from Zagreb (see above). As noted above, the origin of coins of this type is associated with Moldavia, and they are dated from the late 3rd to the mid-2nd c. B.C. It is nevertheless possible not only that they are somewhat earlier, with a *taq* of c. 240 B.C. being established by the presence of Hellenistic coins in mixed hoards, but also that they originated in the area of the Scordisci, south of the Danube.[62] However, Ziegaus offers significantly higher dates for this type of coins: end of the 4th – 1st half of the 3rd c. B.C.,[63] and Levinschi also strongly argues for a 4th c. date for their production.[64] Second, the hoard from Ribnjačka[65] consisted of ca. 112 imitations of tetradrachms of Philip II (hoard no. 4).[66] The *Turnierreiter* type, representing the majority of coins in the hoard, is associated by Pink with the Scordisci,[67] which is rejected by Kos and Mirnik,[68] who opt for the Bjelovar region as its area of origin, while Popović believes it should be associated with regions nearer to Macedonia in the southern Balkans.[69] A single Turnierreiter specimen was indeed found in Kobaš, near Požega,[70] which is in the immediate vicinity of the Bjelovar region, and supports Kos and Mirnik's conjecture.[71] Furthermore, they argue that the second major type of coins in the Ribnjačka hoard, the Dreieckhals, is actually a development of the *Turnierreiter* type,[72] thus most probably also of local origin.[73] However, the question of the autochthony of the

[61] Brunšmid 1895; Pink 1939, 35, 141 no. 205; Preda 1973, 122 no. 45; Dukat, Mirnik 1976, 192; Mirnik 1981, 39 no. 33, 2008, 118.

[62] Wartenburg and Kagan 1999: 401, citing Pink 1939: 38–39 for the area of origin of the coins. However, since Pink based his conjecture on the presence of countermarks exclusively on the coins found in the southern part of the area of circulation of these coins, i.e. in the region nearer to the Danube (cf. Popović 1983, 18; 1987, 61), the appearance of a large number of countermarks on the coins in the hoards from Vovrieşti (Romanian Moldavia, Preda 1973, 121, 509–511 Pl. XXV–XXVII), Velikaya Gorazdovka (Transcarpathian Ukraine, Sova-Gmitrov 1961) and Tabani (Moldova, Levinschi and Ciocanu 2003–2004) makes this argument invalid.

[63] Ziegaus 2010, 14.

[64] Levinschi 1997; 1999; 2010, 31. For a review of suggested dates (2nd half of the 4th – 1st c. B.C.) see Munteanu, Chiriac 2016, 550; for a discussion on chronology, Munteanu, Chiriac 2016, 553–557.

[65] Liščić 1957; Pink 1957; Dukat, Mirnik 1976, 192; Mirnik 1981, 39 no. 36; 2008, 118–120; Kos, Mirnik 1999.

[66] Nos. 1–44 Kos, Mirnik 1999 = Turnierreiter (*OTA* 120); nos. 45–64 Kos, Mirnik 1999 = *OTA* 318, described by Pink (1957, 13) as *Übergangstyp zu Dreieckshals*, by Kos, Mirnik 1999 (and Mirnik 2008, 188 no. 109, 189 no. 117) simply *Dreieckhals*, by Ziegaus (2010, 224) a combination of earlier *Dreieckhals* and the *Turnierreiter* reverse; nos. 65–71 Kos, Mirnik 1999 = *OTA* 417, called by Pink (1957, 13) Wolljackentyp, and by Kos, Mirnik 1999, following *OTA*, Puppenreiter.

[67] Pink 1957, 16–17.

[68] Kos, Mirnik 1999, 304.

[69] Popović 1987, 38.

[70] *OTA* 120.3; Kos, Mirnik 1999, 305–306 with n. 39.

[71] It is apparently accepted by Ziegaus 2010, 221–222.

[72] Kos, Mirnik 1999, 306; cf. Ziegaus 2010, 224.

[73] Thus Ziegaus 2010, 224, cf. Allen 1987, 30, 61. A coin of this type ("jüngerer Dreieckhals", without a horseman on the reverse) is described as coming "from Croatia" (Leu Numismatik, Auction 83, lot 540, May 6th, 2002 = Ziegaus 2010, 222 no. 589, cf. 224), which supports Kos and Mirnik's (and Ziegaus's) suggestion of north-west Croatia as the place of origin of these coins. However, coins with "jüngerer Dreieckhals" obverse in combination with a reverse with a horseman were found in Kaposvár (Pink 1939, 82, 138 no. 124 = Dessewffy 1910, no. 1228, who, however, does not indicate a find site; Ziegaus 2010, 224) and in "Hungary" (Forrer 1908, 46 Fig. 85), while "jüngerer Dreieckhals" pieces (without a horseman) were found in the Zemplén county (Dessewffy 1910, no. 1231) and in Stradonice (Pink 1939, 82 Abb. 321; Dembski 1998, 106 no. 1242) (See also the next note).

hoard, or at least the dominant type(s) of coins in the hoard, remains at least partially open.[74] Kos and Mirnik date the coins from the hoard to the first half of the 2nd c. B.C.[75]

Finally, the hoard from Sveti Petar Orehovec near Križevci consisted of several coins of the Kapostal type (hoard. no. 5).[76] This type of coin, also found at Sisak, was minted from the mid-2nd c. to the late 1st c. B.C. in Transdanubia, and had a relatively wide distribution.[77] At the site of Balina Glavica in central Dalmatia Kapostal coins were found in a hoard together with coins of the Đurđevac type (see below);[78] both types of coins were found at Gomolava in a layer dated to the 2nd half of the 1st century B.C., together with a small hoard of Republican coins and imitations,[79] while at Szalacska dies of Kapostal small silver coins and drachms were found together with a Đurđevac coin.[80] Thus these two types of coins circulated rather widely and contemporaneously, and were often found together,[81] including at Sisak as individual finds, but in the hoards from the territory of the future Pannonia Savia they do not occur together.

Most of the hoards, nine in all, are of Tauriscan coins: one hoard of Varaždin A and B types (hoard. no. 6), one of Samobor A and B types (hoard no. 7), and no fewer than four hoards of Đurđevac type (hoards nos. 8–11, with no. 10 doubtful), with the mixed Pokupsko hoard, the single inhomogeneous example, discussed above. In all these hoards, except the Pokupsko find, only a single type of exclusively Tauriscan coins was found (ignoring the Varaždin and Samobor A/B distinction), and their value for chronological distinctions is thus minimal. However, they indicate a relatively high level of coin production in the region, reveal the relations of various types and their relative chronology, and, with their concealment and non-recovery, testify to some turbulent events – or processes – that transpired in the region in the second half of the 2nd c. B.C.[82] Since a lot has been written on these hoards, especially the three largest ones (Varaždin – but actually Križovljan; Samobor – but actually Okić; and Đurđevac – but actually Šemovec) they will not be discussed in detail here.[83] I would only like to point out that it was probably local mints that issued these coins, or, perhaps it is safer to say, the coins were minted in the vicinity of Varaždin, Samobor and Đurđevac, respectively.[84] However, an unpublished hoard from Bartolovec-Jalžabet, kept at the AMZ, deserves to be discussed in further detail (hoard no. 11).[85] This is the only Đurđevac

[74] Two *Dreieckhals* coins found in and near (Galishegy) Munkács (Mukačeve) in Transcarpathian Ukraine remain enigmatic (Pink 1939, 82, 137 no. 82, 141 no. 194, Abb. 318; Kos, Mirnik 1999, 306. Actually, the coin from Galishegy referred to by Pink is not *Dreieckhals* type at all, but *Audoleonmonogramm* type. Ziegaus 2010, 224 refers to the coin from Munkács as a "jüngerer", even though the piece reproduced by Pink (1939) as Abb. 318 is certainly "älterer", and adds two specimens from a hoard found in relatively nearby Medieşu Aurit (in the Satu Mare county), one of the earlier and the other of the later phase. Actually, the two coins from the Medieşu Aurit hoard are both of the "jüngerer Dreieckhals" type (without a horseman). (See Gohl 1903, 57; cf. Preda 1973, 289, Pl. LIX.4, who, incidentally, refers to this type of coin – the "jüngerer Dreieckhals" type without a horseman – as *Medieşu Aurit* subtype "a" and adds to it the *Schnabelpferd* type as subtype "b"). Finally, one Puppenreiter specimen was found in "northern Hungary" (Leu Numismatik, Auction 83, lot 535, May 6th, 2002 = Ziegaus 2010, 211 no. 560), and this type of coin probably originated in this area (Allen 1987, Map 3 on p. 80; Dembski 1998, 110, north-west Hungary, south-west Slovakia; Ziegaus 2010, 211, between Balaton and the Danube). However, another specimen of this type, from a hoard found in east Slavonia, is recorded in the archives of the Archaeological Museum in Zagreb (12.51g).

[75] Kos, Mirnik 1999, 306; cf. Ziegaus 2010, 222, 224. Preda (1973, 293) dates his type Medieşu Aurit to the mid-2nd c. B.C.

[76] Unpublished. Pink 1939, 103–105, nos. 484–495; *OTA* 484–495; Dembski 1998, 113–114 nos. 1413–1431. Two coins from the hoard are kept in the AMZ (inv. nos. A12554–12555), while at least one more coin of the same type was seen by B. Migotti.

[77] Torbágy 1997, 12–13; 2001–2002, 244, 246 (no precise date); Kos 2002, 152. In Torbágy 2013, 68 she opts for the late 2nd or even early 1st c. as the starting date for this coinage; in 2000, 38 for the 2nd third of the 1st c.

[78] Kos 2002.

[79] Popović 1971, 147–148; 1978, 20; Mirnik 1981, 43 no. 61a; Dautova-Ruševljan 1984, 48, 50–51, 60–61, who treats these two coins as part of the hoard; Crawford 1985, 236; Borić-Brešković, Popović 2006, 39.

[80] Torbágy 2000, 38; 2001–2002a, 244; Kos 2002, 150 n. 6, 153.

[81] Cf. Kos 2002, 153.

[82] Cf. Miškec 2012, 382–383.

[83] For reference see Bilić 2012, 362, 364. For the Đurđevac hoard, add Kos 2009 and Mirnik 2016.

[84] *TKN* p. 56; Kos 1977, 47; 2002, 150; 2009, 309; Kos, Mirnik 2011, 102.

[85] AMZ Num. G2308_1–11, 2309_1.

hoard that consists of bronze tetradrachms, which suggests a later date for both its production and concealment, perhaps as late as the late 1st c. B.C. – early 1st c. AD,[86] thus after the conquest of the region in Octavian's campaign. (We cannot, however, exclude an earlier date for either the production of the coins or their concealment). Furthermore, the coins were made of low-quality metal, with two specimens having a visible silver coating. Also, the poor workmanship further suggests that we are dealing here with "irregular" issues, i.e. imitations of "regular" Đurđevac coins.[87] The average weight of all twelve coins is 9.57g (excluding one heavily worn and corroded specimen, G2308_7, of 6.53g, which significantly deviates from other weights, the average weight is 9.85g), which is fairly close to 9.64g, representing the average weight of Đurđevac coins adduced by Göbl,[88] and also to the average weight of early Đurđevac coins, estimated by Kos at nearly 10g.[89] Thus these "irregular" issues follow fairly closely the "official" weight of Đurđevac issues, suggesting their contemporaneous production, and thus a somewhat earlier date than the one suggested above – perhaps even mid-2nd c. B.C. (See the discussion above on the chronology of Đurđevac coins).[90]

[86] Cf. Kos 2002, 154 for the Balina Glavica silver tdrs.

[87] I would like to thank P. Kos for consulting me on the subject of this hoard and offering his valuable suggestions.

[88] *TKN*, Synchronogramm Ostnoriker.

[89] Kos 2002, 154. Kos (2009, 308–310) divides the coins from the Đurđevac hoard into two groups, with an average weight for the first (earlier) of 9,84g, and for the second (later) of 9,67g.

[90] The average weight of heavily worn Đurđevac coins from the Balina Glavica hoard, perhaps minted in the late second half of the 1st c. B.C., is 8,97g (Kos 2002, 154). Thus their hypothetical imitations would have to lie in this weight range, although their condition suggests that originally they were heavier. But so, probably, were the Jalžabet-Bartolovec coins.

CONCLUDING DISCUSSION

The analysis of individual coin finds and hoards consisting of coins minted prior to the Augustan conquest of the area of the future Pannonia Savia – taking into account the fact that the chronological position of later Celtic/Iron Age coins is problematic, i.e. some of these issues could have been struck in an early post-conquest period – has shown a stark difference in coin use between the undisputed centre of the region, Segestica/Siscia, and the surrounding area between the Sava and Drava rivers. There are several possibilities that could explain this difference, but the model distinguishing between urban and rural (or non-urban) monetary zones, successfully applied to the analysis of Roman socio-economic relations, probably represents the best possible conjecture for a solution of the problem at the moment. The predominance of Roman Republican coins in the La Tène urban centre of Segestica/Siscia – the majority of which we have contextualised in the pre-conquest period – and its almost complete lack outside it, suggests that this coinage was in widespread use in the city itself, but played a reduced role outside it. On the other hand, it seems that the region produced a solid number of its own issues in this period, starting perhaps with the Turnier-reiter and Dreieckhals coins (1st half of the 2nd c. B.C.), produced in the Bjelovar region, and closely followed by major groups of Tauriscan coinage from the mid-2nd c. B.C. onwards, produced in the Varaždin, Samobor and Đurđevac areas. Similarly, some of the later types of Tauriscan coinage were probably in part minted in this same region. A number of fractional coins, securely dated to the very beginning of the minting of Tauriscan coins by the Zvonimirovo find, suggest that these coins were indeed used, besides having an obvious function as a hoarded store of wealth, in everyday local transactions as means of payment and medium of exchange and, as some evidence suggest, also as an inter-regional medium of exchange. The presence of a horizon of

early local imitations of gold staters of Alexander III (Athena/Nike type), which must be dated as early as Lt B2 (probably 1st half of the 3rd c. B.C.), also suggests an early impulse in the local population to produce coins, although their use as money remains problematic.

The main problem remains the chronological affiliation of these coins, i.e., whether they were in use during the pre-conquest period or only after the introduction of Roman rule. Several points should be emphasised with regard to this problem:

1. Both Roman Republican and some Celtic/Iron Age coins were definitely in use in the post-conquest period in the region, the latter at least up to the Tiberian[91] or Claudian period,[92] the former well into the reign of Marcus Aurelius,[93] with legionary *denarii* circulating up to the early 3rd c. A.D. Thus their appearance at certain sites does not immediately signify their pre-conquest use;

2. However, we have previously argued that the pre-Imperial coin assemblage from Sisak indeed reflects the circulation of the 1st c. B.C. This conclusion was in the first place reached on the basis of an analogy with the situation obtaining in Celeia, but was further supported by the coins found in proper archaeological context. Thus a Syrmian phase C tdr was found in a Late Iron Age layer at the Dunavski Lloyd site in Sisak,[94] while a late Đurđevac tdr was similarly found in a Late Iron Age, i.e. pre-conquest layer at the Frankopanska ulica bb site,[95] also in Sisak. Three Republican coins were also recovered from Late Iron Age layers at the Dunavski Lloyd site,[96] one of these in a layer of burning immediately underneath an early Roman layer.[97] On the other hand, a late Đurđevac tdr was apparently found in an early Imperial layer at the Frankopanska ulica bb site,[98] but due to the early phase in the analysis and publishing process of this site it is impossible to draw any definite conclusions from this information. Furthermore, a Samobor A tdr was found in a Roman layer mixed with earlier material at the Povijesni arhiv site in Sisak,[99] which is similarly inconclusive. Finally, a Republican denarius was actually found in an early Imperial layer at the Kukuljevićeva ulica site,[100] while another was found in a Claudian/Neronian or even early Flavian layer at the Train station site.[101] Outside Sisak, the situation is similarly ambiguous, although generally favouring the argument supported here. Thus the small Celtic/Iron Age silver coin from Zvonimirovo (cat. no. 31), as discussed above, was securely dated to the Lt C2 period, while a Samobor C (AE?) tdr (cat. no. 51) found at the Zagreb Upper Town site was found in the context of a late La Tène settlement;[102] other archaeologically contextualised finds are of little value, since their stratigraphic position is undeterminable. Thus a Mamertini bronze (cat. no. 3) found at the Zagreb Upper Town site cannot be precisely contextualised at all;[103] the stratigraphic position of a Republican denarius found at the Osječenica hill fort is similarly indeterminate, since it was found in a layer with mixed Roman and prehistoric material, or a purely Roman layer (cat. no. 57).[104] However, a Đurđevac tdr was found in a Roman-period grave at Ščitarjevo (cat. no. 45), while a legionary *denarius* was found at the same site (cat. no. 63), surely in a Roman context. These two finds suggest an extended period of use

[91] Mackensen 1975, 267; Kos 1977, 34; 2006, 72. Cf. for Celeia Bausovac 2014, 37.

[92] For the presence of Celtic/Iron Age coins (both tdrs and fractions) at Magdalensberg up to and including the Claudian period see Krmnicek 2010, 96–97 Tab. 43 with cat. nos. 11–763. See also Mackensen 1975, 267 and Ruske 2012, 102–103.

[93] Bilić 2012, 374–375.

[94] Cat. no. 7 in Bilić 2017.

[95] Cat. no. 25 in Bilić 2017.

[96] Cat. nos. 34, 53 and 57 in Bilić 2017.

[97] Cat. no. 57 in Bilić 2017.

[98] Cat. no. 24 in Bilić 2017.

[99] Cat. no. 18 in Bilić 2017.

[100] Cat. no. 87 in Bilić 2017.

[101] Cat. no. 95 in Bilić 2017.

[102] Škoberne 1994, 32, 67–68; for the context cf. Majnarić-Pandžić 1994, 3, 11.

[103] Dukat, Mašić 2005, 134.

[104] See Ožanić 1998, 29, 36–37 for both views.

for both Tauriscan and Republican coins, which is unsurprising (see above). Nevertheless, the most important information in this context is provided by the Kuzelin hill fort site, north-east of Zagreb. In systematic excavations of the site seven Celtic/Iron Age tetradrachms were found in total. *All* coins were found in a secure archaeological context of the La Tène stratum of the site, widely distributed throughout the hill fort.[105] More specifically, a Samobor B (AE?) tdr (cat. no. 37) was found along a Celtic/Iron Age rampart wall;[106] an Augentyp-Stamm tdr (cat. no. 48) was found in the flooring of a Celtic/Iron Age house[107] and the remaining five Celtic/Iron Age coins (three Đurđevac tdrs, a Samobor A tdr and a *Zickzackgruppe* tdr)[108] were all found in the same layer.[109] It seems that the archaeological material from the site belongs exclusively to the La Tène D1 phase,[110] i.e. c. 150/130–70/50 B.C., which would thus make the latter date the *taq* for the appearance of these types of coins. All coins, except the Zickzackgruppe tdr, were actually dated by the excavator, together with other archaeological material from the same layer (fibulas, rings, ceramics etc.),[111] to the middle and 2nd part of the 1st c. B.C. (70–15 B.C.),[112] but since this is apparently based on the now discarded chronology for the coins themselves, this must be similarly rejected. After the end of the La Tène occupation of the site, most probably at the end of the 1st c. B.C., there are no traces of Roman presence at the site during the entire 1st c. A.D., but only in the second half of the 2nd century.[113] The Celtic/Iron Age coins – almost exclusively Tauriscan – at Kuzelin were thus found in a secure archeological context; moreover, there is no (for the time being) documented continuation of monetary activity at the site until the second part of the 2nd c. Therefore, it is safe to presume that those coins were used exclusively by the La Tène population settled on the site in a pre-conquest period, which is strong support for our argument. A similar conclusion can be reached with respect to another archaeologically excavated Iron Age site, the Gradina at Donja Dolina on the right bank of the River Sava downstream of Sisak, situated in present-day Bosnia and Herzegovina. Here several Republican coins were found,[114] together with a Syrmian drachm of phase B or C,[115] a Đurđevac (tetra?)drachm[116] and a bronze coin of Hiero II.[117] Even though Marić (1964, 47, 49) distributed the coins from earlier excavations into settlement occupation phases (IIIb, 250 – 150 B.C. and IIIc, 125 B.C. – early 1st century A.D.), he had done this according to the dates he presumed the coins were issued at, so his classification has no value. However, since there is no post-La Tène material on the site,[118] all coins found at Donja Dolina must have been used and lost in a pre-Roman period. Therefore, although the precise archaeological context of these coin finds from Donja Dolina is unfortunately lost, it is still possible to associate them, similarly to the situation obtaining at Kuzelin, with the La Tène population settled on the site in a pre-conquest period.

[105] Sokol 2001a, 14.

[106] Sokol 2001a, 8 (picture), no. 3; 1994a, no.3.

[107] Mirnik 1998, 487.

[108] Cat. nos. 17, 34, 40, 41 and 43; Sokol 1994a, nos. 1, 2, 4; 2001, nos. 1, 2, 4, 6 and 7.

[109] Sokol 2001a, 14.

[110] Dizdar 2011, 87–88.

[111] Sokol 2001b, 17 (figure 1–2); 2003, 200.

[112] Sokol 2001a, 14, cf. 2009, 154.

[113] Sokol 1994b, 200, 201; 1997, 221; 1998, 10; 2003, 201; 2009, 154.

[114] Marić 1964, 47, 49, pl. XXII.2–3, 6: *RRC* 190.1 (169–158 B.C.), 222.1 (143 B.C.) and 254.1 (131 B.C.).

[115] Marić 1964, 49, pl. XXII.5; Popović 1987, 50.

[116] Marić 1964, 49, pl. XXII.4. Other Tauriscan coins from Donja Dolina are mentioned by various authors: Pink (1939, 136), citing Sergejewski (without further reference), mentions 9 Samobor coins (his reference on p. 113 is ambiguous, mentioning only a "closed find" of the "Croatian-group" coins), Truhelka (1904, 73) mentions 10 coins in total, five of which he excavated himself, while on p. 74 (figs. 53–56) he illustrates the four best-preserved billon Đurđevac tetradrachms (Kos 1977, 46; Mirnik 1998, 487, both referring to four pieces illustrated by Truhelka in figs. 53–56; probably also Liščić 1977–1978, 237, referring to the same pieces). These coins were rather light (between 8.2 and 9.2g, Truhelka 1904, 74) and small (between 21 and 24 mm, Truhelka 1904, 74; according to Marić 1963, 72 the four coins illustrated by Truhelka 1904, 74 figs. 52–56 (and reproduced by himself, Marić 1963, 73 T. II.11–15), have diameters between 19 and 22 mm).

[117] *SNG* Cop. 844–856 (Marić 1964, 47; Mirnik 1987, 383).

[118] Marić 1964, 49–51.

Finally, both individual coin finds and hoards from future Pannonia Savia, with their almost complete lack of Republican coins, also suggest a pre-conquest date for the coin use they reflect;

3. Lastly, while it was previously possible to conjecture a late, post-conquest, date for the use of locally produced Celtic/Iron Age coins, drawing such inferences from the low dates attributed to their production, in light of new and archaeologically well-established dates for their production and use, it seems much more plausible to argue for their use during the pre-conquest period. Kos and Šemrov have indeed persuasively argued for the existence of a market-based monetary economy as early as the mid-2nd c. B.C. in the south-east Alpine region,[119] and their conclusions can equally persuasively be applied to the adjacent region to the east that would much later be known under the name of Pannonia Savia. This is far from claiming that these particular coins were produced for and used only – or even predominately – in market exchange, but that one of their functions probably was indeed market exchange.[120]

[119] Kos and Šemrov 2003, 387, 390–391. However, there are no small bronze denominations in this region in this period, especially not in considerable numbers, which would certainly facilitate a market-based monetary economy, and make Kos and Šemrov's conclusion more convincing (Wigg-Wolf 2008, 36).

[120] For an overview of possible uses of coins traditionally referred to as Celtic, but now more often Iron-Age, see Howgego 2013, 26–31, who is rather sceptical of the idea of use of these coins in market exchange, although he does not exclude it completely. Harl (1996, 5–6, 293) is a bit more sympathetic. This work has been supported in part by the Croatian Science Foundation under project no. 1549. I would also like to thank M. Nađ for his help in preparing this article.

SAŽETAK

U radu se u prvom redu detaljno obrađuju svi predcarski pojedinačni nalazi novca (tj. novca iskovanog prije 31. pr. Kr.) s područja suvremene sjeverozapadne Hrvatske, što više ili manje odgovara području koje je u kasnijim razdobljima obuhvaćala rimska provincija Panonija Savija. Istovremeno se analiziraju i suvremene ostave novca, čiji sastav odgovara pojedinačnim nalazima, pronađene na istom području. Na bogatom nalazištu Segestici/Sisciji, suvremenom Sisku, pronađen je najveći broj kovanica, ali i druga, manje poznata nalazišta također pridonose općoj slici cirkulacije novca na ovom području, a ovaj se rad usredotočuje upravo na te nalaze. Velika većina nalaza predstavljaju slučajni pojedinačni nalazi (koji potpadaju pod Reeceovu kategoriju *coin supply*),[121] dok je samo nekoliko nalaza pronađeno u arheološkim iskopavanjima (tj., potpadaju pod Reeceovu kategoriju *coin loss*).[122] Najveći broj nalaza predstavljaju rimski republikanski novci, što je uvjetovano njihovim velikim brojem u Sisku, ali i keltski (željeznodobni) novac je zastupljen u nezanemarivom broju, osobito novac Tauriska. Novoobjavljeni podaci, kolikogod bili šturi, dozvoljavaju reviziju nekih trenutno važećih spoznaja o rasprostranjenosti nekih tipova novca, kao i balansiranu raspravu o cirkulaciji novca na ovom području u navedenom razdoblju.

[121] Reece 2003, 141, 165, cf. 141–149.

[122] Reece 2003, 141, 165, cf. 149–165.

Table 1: Individual pre-Imperial coin finds from north-west Croatia

No.	Type	Denomination	Date (B.C.)	Site	Weight (g)	Comment	Provenance
Central Italy							
1	*"ramo secco"* bar	Cu + Fe	6th– 3rd c.	Trošmarija	300,8	arch. exc.	AMZ A5738
2	*aes formatum* Bertol, Farac 2012 Type IIa	Cu + Fe	6th– 3rd c.	the Kupa near Karlovac (Vrlovka cave)	297,03	arch. survey	Croatian Conservation Institute
Sicily							
Mamertini							
3	*SNG* Cop. 458-462: *SNG* Öst, Dreer 1, 451-453	AE	after 288	Zagreb Upper Town – Grič Park	9,13	pierced; found in a mixed layer, arch. context indeterminate	City Museum Zagreb; Dukat, Mašić 2005
Syracuse – Hiero II							
4	*SNG* Cop. 844-856: *SNG* Öst, Dreer 1, 538-545	AE	274–216	Kiringrad	5,51		AMZ G1190
Numidia							
5	*MAA* 18a	AE	148–118	Glina	15,42		AMZ A5411
6	*MAA* 18	AE	148–118	Plešivica-sedlo	11,42		AMZ Class. ant. 9376; Dukat 2001
7		AE	148–118	Kiringrad		pierced	

No.	Type	Denomination	Date (B.C.)	Site	Weight (g)	Comment	Provenance
Apollonia							
8		dr	250-49/48	Brezova Ravna at Miljana near Klanjec			Mirnik 1990
Dyrrachium imitation							
9		AE dr		Bartolovec-Jalžabet			AMZ G2309_2
Macedonia							
10	*SNG* De, Tübingen 2, 1218-1221; *SNG* Öst, Dreer 3, 645-649	AR	after 167-166 (Tübingen); 158-150 (Dreer)	Križevci area	16,58		AMZ A11235
Celtic/Iron Age							
Eastern Celtic							
11	early imitation of Philip II	tdr	1/II 3rd c. Preda 1973, 441-442, 451	Zagreb	13,1		Forrer 1908, fig. 268
12	late imitation of Philip III (Alexander's type)	tdr	mid-to-late 2nd c. Preda 1973, 330, 343, 448	Zagreb	15,1		Forrer 1908, fig. 336
13	late imitation of Philip III (Alexander's type)	tdr	mid-to-late 2nd c. Preda 1973, 330, 343, 448	Modruš	12,44		*OTA* 590

No.	Type	Denomination	Date (B.C.)	Site	Weight (g)	Comment	Provenance
14	Baumreiter mit Bartkranzavers, group A (*OTA* 129 = Baumreiter) / Crişeni-Berchieş A	tdr	2/II 3rd c. Preda 1973, 104	Brezova Ravna at Miljana near Klanjec			Mirnik 1990, 4
15	Baumreiter mit Bartkranzavers, group B2 (Pink 1939, no. 142) / Crişeni-Berchieş A	dr	2/II 3rd c. Preda 1973, 104	Kraljevec near Đurđevac	3,36		Pink 1939, 60, 139 no. 150
16	Huşi-Vovrieşti	tdr	end of the 3rd – mid 2nd c.	Zagreb?	13,52		Pink 1939, 39-40, 134 no. 3, Abb. 36; Preda 1973, 122 no. 48
17	Zickzackgruppe (cf. *OTA* 459-461)	tdr	late 3rd – 1st half of the 2nd c.	Kuzelin	10,1	arch. excavations, 1991	Museum of Prigorje Sesvete 166/94
Scordisci							
18	Syrmian phase C?	AE tdr		Repušnica	6,57	heavily worn	AMZ G362
19	Syrmian phase C?	AE dr		Samobor	1,9		Coll. Lanz 515 (Kostial 1997, 96)
20	Syrmian phase C?	AE dr		Samobor	1,74		Coll. Lanz 516 (Kostial 1997, 96)
Imitations of staters of Alexander III							
21		AV	3rd c.	Radoboj	8,46		AMZ A1188
22		AV	3rd c.	?	8,34	probably NW Croatia	AMZ A1187

No.	Type	Denomination	Date (B.C.)	Site	Weight (g)	Comment	Provenance
23		AV	3rd c.	Ludbreg	8,21		AMZ A4674
24		AV	3rd c.	Varaždin area	7,84		AMZ A13427
Boii							
25	Muschelstater	AV	1st half of the 2nd – 1st half of the 1st c. (2nd half of the 2nd c.)	near Zagreb	5,89 or 6,89		Dessewffy 1910, no. 485
Norican							
26	Magdalensberg	scs	2nd c. – before 16/15	Đurđevac			GR 50059
27	Magdalensberg	scs	2nd c. – before 16/15	Đurđevac			GR 50060
Tauriscan							
28	Varaždin A	tdr		Kalnik	12,4		priv. coll.
29	Varaždin A/B	tdr		Vaganac (Ogulin)	10,42		AMZ A915
30	Varaždin B	tdr		Križevci	11,94		AMZ A909
31	early Tauriscan	obol	Lt C2, 200 – 150 B.C.	Zvonimirovo – Veliko polje	0,44	grave find	PN 1180
32	Samobor A	tdr		Croatia	11,14	probably NW Croatia	AMZ A8868

No.	Type	Denomination	Date (B.C.)	Site	Weight (g)	Comment	Provenance
33	Samobor A	tdr		Croatia	10,85	probably NW Croatia	AMZ A9582
34	Samobor A	AE tdr		Kuzelin	7,96	arch. exc.	Museum of Prigorje Sesvete
35	Samobor B (early)[1]	tdr		Osječenica		priv. coll.	Durman 1992, 127; 2009, 13
36	Samobor B, *TKN* 45 -109	tdr		Sv. Marija near Okić	11,1		AMZ A10436
37	Samobor B	(AE?) tdr		Kuzelin	10.54	arch. exc. 1983	Museum of Prigorje Sesvete 168/94
38	Đurđevac	tdr		Varaždin	10,42		BP/16/1955.69
39	Đurđevac	tdr		Bjelovar county	10,30		Nemzeti (Dessewffy 1910, no. 90)
40	Đurđevac	tdr		Kuzelin	9,6	arch. exc.	Museum of Prigorje Sesvete
41	Đurđevac	AE tdr		Kuzelin	9,45	arch. exc. 1981	Museum of Prigorje Sesvete 167/94
42	Đurđevac	tdr		Varaždin	8,84		priv. coll. (lost)
43	Đurđevac	AE tdr		Kuzelin	8,17	in the floor of a Celtic house, arch. exc. 1984	Museum of Prigorje Sesvete 169/94
44	Đurđevac	tdr		Veliki Kalnik	7,24		AMZ A917
45	Đurđevac	AE tdr		Ščitarjevo			Roman-period grave (SU 328, grave 2, quadrant a2, special find no. 493); Bilić 2012, 364

No.	Type	Denomination	Date (B.C.)	Site	Weight (g)	Comment	Provenance
46	Frontalgesicht	tdr		Tounj	7,59		AMZ A918
47	Brezelohr B	tdr		near Varaždin	9,83		
48	Augentyp-Stamm	tdr	2nd/1st c.	Kuzelin	8,67	arch. exc.	Museum of Prigorje Sesvete
49	Augentyp-Stamm	tdr		Đurđevac			Dembsky 1998, 92 no. 910
50	Wuschelkopf, *TKN* 85–173	tdr		Zagreb-Stenjevec	9,36		AMZ A10950; Pink 1937, 48; Klemenc 1938, 38 (both erroneously classified the coin as "Samobor")
51	Samobor C	AE (Škoberne 1994, 32) or AG ("poor silver", Mirnik 1998, 487) tdr		Zagreb Upper Town – the Town Museum of Zagreb site	7,88	arch. exc., late La Tène context	City Museum Zagreb
52	Samobor C (SC23)	tdr		Mahično near Karlovac			Čučković 2009, 16
53	Tauriscan? Samobor?	tdr		Osječenica		priv. coll.	Durman 1992, 127; 2009, 13; Ožanić 1998, 36
Celtic – undetermined							
54				Petrijanec		sole information: Celtic coin	Tkalčić's journal
55		tdr		Cerje Tužno near Ivanec	8,47	sole information: Celtic coin	AMZ archives

No.	Type	Denomination	Date (B.C.)	Site	Weight (g)	Comment	Provenance
Republican							
56	RRC 245.1	d	134	Drežnik			AMZ B678
57	RRC 335.1b	d	late 90s	Osječenica		arch. exc., mixed Roman and prehistoric material or a Roman layer	Durman 1992, 127; 2009: 11, 13; Ožanić 1998, 29, 36-37
58	RRC 400.1a	d	71	Kiringrad			AMZ B1404
59	RRC 403.1	d	70	Međimurje			AMZ B1405
60	RRC 422.1b	d	58	Končanica			AMZ B1015
61	RRC 443	d	49–48	near Prelog			Museum of Međimurje
62	RRC 494.9a	AV	42	the Lonja at Preloščica			AMZ B716
63	RRC 544	d	32–31	Ščitarjevo – Župna livada		arch. exc., unknown layer	Museum of Turopolje A-402
64	RRC 544	d	32–31	Ludbreg			
65	RRC ?			Dubovac		information from a news portal	Čučković 2008

[1] Classified by P. Kos (*pers. comm.*).

Table 2: Pre-Imperial coin hoards from north-west Croatia

No.	Site	Composition	Date (B.C.)	Comment
	Macedonia			
1	Croatia	c. 10 AV staters of Alexander III	last 3rd of the 4th c.	undisclosed precise location
	Apollonia and Dyrrachium imitations			
2	Odra Sisačka	70 or 72 AE imitations of Apolloniate and Dyrrachian drachms	end of the 1st quarter of the 1st c. or later	
	Barbaro-Celtic/Iron Age			
3	Narta	33 Huşi-Vovrieşti tdr, 3 original Macedonian coins (?)	end of the 3rd – mid 2nd c. or earlier	
4	Ribnjačka	112 imitations of tdr of Philipp II (44 Turnierreiter, 20 Dreieckhals, 6 Puppenreiter)	first half of the 2nd c.	
5	Sveti Petar Orehovec near Križevci	>2 Kapostaler tdr	mid 2nd c–late 1st c.	
6	Križovljan near Varaždin	109 tdr of Varaždin A and B + Augentyp-Stamm	end of the 1st half of the 2nd c.	the presence of Augentyp-Stamm coin questionable
7	Okić near Samobor	c. 1300 tdr of Samobor A and B type	early 2nd half of the 2nd c.	
8	Šemovec near Đurđevac	c. 400 tdr of Đurđevac type		perhaps also contained a specimen of Samobor A type

No.	Site	Composition	Date (B.C.)	Comment
9	Kozarevac near Koprivnica	7 tdr of Đurđevac type		perhaps part of the Đurđevac hoard (not included in Kos 2009) Pink 1939, 139 (7 pieces, but notes only 6): Dessewffy 1910, nos. 90, 477-480, 734; *TKN*, nos. 12, 60, 68, 70, 84, 103; the only possible correlation is Dessewffy 1910, no. 478/*TKN*, no. 84; BP 27A/1898/1-3, 31A/1898/1898/1, 3, R. I. 6062 + 31A/1898/2 (a letter from K. Biró-Sey of 11th of July, 1988, AMZ archives)
10	Špišić Bukovica near Virovitica	12 AR, undisclosed no. of coins of Đurđevac type		the presence of Đurđevac coins questionable
11	Bartolovec-Jalžabet	12 AE tdr of Đurđevac type		possible presence of other types of coins; low quality metal and poor workmanship (irregular issues); two specimens silvered
12	Pokupsko	2 early Đurđevac tdr, 3 Samobor A tdr, 3 Samobor B tdr	140s	
13	Đurđevac 1905	1 Augentyp-Stamm		KHM Wien 26977
14	Banjšćina near Varaždinske Toplice	>2 AR Celtic tdr: Varaždin or Ribnjačka (i.e., Turnierreiter?)		attribution by Zmajić 1967, 24
	Roman Republican			
15	Sisak 1878	4 d	46	

ABBREVIATIONS

HNI = Rutter, N. K. (ed.), *Historia Nummorum. Italy*, London, British Museum Press, 2001.

MAA = J. Alexandropoulos, *Les monnaies de l'Afrique antique 400 av. J.-C. – 40 ap. J.-C.*, Toulouse, Presses universitaires du Mirail, 2007.

Price = M. J. Price, *The Coinage in the Name of Alexander the Great and Philip Arrhidaeus*, Volume I–II, Zurich, London, The British Museum, Swiss Numismatic Society, 1991.

OTA = R. Göbl, *Ostkeltischer Typen-Atlas*, Braunschweig, Klinkhardt & Biermann, 1973.

RRC = M. Crawford, *Roman Republican Coinage*, Volume I–II, Cambridge, Cambridge University Press, 1983.

SNG Cop. = *Sylloge nummorum graecorum. The Royal Collection of Coins and Medals. Danish National Museum,* 1*, Italy*, West Milford, Sunrise Publications, 1981.

SNG De, Tübingen 2 = *Sylloge nummorum graecorum Deutschland. Münzammlung der Universität Tübingen,* 2, *Taurische Chersones – Korkyra*, Berlin, Mann, 1982.

SNG Öst, Dreer 1 = *Sylloge nummorum graecorum, Sammlung Dreer, Klagenfurt im Landesmuseum für Kärnten*, 1, *Italien – Sizilien*, Klagenfurt, Geschichtsverein für Kärnten, 1967.

SNG Öst, Dreer 3 = *Sylloge nummorum graecorum, Sammlung Dreer, Klagenfurt im Landesmuseum für Kärnten*, 3, *Thracien – Macedonien Päonien*, Klagenfurt, Landesmuseum für Kärnten, 1990.

TKN = R. Göbl, *Typologie und Chronologie der keltischen Münzprägung in Noricum*, Wien, Österreichischen Akademie des Wissenschaften, 1973.

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Aquae Iasae – nova otkrića u rimskom svetištu – s posebnim osvrtom na kultove Apolona, Eskulapa i Serapisa

Aquae Iasae – new discoveries in the Roman sanctuary – with special regard to the cults of Apollo, Aesculapius and Serapis

UDK / UDC: 903.7(497.5 Varaždinske Toplice)"652"
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Članak obrađuje rezultate novih istraživanja u Varaždinskim Toplicama, koja su provedena od 2011. do 2015. godine na prostoru rimskog svetišta, oko prirodnog izvora termalne vode. Istraživanjima je ustanovljeno da je u 1. stoljeću izvor bio ograđen na širem prostoru, a u 2. stoljeću oko njega se gradi pravokutna konstrukcija – izvorišni bazen veličine 8 x 13,5 m, iz kojeg se sustavom kanala termalna voda odvodila u kupališta. Pokazalo se da su za popravke izvorišnog bazena u 4. stoljeću korišteni stariji natpisi, reljefi, pa čak i skulpture koje su, kao običan građevinski materijal, poslužile za gradnju i zatrpavanje. Pronađeno je više od 50 žrtvenika, natpisa i reljefa, a u samome izvorištu oko 17.000 rimskih kovanica. U članku se pozornost posebno obratila na dio nalaza koji svjedoči o prisutnosti kultova Apolona (Apolona – Sola),

The paper presents the results of the new archaeological excavations in Varaždinske Toplice, conducted from 2011 to 2015 in the area of the Roman sanctuary built around the natural hot spring. The excavations have shown that a wide area around the spring was enclosed during the 1st century AD, while a rectangular structure was built around it in the 2nd century AD; a spring reservoir 8 x 13.5 meters in size, from which thermal water was then lead to the baths through a system of canals. It was discovered that the spring reservoir was repaired in the 4th century AD using older inscriptions, reliefs, and even sculptures, which were used as regular construction material for masonry and backfill. More than 50 sacrificial altars, inscriptions, and reliefs were found, while the spring itself contained 17,000 Roman coins. Special attention is given in the paper to the finds that confirm the existence of

Eskulapa i Serapisa u razdoblju s 2. na 3. stoljeće, a koji govore o popularnosti ovoga svetišta i među najvišim državnim službenicima toga vremena. Novi nalazi ukazuju i na mogućnost da je oko termalnog izvora bilo i proročište, a prema nalazu jednog reljefa s natpisom može se pretpostaviti točan datum održavanja svečanosti u čast ženskih božanstava – Izide Fortune, Venere i nimfa.

Ključne riječi: *Varaždinske Toplice, termalna sumporna voda, izvorišni bazen, Apolon, Eskulap, Serapis, proročište*

cults dedicated to Apollo (Apollo/Sol), Aesculapius, and Serapis at the baths during the 2nd and 3rd century AD, which also testify to the popularity of this sanctuary among the highest government officials of the time. New finds also indicate the possibility of an oracle around the spring, and a relief with an inscription could allow us to infer the exact date of the festivities held in honour of female deities: Isis/Fortuna, Venus, and the nymphs.

Key words: *Varaždinske Toplice, thermal sulphur water, spring reservoir, Apollo, Aesculapius, Serapis, oracle*

Slika / Figure 1: Kompleks rimske arhitekture u gradskom parku u Varaždinkim Toplicama (avionski snimak: Vektra, Varaždin). / Roman architectural complex in the town park in Varaždinske Toplice (aerial photo by Vektra, Varaždin).

KOMPLEKS RIMSKE ARHITEKTURE U GRADSKOM PARKU

Od 1953. godine Arheološki muzej u Zagrebu provodi istraživanja na prostoru gradskog parka u Varaždinskim Toplicama. Na toj je lokaciji, na površini od 6000 m², otkriven kompleks rimske javne arhitekture, a sastoji se od dvije cjeline – kupališnog dijela (kupalište i bazilika) i svetišta izgrađenog oko prirodnog izvora termalne sumporne vode (sl. 1, 2).[1]

[1] Nemeth-Ehrlich, Kušan Špalj 2014, 24-27, 36-41; Nemeth-Ehrlich, Kušan Špalj 2014a, 133-140; Nemeth-Ehrlich, Kušan Špalj, 2015, 24-27, 36-41.

ROMAN ARCHITECTURAL COMPLEX IN THE TOWN PARK

Since 1953, the Archaeological Museum in Zagreb has conducted excavations at the town park in Varaždinske Toplice. A public Roman architectural complex was discovered at the site, covering an area of 6000 m² and comprised of two separate sections: the thermae section (the baths and basilica) and the sanctuary built around the natural spring of thermal sulphur water (Fig. 1, 2).[1]

[1] Nemeth-Ehrlich, Kušan Špalj 2014, 24-27, 36-41; Nemeth-Ehrlich, Kušan Špalj 2014a, 133-140; Nemeth-Ehrlich, Kušan Špalj, 2015, 24-27, 36-41;

Od 1. do 4. stoljeća izgradnja na ovome prostoru uglavnom je bila prilagođena položaju i značaju prirodnog izvorišta tako što je građevinskim rješenjima postignuto optimalno korištenje termalne vode, a istovremeno je arhitektonskim oblikovanjem naglašen i njegov mistični te kultni karakter. Sva dosadašnja istraživanja, brojni nalazi i sačuvana arhitektura svjedoče o važnosti rimskog naselja u razdoblju od 1. do 4. stoljeća, koje je zbog svoje ljekovite vode bilo vrlo popularno lječilište i svetište, poznato i među najvišim društvenim krugovima Rimskoga Carstva.

From the 1st to the 4th century, construction in this area was in accordance with the position and significance of the natural spring in the regard that optimal use of the thermal water was achieved through structural solutions, while at the same time using architectural interventions to emphasize the mystical and cult nature of the hot spring. The previous excavations, numerous finds, and preserved architectural remains testify to the importance of the Roman settlement from the 1st to the 4th century, which was a popular health resort and sanctuary due to its curative water, known even amongst the highest social circles of the Roman Empire.

Slika / Figure 2: 3D virtualna rekonstrukcija kompleksa rimske arhitekture u Varaždinskim Toplicama, 4. st. (izradio: Studio Kušan, Zagreb). / 3D virtual reconstruction of the Roman architectural complex in Varaždinske Toplice, 4th c. (made by Studio Kušan, Zagreb).

ARHEOLOŠKA ISTRAŽIVANJA NA PROSTORU RIMSKOG SVETIŠTA

U prvoj fazi radova na ovome lokalitetu, od 1953. do 1982. godine, koja su vodili prof. M. Gorenc, dr. sc. B. Vikić i V. Damevski, istražen je kupališni dio kompleksa i veći dio svetišta.[2] Naime, tada još nije bilo moguće istraživanje prostora oko prirodnog izvora jer su se u tome dijelu nalazile aktivne izvorske instalacije kojima je ter-

[2] Vikić-Belančić, Gorenc 1958, 75-127; Vikić-Belančić, Gorenc 1961, 181-223; Vikić-Belančić, Gorenc 1970, 121-157; Gorenc, Vikić 1963, 111-117; Gorenc, Vikić 1975, 32-50; Gorenc, Vikić 1980; Nemeth-Ehrlich et al. 1997.

ARCHAEOLOGICAL EXCAVATIONS OF THE ROMAN SANCTUARY

In the first phase of excavations at this site from 1953 to 1982, which was headed by Prof. M. Gorenc, B. Vikić, PhD, and V. Damevski, the bath section of the complex was excavated, along with a larger portion of the sanctuary.[2] Namely, the excavation of the area around the natural hot spring was not possible at the time because active spring installations that lead

[2] Vikić-Belančić, Gorenc 1958, 75-127; Vikić-Belančić, Gorenc 1961, 181-223; Vikić-Belančić, Gorenc 1970, 121-157; Gorenc, Vikić 1963, 111-117; Gorenc, Vikić 1975, 32-50; Gorenc, Vikić 1980; Nemeth-Ehrlich et al. 1997.

Slika / Figure 3: Pogled na izvorišni bazen, nakon istraživanja 2006.god. (snimila D. Nemeth-Ehrlich). / Spring reservoir after the 2006 excavations (photo by D. Nemeth-Ehrlich).

malna voda odvođena u lječilište.[3] Premda su radovi na ovome lokalitetu nastavljeni početkom 90-ih godina,[4] istraživanja u samom svetištu nastavljena su tek 1997., odnosno 1998. godine[5], kada se zahvaljujući dobroj suradnji sa Specijalnom bolnicom Varaždinske Toplice uspio postići dogovor o premještanju cjevovoda i postavljanju nove bušotine izvan rimskog svetišta. Tako se 1998. godine provelo istraživanje do nivoa opločenja svetišta, a u središnjem dijelu pojavili su se zidovi jedne pravokutne konstrukcije (vel. 13,5 x 8 m). Već se tada pretpostavilo da je riječ o izvorišnom bazenu kojim je bio „ograđen" prirodni izvor, odnosno o kaptaži prirodnog izvora,[6] na način kako je poznato i iz rimskog naselja

[3] Na tom se prostoru nalazila bušotina kojom se voda od 1962. godine crpila iz dubljih slojeva te cjevovod za odvodnju termalne vode u Specijalne bolnice za medicinsku rehabilitaciju.

[4] Zahvaljujući sredstvima Ministarstva kulture RH, radove ponovno pokreće Arheološki muzej u Zagrebu pod vodstvom D. Nemeth-Ehrlich. Od 1992. do 1996. godine radovi su usmjereni na sanaciju rimske arhitekture, okolne padine, izradu drenaže i pripremu potrebne projektne i konzervatorske dokumentacije; Nemeth-Ehrlich 1997a, 73-79.

[5] Nemeth-Ehrlich, Kušan 1999, 68-74.

[6] Kušan Špalj 1999, 111-113.

the thermal water to the health resort were located in that section of the site.[3] Even though excavations were continued at the site in the early 1990s,[4] the excavations of the sanctuary itself were continued as late as 1997 and 1998,[5] when a compromise was reached thanks to good cooperation with the Special hospital for rehabilitation in Varaždinske Toplice, resulting in the relocation of the pipeline and drilling of a new well outside the parameters of the Roman sanctuary. In 1998, the sanctuary was excavated to the level of its paving, and a rectangular structure (13.5 x 8 m) was discovered in the central area. Even then the researchers speculated that the rectangular structure was a reservoir "enclosing" the natural spring, i.e. a reservoir used for catchment,[6] in the same

[3] There was a well in this place through which thermal water was pumped up and lead by a pipeline to the Special hospital for rehabilitation since 1962.

[4] Thanks to the funds provided by Croatia's Ministry of Culture, the Archaeological Museum in Zagreb continued the excavations, headed by D. Nemeth-Ehrlich. Between 1992 and 1996, the work focused on conserving the Roman architecture, stabilizing the surrounding slope, laying down drainage, and preparing the necessary project and conservation documentation; Nemeth-Ehrlich 1997a , 73-79;

[5] Nemeth-Ehrlich, Kušan 1999, 68-74;

[6] Kušan Špalj 1999, 111-113.

Slika / Figure 4: Pogled na izvorišni bazen, nakon istraživanja 2006. god. (snimila D. Nemeth-Ehrlich). / Spring reservoir after the 2006 excavation (photo by D. Nemeth-Ehrlich).

Aquae Sulis (Bath).[7] To je potvrđeno 2006. godine, kada je izvorišni bazen istražen do dna zidova,[8] a nakon što su ugašene pumpe kojima je termalna voda ispumpavana tijekom radova,[9] prvi put nakon rimskog vremena bazen se ispunio termalnom vodom (sl. 3, 4).

Istraživanja koja su uslijedila od 2011. do 2013. godine donijela su iznimno važna otkrića jer se pokazalo da su za popravke izvorišnog bazena, najvjerojatnije u 4. stoljeću, korišteni stariji natpisi, reljefi, pa čak i skulpture koje su, kao običan građevinski materijal, poslužile za gradnju i zatrpavanje (sl. 5).[10] Pronađeno je više od 50 žrtvenika, natpisa, reljefa i dijelova skulptura, a

[7] Cunliffe, B., Davenport 1985, 37-45.

[8] Nemeth-Ehrlich, Kušan Špalj 2007,150-153; Nemeth-Ehrlich, Kušan Špalj 2011, 211-232; Kušan Špalj, Nemeth-Ehrlich, 2012, 107 -112.

[9] Zbog prirodnog izviranja termalne vode (temperature 58 °C) brzinom do 20 l/s, cijelo su vrijeme trajanja radova bile uključene dvije, ponekad i četiri muljne pumpe, a zbog pojave štetnih plinova – ugljičnog monoksida (CO) i sumporovodika (H_2S), korišteni su ventilatori i ograničavan je boravak radnika u iskopu.

[10] Nemeth-Ehrlich, Kušan Špalj, 2014, 28-32, 42-45; Nemeth-Ehrlich, Kušan Špalj, 2015, 28-32, 42-45.

manner as in the Roman settlement of Aquae Sulis (Bath).[7] The hypothesis was confirmed in 2006, when the reservoir was excavated to the bottom of its walls.[8] After the pumps that pumped out the thermal water during excavations were turned off,[9] the reservoir filled up with thermal water for the first time since antiquity (Fig. 3, 4).

The excavations conducted from 2011 to 2013 resulted in extremely important discoveries regarding the repairs of the spring reservoir, probably conducted during the 4th century. Older inscriptions, reliefs, and even sculptures were used as common building material, used for construction and backfill (Fig. 5).[10] More than 50 sacrificial altars, inscriptions, reliefs, and parts of sculptures were discovered, while

[7] Cunliffe, B., Davenport 1985, 37-45

[8] Nemeth-Ehrlich, Kušan Špalj 2007,150-153; Nemeth-Ehrlich, Kušan Špalj 2011, 211-232; Kušan Špalj, Nemeth-Ehrlich, 2012, 107 -112;

[9] Because the thermal water (58 °C) emerges naturally at 20 l/s, two, and sometimes four, sludge pumps were used during excavations, while fans were used to disperse the harmful gasses carbon monoxide (CO) and hydrogen sulphide (H2S), and the time the workers spent in the dig was limited

[10] Nemeth-Ehrlich, Kušan Špalj, 2014, 28-32, 42-45; Nemeth-Ehrlich, Kušan Špalj, 2015, 28-32,42-45;

Slika / Figure 5: Pogled na prostor svetišta i izvorišni bazen, tijekom istraživanja 2011. god. (snimila D. Nemeth-Ehrlich). / Sanctuary and spring reservoir during the 2011 excavations (photo by D. Nemeth-Ehrlich).

u ispiranju blata, koje je ispunjavalo izvorišni bazen, pronađeno je oko 17.000 rimskih kovanica[11] i nešto nakita (perle, prstenje, narukvice)[12], što su kao zavjetni darovi ubacivani u vodu, najvjerojatnije u čast nimfama, zaštitnicama termalnog izvora. Ti su nalazi nepregledni izvor novih informacija o razvoju svetišta uz termalni izvor, o božanstvima koja su štovana, popratnim ritualima i običajima, ali i ljudima koji su posjećivali ovo lječilište.

Sama gradnja izvorišnog bazena predstavljala je iznimno složen građevinski zahvat kojem je prethodilo preusmjeravanje termalne vode kako bi se moglo graditi na suhome. Drveni kanal, pronađen južno od izvorišnog bazena, vjerojatno je korišten u tu svrhu tijekom gradnje u 2. stoljeću,[13] a duboki zidani kanal u jugoistočnom dijelu

[11] Bilić, 2014, 120-126; Bilić, 2015, 120-126.

[12] Perok 2014, kat. br. 90-114.

[13] Kanal je istražen 2014. godine.

the mud that filled the spring reservoir yielded approximately 17,000 Roman coins[11] and several pieces of jewellery (beads, rings, bracelets)[12] that were dropped into the water as votive offerings, most likely to the nymphs who were the guardians of the hot spring. The finds are a vast source of information about the evolution of the sanctuary around the hot spring, the deities worshiped there, accompanying rituals and customs, as well as the people who visited the health resort.

The construction of the spring reservoir itself was a complex feat because the thermal water had to be redirected so the construction site would be dry. A wooden canal, discovered south of the spring reservoir, was probably used to redirect the water during construction in the 2nd century,[13] while a deep stone-built canal in

[11] Bilić, 2014, 120-126; Bilić, 2015, 120-126.

[12] Perok 2014, Cat. no. 90-114.

[13] The canal was excavated in 2014

Slika / Figure 6: Zidani kanal, južno od izvorišnog bazena, koji je vjerojatno služio za pražnjenje vode (snimila D. Kušan Špalj). / Stone-built canal to the south of the spring reservoir, probably used for drainage (photo by D. Kušan Špalj).

Slika / Figure 7: Sjeveroistočni ugao izvorišnog bazena sa sustavom učvršćenja terena, tijekom istraživanja 2012. god. (snimila D. Nemeth-Ehrlich). / North-eastern corner of the spring reservoir with a system for terrain stabilisation during the 2012 excavations (photo by D. Nemeth-Ehrlich).

vjerojatno tijekom velike obnove u 4. stoljeću (sl. 6).[14] Prije gradnje zidova proveden je vrlo kompliciran zahvat učvršćenja terena, kako bi se stvorilo stabilno tlo za gradnju. Zbog toga su drveni hrastovi piloti zabijeni ispod zidova prije gradnje temelja, a učvršćen je teren unutar i izvan bazena (sl. 7). Istočni i zapadni zid izravno su izgrađeni na padini prirodne gline koja se strmo spušta prema sredini bazena, dok je tlo ispod sjevernog i južnog zida bilo znatno nestabilnije, kao i prostor južno od bazena. To je bio i razlog zbog čega su sjeverni i južni zid popravljani u 4. stoljeću, dok o gradnji u 2. stoljeću svjedoče istočni i zapadni zid, koji mjestimično imaju i sačuvanu ogradu. Za gradnju zidova u 2. stoljeću upotrijebljen je lokalni kamen – litotamnijski vapnenac

[14] Nemeth-Ehrlich, Kušan Špalj 2014, 28, 42; Nemeth-Ehrlich, Kušan Špalj 2015, 28, 42.

the south-eastern section was probably used during repairs in the 4th century (Fig. 6).[14] Before the walls could be erected, there was the complex task of stabilizing the terrain in order to make the ground suitable for construction. Oak piles were driven in below the walls before the foundations were laid down, while the terrain in and around the reservoir was stabilized as well (Fig. 7). The eastern and western walls were built directly on a steep natural clay deposit that slopes toward the centre of the reservoir, while the soil beneath the northern and southern walls was significantly more unstable, as was the terrain south of the reservoir. The northern and southern walls were repaired in the 4th century for exactly that reason, while the eastern and western walls remained intact in their original form from the 2nd century, with sections of their fence still intact. The

[14] Nemeth-Ehrlich, Kušan Špalj 2014, 28, 42; Nemeth-Ehrlich, Kušan Špalj 2015, 28,42;

Slika / Figure 8: Pogled na urušeni sjeverni zid izvorišnog bazena, tijekom istraživanja 2011. god. (snimila D. Nemeth-Ehrlich). / A collapsed northern wall of the spring reservoir during the 2011 excavations (photo by D. Nemeth-Ehrlich).

raznih struktura[15] koji je, ovisno o čvrstoći i drugim svojstvima, korišten za pojedine dijelove zida. Temelj je bio građen od većih, grubo obrađenih blokova, a zid se sastojao od tri reda pravokutnih kamenih blokova

original walls from the 2nd century were constructed from local stone; lithothamnium limestone of different textures,[15] which was used for different parts of the walls depending on its hardness and other properties. The founda-

[15] Aljinović 2014, 126-129; Aljinović 2015, 126-129.

[15] Aljinović 2014, 126-129; Aljinović 2015, 126-129

Slika / Figure 9: Pogled na južni zid izvorišnog bazena s vidljivom konstrukcijom zida sa sekundarno upotrebljenim spomenicima, tijekom istraživanja prostora južno od izvorišta 2011. god. (snimila D. Nemeth-Ehrlich). / Southern wall of the spring reservoir with a wall constructed of reused monuments during the 2011 excavations of the area to the south of the spring (photo by D. Nemeth-Ehrlich).

u tehnici *opus quadratum*.[16] Za taj je dio zida upotrijebljen vrlo mekani, ali gusti sitnozrnati vapnenac, kojeg je bilo moguće vrlo precizno obraditi kako bi blokovi potpuno prianjali jedan uz drugi, dok je gustoća kamena osigurala nepropusnost zida. Kameni su blokovi slagani na način da su neki bili postavljeni uzdužno, a neki poprečno, te je tako postignuto dodatno učvršćenje i sidrenje u okolni teren. Iznad dijela zida, u tehnici *opus quadratum*, postavljen je završni red kamenih blokova od gušćeg vapnenca, visine 25 cm i širine 70 cm, s utorom (dubine 5 – 10 cm), a služio je kao ležište za kamene grede ograde. Za grede, od kojih je bila izrađena ograda (visine 70 cm), upotrijebljen je krupnozrnati vapnenac, otporan na vanjske uvjete. Dodatnu čvrstoću ovoj konstrukciji davalo je kutno i vezno kamenje kojim su bile međusobno povezane kamene grede, kao i

[16] Adam 1999, 206.

tion was made out of large rough-hewn blocks, while the walls were built out of three lines of rectangular stone blocks in the technique of *opus quadratum*.[16] This section of the wall was built from a very soft, but dense fine-grained limestone, which could be finely cut to adhere to one another completely, while the density of the stone ensured the walls would be watertight. Some of the stone blocks were laid down longitudinally, while others were laid down transversely, making the wall stronger and anchoring it to the surrounding terrain. Above the section of the wall built in the technique of *opus quadratum*, there was a final line of stone blocks made out of a more dense type of limestone, 25 cm in height and 70 cm in width, with slots (5-10 cm in depth), serving as the base for the fence's stone beams. A course-grained limestone resistant to adverse weather conditions was utilized for the beams and slabs, from which a 70 cm high fence was made. The fence

[16] Adam 1999, 206.

kameni blokovi koji su povezivali ogradu s opločenjem foruma. Prema načinu gradnje i upotrijebljenom materijalu, očito je da su na većem dijelu sjevernog i južnog zida izvršeni popravci tijekom obnove kompleksa, najvjerojatnije početkom 4. stoljeća. Ti su zidovi zatečeni u vrlo oštećenom stanju, što pokazuje kako je došlo do pomicanja terena i nakon njihove obnove u 4. stoljeću. Vjerojatno je došlo do ispiranja i pomicanja tla u području izviranja vode, zbog čega su zidovi i slojevi s rimskim nalazima propali prema sredini bazena. Zbog toga se i veći dio sjevernog zida urušio, a ostao je sačuvan samo u rubnim dijelovima (sl. 8), dok je južni zid sačuvan u cijelosti, zajedno s ogradom, ali se pomaknuo i potonuo prema sredini izvorišnog bazena (sl. 9). U urušenju sjevernog zida, ali i u njegovim sačuvanim dijelovima, te u južnom zidu, pronađeni su brojni sekundarno upotrijebljeni natpisi, žrtvenici i reljefi. To je kamenje, uz manje dorade, korišteno za gradnju i slagano u sličnoj tehnici, kao i zidovi iz 2. stoljeća. U urušenju i konstrukciji ovih zidova pronađeno je i više dijelova tanjih mramornih ploča – uglavnom fragmenata reljefa i natpisa, a koji su korišteni za podlaganje većih kamenih blokova u konstrukciji zidova. Zanimljivo je i da su neki dijelovi istih ploča pronađeni na raznim mjestima; npr. dijelovi istih reljefa pronađeni su u konstrukciji sjevernog i južnog zida, a jedan je reljef s prikazom 3 nimfe,[17] čiji su dijelovi nađeni uz sjeverni zid izvorišta, nadopunjen fragmentima pronađenim još 60-ih godina u zidu istočnog hrama i jednom zidu kupališta, što potvrđuje i istovremenost obnove tih objekata.

[17] Kušan Špalj, 2014, 61-62, 86-87. kat. br. 80: Kušan Špalj, 2015, 61-62, 86-87. kat. br. 80.

was additionally strengthened by the corner and binding stones by which the stone beams were connected, as well as the stone slabs connecting the fence to the forum paving. According to the manner of construction and the used material, it is apparent that larger sections of the northern and southern walls were repaired when the complex was being renovated, probably at the beginning of the 4th century. There was probably significant erosion and soil shift in the vicinity of the spring so the walls and archaeological layers with Roman finds shifted along toward the centre of the reservoir. A larger section of the northern wall collapsed because of this as well (Fig. 8), and only the corner sections remained intact. The southern wall was preserved in its entirety, along with its fence, but did shift and sink toward the centre of the spring reservoir (Fig. 9). In the rubble of the northern wall, but also in its preserved sections, and incorporated into the southern wall, numerous reused inscriptions, sacrificial altars, and reliefs were found. The material was reworked used for construction using a similar technique as the one used for the walls from the 2nd century. In the rubble and structure of these walls, several thin slabs of marble were found; mostly fragments of reliefs and inscriptions, which were used as chocks for fixing larger blocks of stone into place. It is interesting to note that different pieces of the same slabs were found in different places, e.g. pieces of the same relief were found in both the northern and southern wall. One relief depicting three nymphs[17] was found along the northern wall of the spring and matched fragments found in the structure of the wall of the eastern temple and one wall of the baths during the excavations conducted in 1960's, which confirms that the different structures were repaired and renovated at the same time.

[17] Kušan Špalj, 2014, 61-62, 86-87. Cat.no. 80: Kušan Špalj, 2015, 61-62, 86-87. Cat.no. 80:

Slika / Figure 10: Pogled na zidove kojima je bilo ograđeno izvorište u 1. st., istraživanje 2013. godine (snimila D. Nemeth-Ehrlich). / Walls surrounding the spring in the 1st c., the 2013 excavations (photo by D. Nemeth-Ehrlich).

PROSTOR SVETIŠTA: FAZE IZGRADNJE I OBNOVE OD 1. DO 4. STOLJEĆA

Prostor oko prirodnog izvora već je u 1. stoljeću imao karakter svetišta, a što su potvrdila istraživanja provedena od 2012. do 2015. godine. Nalaz kamenih zidova i drvenih konstrukcija ukazuju na to kako su u 1. stoljeću Rimljani samo „ogradili" veliku prirodnu jamu, gdje je bilo prirodno izvorište, i tako omogućili pristup vodi. Sa zapadne i istočne strane bili su zidovi s polukružnim nišama, a u sjevernom dijelu stepenasta, ožbukana konstrukcija ispred jednoga pravokutnog objekta (sl. 10).[18] Riječ je najvjerojatnije o hramu, čiji su zidovi sačuvani ispod kasnijega sjevernog stepeništa, a s obzirom na natpise datirane u ovu najraniju fazu,[19] vjerojatno je posrijedi

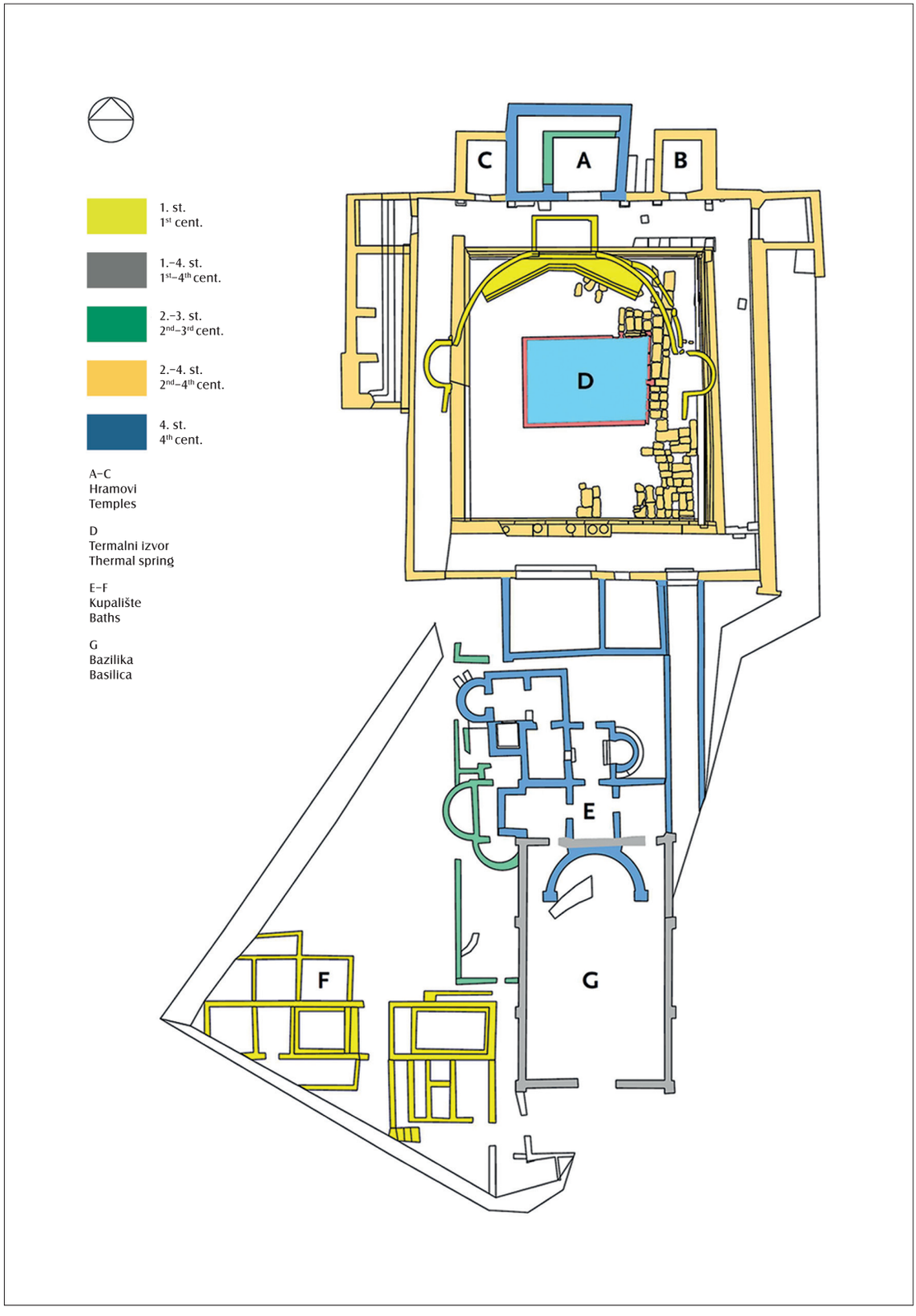
[18] Nemeth-Ehrlich, Kušan Špalj 2014, 32, 46; Nemeth-Ehrlich, Kušan Špalj 2015, 32, 46.

[19] Vikić-Belančić, Gorenc 1970, 151; CIL 4118; CIL III 10893.

THE SANCTUARY: PHASES OF CONSTRUCTION AND REPAIRS FROM THE 1st TO THE 4th CENTURY

The space around the natural spring was a sanctuary as early as the 1st century, which was confirmed by the archaeological excavations conducted from 2012 to 2015. The stone walls and remains of wooden structures discovered show that the Romans simply "fenced off" the large natural spring pit in the 1st century, enabling access to the thermal water. There were walls with semi-circular niches on the western and eastern sides, while a stair-like plastered structure was located on the northern section in front of another rectangular structure (Fig. 10).[18] The rectangular structure was most likely a temple, the walls of which were preserved below the later northern stairs. Taking into consideration the inscriptions, which date

[18] Nemeth-Ehrlich, Kušan Špalj 2014, 32, 46; Nemeth-Ehrlich, Kušan Špalj 2015, 32, 46



Tlocrt / Layout 1: Kompleks rimske arhitekture u gradskom parku, 1– 4. st. (geodetsko snimanje: ing. M. Kadi, Vektra -Varaždin, obrada: Vektra -Varaždin, Studio Kušan, S. Skrinjarić). / Roman architectural complex in the town park, 1st–4th c. (land survey: ing. M. Kadi, Vektra -Varaždin, Studio Kušan, S. Škrinjarić).

svetište posvećeno nimfama. Najnoviji nalazi iz 2015. godine upućuju i na jednu još raniju fazu u kojoj je prostor izviranja bio ograđen samo jednostavnim zidovima bez apsida.

Budući da je u ovim najranijim fazama termalna voda bila „ograđena" na relativno velikom prostoru, istovremeno se i hladila te je od 58 °C, koliko je njezina temperatura kod izviranja, postala ugodne temperature 30 – 35 °C.[20] Stepenasti okvir sugerira da je bio moguć ulazak u vodu, ili sjedenje na samome rubu, tako da se liječenje vjerojatno odvijalo i kao dio rituala u svetištu.[21] Voda je kanalom odvođena u kupalište, i danas vidljivo u jugozapadnom dijelu kompleksa, a koje se sastojalo od niza pravokutnih prostorija i većih stepenastih bazena, pa se može pretpostaviti da je bilo namijenjeno većim grupama ljudi, odnosno najvjerojatnije su u ovoj fazi glavni korisnici bili vojnici.[22]

U 2. stoljeću dogodile su se velike promjene na cijelome kompleksu, vjerojatno kao posljedica sve većeg broja posjetitelja i novih zahtjeva u samome kultu, ali i zbog nove administrativne reorganizacije kada naselje *Aquae Iasae,* vjerojatno, kao dio teritorija kolonije Petovione,[23] postaje glavno lječilište na tome području. U toj je fazi potpuno preuređen prostor oko prirodnog izvorišta, a kako bi se dobila što veća površina, izgradnja se širi u okolno brdo. Radi se o pomno planiranoj izgradnji, s vješto izvedenim građevinskim rješenjima, prilagođenima zadanim prirodnim uvjetima. Kako bi se maksimalno iskoristio prostor za gradnju, zidovima hramova (i bočnih prostorija) „zasijeca" se padina, a sve se dodatno učvršćuje masivnim potpornim zidovima s istočne i zapadne strane. U padini iza zidova izrađen je sustav obodne drenaže kojom se skupljala oborinska voda, a što je bilo važno za spre-

[20] To je potvrđeno i mjerenjem temperature vode, kada je nakon istraživanja 2013. godine termalna voda ispunila istraženi prostor ograđenog izvorišta iz 1. stoljeća.

[21] Kušan Špalj 2014 a,107-108, 114-115; Kušan Špalj 2015a, 107-108, 114-115.

[22] Vikić-Belančić, Gorenc 1970, 151.

[23] Klemenc, Saria 1936, 93; Horvat 2003, 160.

back to the earliest phase, we can presume that the temple was dedicated to the nymphs.[19] The most recent finds from 2015 indicate an even earlier phase, during which the spring was enclosed by simple walls with no apses.

Since the thermal water was "enclosed" in a relatively large space in the earliest phases, it cooled from 58 °C, which is the temperature of the water when it emerges from the ground, to a pleasant temperature between 30 and 35 °C.[20] The stairs indicate that it was possible to enter the water or sit at the very edge of the spring, and healing was probably a part of the rituals conducted in the sanctuary.[21] The water was lead through a canal to the thermae, which can still be seen in the south-western section of the complex, and consisted of rectangular rooms and large stair-like pools, so they were probably intended for larger groups of people, i.e. the main users of the thermae in this phase were soldiers.[22]

The 2nd century brought about significant changes for the entire complex, probably as a result of more numerous visitors and new demands regarding cult worship, but also as a result of administrative reorganization. The settlement of *Aquae Iasae*, belonging to the territory of the Poetovio colony,[23] probably became the main health facility of the region at that time. In this phase, the space around the natural spring was completely renovated, and construction expanded to the nearby hill in order to gain as much space as possible. The construction was carefully planned, and the architectural solutions were skilfully adapted to the challenges of the natural landscape. In order to fully make use of the area for construction, the walls of the temples (and side rooms) "cut" into the slope, additionally strengthened by massive supporting walls from the east and west. On the slope behind the walls, a system of drainage was laid down aimed at collecting rainwater, which was important for preventing the walls from getting

[19] Vikić-Belančić, Gorenc 1970, 151; CIL 4118; CIL III 10893

[20] In 2013, this was confirmed by temperature measurements when water filled the already excavated enclosed spring from the 1st century;

[21] Kušan Špalj 2014 a, 107-108, 114-115; Kušan Špalj 2015a, 107-108, 114-115.

[22] Vikić-Belančić, Gorenc 1970, 151.

[23] Klemenc, Saria 1936, 93; Horvat 2003, 160;

čavanje vlaženja zidova, kao i za stabilnost padine. U ovoj fazi prirodni izvor ograđuje se na manjoj površini, odnosno oko njega se gradi pravokutni bazen veličine 8 x 13,5 m, sa zidovima visine cca 2 m i ogradom. Novim načinom kaptaže izvora mijenja se i njegova funkcija u svetištu jer se voda u manjem prostoru više ne uspijeva dovoljno ohladiti za direktno korištenje. U ovoj fazi liječenje se provodi isključivo u kupalištu u koje se termalna voda dovodi sustavom zidanih kanala, a prirodno izvorište dobiva izrazito kultni karakter, dodatno naglašen izgradnjom okolnog prostora svetišta. Radilo se o relativno zatvorenom prostoru, ograđenom visokim trjemovima, u kojem je dominirao „sveti izvor", a isparavanje vruće termalne vode posve je sigurno pojačavalo vrlo mističnu atmosferu svetišta. Oblik svetišta, kao foruma s kapitolijem, u funkciji je naglašavanja kultnog karaktera izvorišta te je ovdje riječ o jedinstvenoj arhitektonskoj cjelini, u kojoj je prirodnom fenomenu, ljewet, as well as for the stability of the slope. In this phase, a smaller space around the natural spring was enclosed, by building a rectangular 8 x 13.5 m reservoir around it, with walls approximately 2 m high and a fence. The new method of catchment changed the role of the spring within the sanctuary, because the water was not able to cool enough in the smaller space and direct use was not possible. In this phase, healing is reserved for the thermae, to which thermal water was led by a system of canals, and the natural spring is used exclusively for cult worship, highlighted by the construction of the surrounding sanctuary. It was a relatively closed space enclosed by high porticos, dominated by "the sacred spring", and the steam coming from the thermal spring most likely emphasized the mystical atmosphere of the sanctuary. The sanctuary was built as a forum with a capitolium to emphasize the cult character of the spring. A complex architectural structure on top of a natural phenomenon, a healing spring, was imbued by the supernatural, while enabling con-

Slika / Figure 11: 3 D model izgleda svetišta u 4. st., s detaljima ograde izvorišnog bazena (izrađeni na temelju nađenih elemenata), (izradio Studio Kušan, Zagreb). / 3D model of the the 4th c. sanctuary, with a detailed view of the spring reservoir enclosure (made on the basis of existing elements) (made by Studio Kušan, Zagreb).

kovitom izvorištu, dana dimenzija nadnaravnog, a istovremeno je vještinom rimskih graditelja ostvarena i njegova kontrolirana eksploatacija (sl. 11). Poznato je da se cijeli kompleks obnavlja početkom 4. stoljeća,[24] gradi se novo kupalište,[25] ali u izgledu svetišta nije došlo do većih promijena. Građevinski radovi uglavnom su se odnosili na obnovu i popravke pojedinih objekata (krovišta, stupova i sl.) te je proširen središnji hram, nakon čega su svi hramovi natkriveni zajedničkim krovištem. U ovu fazu najvjerojatnije treba smjestiti i popravke izvedene na izvorišnom bazenu i okolnom opločenju, kada su sekundarno iskorišteni brojni kameni spomenici.[26]

KULTOVI U SVETIŠTU OD 1. DO 4. STOLJEĆA

Ljekovita voda[27] je bila bila glavni razlog popularnosti ovog lječilišta i svetišta, ali i štovanja raznih božanstava kojima se pripisivalo njezino čudotvorno djelovanje.

Prema do sada pronađenim zavjetnim natpisima može se pretpostaviti da je u 1. stoljeću svetište bilo posvećeno nimfama[28] i da je tada cijeli prostor bio u funkciji nimfeja.[29] U 2. stoljeću, velikim građevinskim zahvatima i izgradnjom više hramova, uvode se i nova božanstva, a sasvim sigurno uvode se i nove svečanosti te rituali. O vrlo dinamičnom religijskom životu u ovome svetištu svjedoče mnogobrojni novi nalazi reljefa i natpisa[30] koji se uglavnom mogu datirati u razdoblje s 2. na 3. stoljeće. Već su u ranijim istraživanjima pronađeni brojni natpisi[31] s

[24] Natpis na tzv. ploči cara Konstantina (CIL III 4121.) spominje obnovu građevina uništenih u požaru, a arheološka istraživanja potvrdila su građevinske zahvate na cijelome kompleksu tijekom 4. stoljeća.

[25] Vikić-Belančić, Gorenc 1961, 181-223.

[26] Nemeth-Ehrlich, Kušan Špalj 2014, 34, 48-49; Nemeth-Ehrlich, Kušan Špalj 2015, 34, 48-49.

[27] Hajduk, Luetić 1981,59-82; Šimunić, Avanić 2008, 205-218.

[28] CIL 4118; CIL III 10893.

[29] Kušan Špalj 2014a, 108,115; Kušan Špalj 2015a, 108,115.

[30] Nalazi nađeni u istraživanjima prostora rimskog svetišta od 2011. do 2015. godine.

[31] Rendić-Miočević, 1992,67-76; Rendić-Miočević, Šegvić 1998, 7-16; Lučić 2013, 185-255.

trolled exploitation of the spring through the skill of Roman engineers (Fig. 11). The whole complex was renovated during the 4th century,[24] and new baths were added,[25] but there were no major changes to the layout of the sanctuary. Construction work was mostly limited to the repairs of certain elements (roofs, pillars etc.), and the central temple was expanded, after which all the temples were covered with a common roof. The repairs done to the spring reservoir and the surrounding paving should probably also be dated to this phase, when numerous stone monuments were reused.[26]

CULTS IN THE SANCTUARY FROM THE 1ST TO THE 4TH CENTURY

The healing properties of the water[27] was the main reason for the popularity of this health resort and its sanctuary, but also for the worship of deities considered responsible for the water's miraculous effects.

According to discovered votive inscriptions, it can be inferred that the sanctuary was dedicated to the nymphs during the 1st century[28] and that it served as a nymphaeum.[29] In the 2nd century, construction work and new temples brought about new deities, as well as new festivities and rituals. Numerous recent finds of reliefs and inscriptions testify to the dynamic religious activities within the sanctuary,[30] which can mostly be dated to the period from the 2nd to the 3rd century. Earlier excavations also yielded numerous inscriptions[31] dedicated to

[24] An inscription on the so-called tablet of Emperor Constantine (CIL III 4121.) mentions repairs on structures destroyed in a fire, and construction across the whole complex in the 4th century was confirmed by archaeological excavations as well.

[25] Vikić-Belančić, Gorenc 1961, 181-223.

[26] Nemeth-Ehrlich, Kušan Špalj 2014, 34, 48-49; Nemeth-Ehrlich, Kušan Špalj 2015, 34, 48-49.

[27] Hajduk, Luetić 1981, 59-82; Šimunić, Avanić 2008, 205-218.

[28] CIL 4118; CIL III 10893

[29] Kušan Špalj 2014a, 108,115; Kušan Špalj 2015a, 108,115;

[30] Finds discovered during the excavations at the Roman sanctuary between 2011 and 2015.

[31] Rendić-Miočević, 1992, 67-76; Rendić-Miočević, Šegvić 1998, 7-16; Lučić 2013, 185-255.

posvetama nimfama[32], ali i natpisi posvećeni Dijani[33], Fortuni[34], Poluksu[35], Minervi[36], Junoni[37], Silvanama[38], Herkulu[39] i Solu[40]. U posljednjih su nekoliko godina pronađeni i natpisi na kojima se spominju Asklepije i Higija, Izida, Serapis i Apolon, a novi nalazi reljefa i skulptura pokazuju da su u svetištu štovane i božice Izida – Fortuna i Venera te Apolon – Sol i Dijana – Luna.[41] Daleko su najbrojniji reljefi i natpisi posvećeni nimfama koje su, kao zaštitnice vode i personifikacije izvora, predstavljale svojevrsni lokalni kult te se često i spominju kao lokalne nimfe – *iasae.*[42] Zanimljivo je da se na mnogim natpisima pojavljuju i zajedno s drugim božanstvima (npr. s Fortunom, Apolonom, Dijanom, Serapisom, Minervom, Junonom),[43] što svakako ukazuje na specifičnost ovog svetišta u kojem je dominirao kult izvora.

Dosadašnja su istraživanja pokazala da je religijski život ovoga svetišta razvijan na štovanju božanstava vezanih uz liječenje i ozdravljenje, a novi nalazi koji otkrivaju štovanje Apolona, Eskulapa i Serapisa ukazuju i na službenu (državnu) religiju[44] koju su „širili" državni službenici za dinastije Severa, kao i na prisustvo carskog kulta,[45] prije svega vidljivog u isticanju božanskog karaktera cara Karakale.

Osim brojnih nalaza o karakteru svetišta i ambijentu u kojem su se odvijali rituali i svečanosti, najbolje svjedoči „sveti izvor" s ljekovitom vodom koja neprestano izvire i

[32] CIL III 4117, 4118,4119,10891,10893 itd.

[33] AE 1938 0516, Iljug 0356, Iljug-02 1166, Vikić-Belančić, Gorenc 1958,114 itd.

[34] AE 1976,0540.

[35] CIL III 4120; AIJ 466.

[36] ILJug 1169; RIU 2, 13; Gorenc, Vikić 1975, 39; Redő 2003, 204.

[37] ILJug 1168.

[38] AIJ 467; AIJ 468 a, b.

[39] AIJ 458.

[40] Demo 1994, 72; Migotti 1999, 56.

[41] Kušan Špalj 2014, 56-119; Kušan Špalj 2015, 56-119.

[42] AE 1985.,00714; ILJug-02 1170.

[43] Kušan Špalj 2014, 50,70, 76 83, 95, 100. 161 (kat. br.76); Kušan Špalj 2015, 50,70, 76 83, 95, 100. 161 (kat. br. 76.);

[44] Ando 2007, 444.

[45] Fishwick 1991; Weddle 2014.

the nymphs[32], but also inscriptions dedicated to Diana[33], Fortuna[34], Pollux[35], Minerva[36], Juno[37], Silvanae[38], Hercules,[39] and Sol[40]. In recent years, inscriptions were discovered mentioning Asclepius and Hygia, Isis, Serapis, and Apollo, while new finds of sculptures also show that Isis/Fortuna, Venus, Apollo/Sol, and Diana/Luna were worshiped in the sanctuary.[41] The most numerous are the reliefs and inscriptions dedicated to the nymphs, who were the guardians of the water, personifications of the spring, reflected a local cult, and were often referred to as local nymphs, *iasae.*[42] It is interesting to note that they appear on inscriptions dedicated to other deities as well (e.g. Fortuna, Apollo, Diana, Serapis, Minerva, and Juno),[43] which indicates the specific character of this sanctuary, where the cult of the spring was the dominant cult.

Excavations have so far shown that religious worship in this sanctuary revolved around the worship of deities connected with healing and recovery, and new finds show the worship of Apollo, Aesculapius, and Serapis, which indicates the presence of the official (state) religion,[44] "spread" by officials during the rule of the Severan dynasty. The new finds also indicate the presence of the Imperial cult,[45] primarily apparent in the emphasis of the divine nature of Emperor Caracalla.

In addition to the numerous finds, the nature and ambiance of the sanctuary that housed rituals and festivities is best seen in the "sacred spring", providing a constant supply of mystical

[32] CIL III 4117, 4118, 4119, 10891, 10893 etc.

[33] AE 1938 0516, Iljug 0356, Iljug-02 1166, Vikić-Belančić, Gorenc 1958,114 etc.

[34] AE 1976,0540

[35] CIL III 4120; AIJ 466

[36] ILJug 1169; RIU 2, 13; Gorenc, Vikić 1975, 39; Redő 2003, 204.

[37] ILJug 1168

[38] AIJ 467; AIJ 468 a,b;

[39] AIJ 458

[40] Demo 1994, 72; Migotti 1999, 56

[41] Kušan Špalj 2014, 56-119; Kušan Špalj 2015, 56-119;

[42] AE 1985. 00714; ILJug-02 1170.

[43] Kušan Špalj 2014, 50, 70, 76 83, 95, 100. 161 (Cat.no.76); Kušan Špalj 2015, 50,70, 76 83, 95, 100. 161 (Cat. no.76.);

[44] Ando 2007, 444.

[45] Fishwick 1991; Weddle 2014.

dočarava mističnost prostora te tako doprinosi razumijevanju specifičnoga religijskog života naselja *Aquae Iasae*.

KULTOVI ESKULAPA, APOLONA I SERAPISA

Eskulap

U novijim su istraživanjima u Varaždinskim Toplicama pronađeni spomenici koji potvrđuju prisustvo kulta u kojem su zajedno štovani bog liječništva i zdravlja *Aesculapius (*grč. *Asklepios)* i njegova kći Salus – Hygia (grč. *Hygieia)*, božica zdravlja. Djelomično sačuvan žrtvenik, posvećen ovim božanstvima, pronađen je 2001. godine u urušenju kod zapadnog trijema svetišta i vjerojatno je bio sekundarno upotrijebljen u jednom od zidova. Riječ je o jednostavnom žrtveniku, relativno malih dimenzija, izrađenom od gustoga sitnozrnatog vapnenca, a sačuvan je samo gornji dio s imenima božanstava, prema kojima se može odrediti da se radilo o posveti Asklepiju i Higiji – *Asclepi/o et Hy/giae*.[46] Oblik imena božanstava (*Asclepius, Hygia)* predstavlja latinizirani oblik grčkih imena, kao što je to slučaj i na nekim drugim natpisima iz Panonije i Dacije.[47]

U istraživanjima 2011. godine pronađena je i jedna mramorna ploča s reljefnim prikazom božanstava zdravlja,[48] a prema natpisu moguće je datirati njezin nastanak i postavljanje u svetište za vladavine cara Karakale.[49] Pronađena je na prostoru južno od izvorišta, gdje je bila sekundarno upotrijebljena u opločenju, vjerojatno početkom 4. stoljeća (sl. 12). Na reljefu su prikazani Eskulap (*Aesculapius*), njegova kći Salus (*Salus – Hygia)*, a između njih i njegov sin Telesfor (*Telesphorus)*, za kojeg se vjerovalo da donosi oporavak od bolesti (sl. 13).

[46] Dimenzije žrtvenika: visina 27 cm, širina 21 cm, debljina 10 cm; Nemeth-Ehrlich, Kušan Špalj 2012, 112, sl. 31; Kušan Špalj 2014, 72, 96; Kušan Špalj 2015, 72, 96.

[47] CIL III, 15137; CIL III, 03413; AE 1982, 00805; CIL III, 07740 itd.

[48] Kušan Špalj 2014, 73- 75, 96-99, (kat. br. 69); Kušan Špalj 2015, 73- 75, 96-99, (kat. br. 69).

[49] Ploča je visine 128 cm, širine 121 cm i debljine od 18 do 24 cm. Privremena pohrana: AMZ, VTks-17.

healing water and makes easier to understand the specific nature of the religious worship in the settlement of *Aquae Iasae*.

THE CULTS OF AESCULAPIUS, APOLLO AND SERAPIS

Aesculapius

During recent excavations in Varaždinske Toplice, monuments were discovered that confirm the existence of a cult dedicated to the god of medicine *Aesculapius* (from the Greek *Asklepios*) and his daughter Salus/Hygia (from the Greek *Hygieia*), the goddess of health. A partially preserved sacrificial altar dedicated to these deities was discovered in 2001, in the rubble of the western portico of the sanctuary, probably reused for one of the walls. The sacrificial altar is relatively simple, small in size, and made out of dense, fine-grained limestone. Only the upper part of the altar was preserved, containing the names of the deities, from which it was inferred that it was dedicated to Asclepius and Hygia – *Asclepi/o et Hy/giae*.[46] The names of the deities (*Asclepius, Hygia*) are in the Latinized form of their Greek names, as is the case with other inscriptions from Pannonia and Roman Dacia.[47]

During the excavations in 2011, a marble slab was discovered with a relief depicting deities connected with healing.[48] According to the inscription on the slab, the relief was made and incorporated into the sanctuary during the rule of Emperor Caracalla.[49] It was discovered in the area south of the spring, where it was reused in the paving, probably at the beginning of the 4th century (Fig. 12). The relief depicts Aesculapius and his daughter Salus (*Hygia)*, with his son Telesphorus between them, believed to grant recovery from illness (Fig. 13).

[46] Dimensions of the sacrificial altar: height 27 cm, width 21 cm, thickness 10 cm.; Nemeth-Ehrlich., Kušan Špalj 2012, 112, Fig. 31.; Kušan Špalj 2014, 72, 96; Kušan Špalj 2015, 72, 96;

[47] CIL III, 15137; CIL III, 03413; AE 1982, 00805; CIL III, 07740 etc.

[48] Kušan Špalj 2014, 73- 75, 96-99, (Cat. no. 69); Kušan Špalj 2015, 73- 75, 96-99, (Cat. no. 69);

[49] The slab is 128 cm in height, 121 cm in width and is from 18 to 24 cm thick. Temporary storage: AMZ, VTks-17.

Slika / Figure 12: Mjesto nalaza ploče s reljefom i natpisom za zdravlje i pobjede cara Karakale, istraživanje 2011. god. (snimila D. Nemeth-Ehrlich). / Find spot of the slab with a relief and inscription for health and victory of the emperor Caracalla, the 2011 excavations (photo by D. Nemeth-Ehrlich).

Slika / Figure 13: Ploča s prikazom božanstava zdravlja i natpisom za zdravlje i pobjede cara Karakale (snimio: Zottmann Gmbh, Austrija). / The slab with a depiction of the gods of medicine and an inscription for health and victories of the emperor Caracalla (photo by Zottmann Gmbh, Austria).

Prikaz na mramornoj ploči kompozicijski je horizontalno podijeljen u tri dijela. Iznad dvije polukružne niše nalazi se *tabula ansata* s natpisom, smještena između dvije Viktorije koje u rukama drže vjenčiće i palmine grane. Natpis unutar *tabule ansate* otkriva da se radi o molbi za zdravlje i pobjede cara Karakale.[50]

PRO SALVTE ET VICTORIIS
IMPERATORIS CAESARIS
M(arci) AVRELLI(i) ANTONINI
PII FELICIS AVGVSTI

Za zdravlje i pobjede cara i cezara Marka Aurelija Antonina, pobožnog, sretnog, uzvišenog.

Zanimljiv je oblik gentilicija *Aurellius* (s dva slova „L“), koji se pojavljuje na natpisima od kraja 2. stoljeća,[51] vezano uz Karakalu i njegove nasljednike Elagabala i Aleksandra Severa.[52] Pretpostavlja se da je takav oblik

The depiction on the marble slab is horizontally separated into three parts. Above two semi-circular niches, there is a *tabula ansata* with an inscription, positioned between two Victorias with wreaths and palm branches in their hands. The inscription within the *tabula ansata* shows that the donor asked the deities to bring good health and many victories to Emperor Caracalla.[50]

PRO SALVTE ET VICTORIIS
IMPERATORIS CAESARIS
M(arci) AVRELLI(i) ANTONINI
PII FELICIS AVGVSTI

For the health and victories of Emperor and Caesar Marcus Aurellius Antoninus, the pious, the lucky, the exalted

The form of the *nomen gentilicium Aurellius* (with two Ls) is interesting to note, which appears on inscriptions from the end of the 2nd century,[51] regarding Caracalla and his followers Elagabalus and Severus Alexander.[52] It is as-

[50] Visina slova – 1. – 3. red: 2, 2 cm, 4. red: 2 cm.

[51] AE 1904, 75.

[52] CIL VI 570, CIL XVI 143, CIL III,05750, CIL III 05746 itd.

[50] Letter height- lines 1-3: 2.2 cm, line 4: 2 cm.

[51] AE 1904, 75

[52] CIL VI 570, CIL XVI 143, CIL III, 05750, CIL III 05746 etc.

Slika / Figure 14: Model dobiven 3D skeniranjem (izradila Vektra, Varaždin). / 3D scanning model (made by Vektra, Varaždin).

bio korišten s namjerom da se članovi carske obitelji razlikuju od ostalih koji su nosili to ime.[53]

Ispod natpisa je prikazana školjka i dva manja delfina. Centralni dio prikaza čine dvije polukružne niše, s korintskim stupovima, u kojima na povišenoj stepenici stoje bogovi Eskulap i Salus (Higija), a između njih mali Telesfor. Eskulap je prikazan kao snažan muškarac, omotan samo u plašt od kojeg je jedan kraj prebačen preko lijevog ramena i pada niz tijelo, dok drugi kraj, koji pridržava lijevom rukom, prekriva desno bedro. Prikazan je u kontrapostu, oslonjen na desnu nogu, a u desnoj ruci drži štap oko kojeg je omotana zmija. Salus (Higija) je odjevena u hiton koji seže do poda, s prebačenim ogrtačem preko lijevog ramena. U desnoj ruci drži zmiju, a u lijevoj jaje. Telesfor je smješten ispred središnjeg stupa, omotan u ogrtač sa šiljastom kapuljačom na glavi

[53] Degrassi 1921, 293-299; Gordon 1983, 28, 33.

sumed that this form was used with the intent of differentiating members of the imperial family from others with the same name.[53]

Below the inscription, there is a shell with two small dolphins. In the central piece of the image, there are two semi-circular niches with Corinthian pillars, in which Aesculapius and Salus (Hygia) are standing on an elevated stair, a dwarf Telesphorus between them. Aesculapius is depicted as a strong man, wearing nothing but his cloak over his left shoulder, flowing freely down his body. He is holding the other end of the cloak with his left hand, covering his right thigh. He is depicted in contrapposto, leaning against his right leg, holding his snake-entwined staff. Salus (Hygia) is wearing a chiton which reaches the ground, with a cloak over her left shoulder. In her right hand, she holds a snake, while holding an egg in the left. Telesphorus is in front of the central pillar, wrapped in a cloak with a pointed hood (*cucul-*

[53] Degrassi 1921, 293-299; Gordon 1983, 28, 33.

(cucullus). Ispod reljefa, na donjem okviru ploče, nalazi se natpis s imenom dedikanta i posvetom[54]:

L(ucius) ALFENVS AVITIANVS LEG(atus)
LEG(ionis) X GEMIN(ae)
ANTONINIANAE P(iae)F(idelis) PRAES(es)
PROV(inciae) ARAB(iae)
DEVOTVS NVMINI MAIESTATIQVE EIVS

Lucije Alfen Avitijan, legat X. legije gemine antoninijanske pobožne i odane, upravitelj provincije Arabije. Posvećeno božanstvu i veličanstvu njegovom.

Ovaj je reljef iznimne kvalitete i pokazuje da je riječ o djelu vrhunskog majstora, a njegova vještina prepoznaje se u mekoći i preciznosti kojom su izvedeni likovi, arhitektonski elementi, i pojedini detalji. Kompozicijom spomenika, raščlanjenog u tri dijela, postignuta je ravnoteža plošnih površina s natpisima i središnjeg, relativno dinamičkoga figuralnog prikaza. Smještajem glavnih likova u arhitektonske okvire, unutar dvije polukružne niše, na postamentu u obliku stepenica hrama, uspostavljena je strukturalna povezanost reljefnog polja i elemenata arhitekture. Položajem Eskulapove desne ruke ispred središnjeg pilastra postignuta je dinamičnost pokreta i osjećaj dubine prostora. Prostornost je naglašena i postavljanjem lika patuljka Telesfora ispred središnjeg pilastra, čime se dodatno pojačava doživljaj prostora ispred arhitektonskog okvira i dojam odvajanja likova od pozadine. Položajem tijela Eskulapa, s osloncem na desnu nogu, te tijela Salus, s osloncem na lijevu nogu, omogućeno je blago zaokretanje njihovih tijela i glava prema središnjoj osi reljefa, a što je doprinijelo ukupnom skladu i uravnoteženosti kompozicije.

Dok su božica Salus i mali Telesfor prikazani u skladu s uobičajenom ikonografijom, lik Eskulapa pokazuje znatna odstupanja od standardnih prikaza na reljefima i skulpturama grčko-helenističkog i rimskog razdoblja. Za razliku od uobičajenog prikaza starijeg muškarca s ogrtačem, koji mu prekriva donji dio tijela, lik Eskulapa na relje-

[54] Visina slova 1. – 3. red: 2,8 – 3,1 cm.

lus). Below the relief, on the lower frame of the slab, there is an inscription with the name of the dedicator and a dedication[54]:

L(ucius) ALFENVS AVITIANVS LEG(atus)
LEG(ionis) X GEMIN(ae)
ANTONINIANAE P(iae)F(idelis) PRAES(es)
PROV(inciae) ARAB(iae)
DEVOTVS NVMINI MAIESTATIQVE EIVS

Lucius Alfenus Avitianus, legate of the legio X Gemina Antoniniana pia fidelis, governor of the province of Arabia. Dedicated to his divinity and majesty.

The relief is of exquisite quality and it is obviously the work of a master craftsman, whose skill is apparent in the softness and precision with which the figures, architectural elements, and certain details were done. By separating the monument into three sections, a balance of surfaces with inscriptions was achieved with the relatively dynamic central figural image. By placing the key figures inside architectural elements, inside two semi-circular niches, on a pedestal in the form of a temple stair, a structural connection between the relief and the architectural elements was achieved. Dynamic movement and a feeling of depth were achieved by placing Aesculapius' hand in front of the central pilaster. Space is also emphasized by placing Telesphorus in front of the central pilaster, additionally enhancing the feeling of space in front of the architectural framework and the feeling of the characters coming out of the background. By Aesculapius leaning on his right leg and Salus leaning on her left, their bodies could be slightly turned toward the central axis of the relief, contributing to the general harmony and balance of the composition.

While the goddess Salus and little Telesphorus are depicted in accordance with the usual iconography, the depiction of Aesculapius shows significant deviation from the standard depictions on reliefs and sculptures from the Greek and Roman periods. As opposed to being depicted as an older man with a cloak covering the lower part of his body, Aesculapius from Varaždinske Toplice is a young, strong, scantily clad man. Especially interesting is the way

[54] Letter height: lines 1-3: 2.8-3.1 cm.

fu iz Varaždinskih Toplica predstavljen je kao snažan, mlađi muškarac, vrlo oskudno odjeven. Posebno je zanimljiv način na koji je prikazano lice, s vrlo izraženim portretnim karakteristikama. Detalji šireg lica s naglašenim jagodičnim kostima, kao i nabori na čelu, ukazuju da je na ovome reljefu vjerojatno prikazan car Karakala (sl. 14).[55] Usporedba s Karakalinim portretima, s vrlo naglašenim emocijama karakterističnima za početak njegove samostalne vladavine,[56] pokazuje slične crte lica i izraz koje ima Eskulap na reljefu iz Varaždinskih Toplica. To posebno potvrđuju bore iznad nosa koje licu daju dramatičan izraz i snagu. Oblikovanje frizure s naglašenim uvojcima ukazuje na sličnost s prikazima Aleksandra Velikog,[57] dok je prikazom idealiziranoga mladenačkog tijela, naglašen herojski i vojnički karakter cara, odnosno njegova snaga i moć.

Natpis otkriva da je riječ o vrlo službenom karakteru posvete za carevo zdravlje i pobjede (*pro salute et victoriis*), a donator je bio *Lucius Alfenus Avitianus*, legat X. legije i upravitelj (*praeses)* provincije Arabije, važna osoba u službi države i samog cara, vjerojatno iz njegova užeg kruga ljudi od povjerenja. Za dataciju je natpisa važan podatak da je posvećen samo caru Karakali, što pokazuje da je iz razdoblja njegove samostalne vladavine (211. – 217. godine), dok je za precizniju dataciju važna funkcija donatora.

Lucius Alfenus Avitianus bio je porijeklom iz Hispanije pa je tijekom svoje karijere obavljao vrlo visoke državne službe,[58] a što je moguće rekonstruirati prema natpisima na kojima se pojavljuje njegovo ime i funkcije koje je obavljao. Tako se na natpisu iz Piliscéva (Mađarska), koji je posvetio Jupiteru (Neptunu, Serapisu),[59] također za Karakalino zdravlje i pobjedu, nalazi podatak da je bio upravitelj Donje Panonije. Zanimljivo je

[55] Mennen 2006, 258.

[56] Kleiner 1992, 324.

[57] Furthwängler, Urlich 1912, 194-196; Kilerich 1993, 85-92.

[58] Fitz 1960; Fitz 1993, 1026.

[59] CIL III 3637.

the face was depicted, with highlighted portrait characteristics. The details of the wide face with prominent cheekbones and folds on the forehead indicate that the relief probably depicts Emperor Caracalla as Aesculapius (Fig. 14).[55] A comparison of Caracalla's portraits with emphasized facial expressions characteristic for the beginning of his independent rule[56] shows very similar facial lines and the same expression Aesculapius has on the relief from Varaždinske Toplice. This is especially confirmed by the folds above the nose, giving the face a dramatic strength. The emphasized curls in the styling of the hair resemble the portraits of Alexander the Great.[57] The idealistic depiction of a young, strong body is used to highlight the heroic military nature of the emperor, i.e. his strength and power.

The inscription reveals that the nature of the dedication for the health and victories of the emperor is very formal (*pro salute et victoriis*), and that the donator was *Lucius Alfenus Avitianus*, the legate of the *legio X Gemina* and governor (*praeses*) of the province of Arabia, an important person in the service of the empire and the emperor, probably belonging to the most trusted of advisors. Regarding the date of the inscription, it is important to note that it was dedicated only to Emperor Caracalla, which indicates that it is from the period of his independent rule, (AD 211 – AD 217), while the position of the donator is important for precisely dating the inscription.

Lucius Alfenus Avitianus hailed from Hispania and held prominent state positions as an official during his career,[58] inferred from the inscriptions mentioning his name and functions. An inscription found in Piliscév (Hungary), dedicated to Jupiter (Neptune, Serapis),[59] also asking good health and victory for Emperor Caracalla, contains the additional information that he was the governor of Pannonia Inferior at the time. It is interesting to note that several similar inscriptions dedicated to Serapis were found in north-eastern Pannonia, all containing official

[55] Mennen 2006, 258.

[56] Kleiner 1992,324.

[57] Furthwängler, Urlich 1912, 194-196; Kilerich 1993, 85-92.

[58] Fitz 1960; Fitz 1993, 1026

[59] CIL III 3637.

da je više sličnih natpisa posvećenih Serapisu pronađeno na prostoru sjeveroistočne Panonije, a svi sadrže službene formule – *pro salute et victoria* – za zdravlje i pobjedu cara Karakale te su ih postavili visoki državni službenici.[60] Postoje pretpostavke da se grupa ovih spomenika povezuje s carevom posjetom Panoniji 214. godine i da su postavljeni u povodu rata koji je Karakala vodio protiv Kvada, polovinom 214. godine.[61] Posvete Serapisu na tim natpisima svjedoče i o službenoj religiji u koju su tijekom toga razdoblja uključeni i istočni kultovi. Poznato je da je Karakala još od mladosti bio oduševljen egipatskim kultovima, kada je s obitelji proveo dulje vrijeme u Egiptu.[62] U vrijeme su njegove samostalne vladavine kultovi Izide i Serapisa postali dijelom službene religije te su uvedeni i u sam Rim,[63]a na Kvirinalu je vjerojatno bio podignut hram Serapisu.[64] Veliku važnost, koju je Serapis imao za Karakalu, treba tražiti upravo u njegovoj brizi za vlastito zdravlje, a natpisi koje su tome božanstvu posvećivali visoki vojni i državni službenici pokazuju njihovu privrženost caru.[65] Serapis postaje vrhovno božanstvo i poistovjećuje se s Jupiterom, ali povezan je i s Eskulapom kroz moć ozdravljenja. Karakalinu je vladavinu obilježila i njegova opčinjenost Aleksandrom Velikim, kojeg je oponašao ne samo prihvaćanjem istočnih kultova već i izgledom, načinom ratovanja, a i veliki pohod prema istoku bio je potaknut njegovim uzorom.[66]

Prema spomenutom natpisu iz Piliscéva pretpostavlja se da je Avitijan od sredine 214. godine bio prvi upravitelj reorganizirane provincije Panonije, odnosno da ga je Karakala postavio za prvog konzularnoga upravitelja Donje Panonije.[67] Njegovo ime

[60] RIU 3 753; RIU 3 645; Mrav 2000, 81-83.

[61] Mrav 2000, 88; postoji i mišljenje da su ti natpisi vezani uz pobjedu Karakale protiv Alamana, u jesen 213. godine (Kovacs 2012, 390-391).

[62] Cass. Dio 75, 13, 1; SHA 17, 3-4; Mrav 2000, 83.

[63] Aur. Vict. *Caes*. 21, 4.

[64] CIL VI 570; Mrav 2000, 84; Rowan 2012, 143.

[65] Bricault, Versluys 2014, 12-15.

[66] Boteva 1999, 181-188.

[67] Fitz 1993, 1026.

formulae -*pro salute et victoria*- for the health and victory of Emperor Caracalla, and all erected by high government officials.[60] Some believe that these monuments are connected with the emperor's visit to Pannonia in AD 214, and that they were commissioned in regard to Caracalla's war against the Quadi, in the middle of AD 214.[61] The inscriptions dedicated to Serapis also indicate the presence of the official religion incorporating Eastern cults. It is known that Caracalla was fascinated by Egyptian cults in his youth, when he spent a significant amount of time in Egypt with his family.[62] During his independent rule, the cults of Isis and Serapis were included into the official religion, and were introduced to Rome itself;[63] there was probably a temple dedicated to Serapis erected on Quirinal.[64] The reason why Serapis was so important to Caracalla probably lies in his concern for his own health, while inscriptions dedicated to Serapis by high military and government officials show their allegiance to the emperor.[65] Serapis became the supreme god and was equated with Jupiter, but was also connected with Aesculapius through his power of healing. Caracalla's rule was also marked by his fascination with Alexander the Great, whom he imitated not only by accepting Eastern cults, but also in appearance, style of warfare, and marching to the East with his armies.[66]

According to the aforementioned inscription from Piliscév, it is assumed that Avitianus was the first governor of the reorganized province of Pannonia from the middle of AD 214, i.e. that Caracalla appointed him as the proconsul of Pannonia Inferior.[67] His name also appears on an inscription from Gerasa (Jerash, Jordan), where he is mentioned as the governor of the province of Arabia.[68] With regard to other known governors

[60] RIU 3 753; RIU 3 645; Mrav 2000, 81-83.

[61] Mrav 2000, 88; There is also the opinion that the inscriptions are connected with Caracalla's victory against the Alemanni, in the fall of AD 213 (Kovacs 2012, 390-391)

[62] Cass. Dio 75, 13, 1; SHA 17, 3-4; Mrav 2000, 83

[63] Aur. Vict. *Caes*. 21, 4

[64] CIL VI 570; Mrav 2000, 84; Rowan 2012, 143.

[65] Bricault, Versluys 2014, 12-15.

[66] Boteva 1999, 181-188.

[67] Fitz 1993, 1026

[68] IGR, III, 1371

pojavljuje se i na natpisu iz Gerasa (Jerash, Jordan), gdje se spominje kao upravitelj provincije Arabije.[68] S obzirom na druge, za sada poznate upravitelje te provincije, postoji mogućnost da je na dužnosti bio od 209. do 211 godine ili od 212. do 213. godine.[69] Moguće je da do sredine 214. godine vrši i funkciju konzula, nakon čega preuzima upravu nad Donjom Panonijom, ali nije isključeno da je, kao bliski Karakalin suradnik, postao upravitelj Panonije, a da prije toga nije bio konzul. Natpis iz Varaždinskih Toplica, koji sigurno nije nastao prije početka 212. godine, kada nakon ubojstva Gete (u prosincu 211.) počinje Karakalina samostalna vladavina, ostavlja mogućnost da je bio upravitelj Arabije do 213., ali daje i nove podatke o njegovoj karijeri neposredno prije preuzimanja funkcije upravitelja Donje Panonije. Naime, na natpisu iz Varaždinskih Toplica spominje se da je Avitijan bio i legat X. legije gemine. Legija X. gemina bila je stacionirana u Vindoboni (Beč, Austrija), od 114. godine do 5. stoljeća,[70] a natpis iz Varaždinskih Toplica potvrđuje da je, zbog svoje lojalnosti caru Karakali, već u njegovo vrijeme nosila i naziv *antoniniana.*[71] Ako su Avitijanove funkcije na natpisu iz Varaždinskih Toplica spomenute kronološki i u vrijeme postavljanja spomenika je vršio dužnost upravitelja Arabije, onda bi se datacija mogla precizirati od početka samostalne Karakaline vladavine (kraj 211., početak 212.), do početka 213. godine, kada se pretpostavlja da je funkciju upravitelja Arabije preuzeo Furnius Iulianus.[72]

Međutim, ako je u vrijeme postavljanja ovog natpisa vršio dužnost legata X. legije, a funkciju upravitelja Arabije obavljao neposredno prije preuzimanja legije te se ona spominje na natpisu kao važan dio njegove karijere (*cursus honorum*), postoji mogućnost da se natpis datira na početak 212. pa

[68] IGR, III, 1371.

[69] Fitz 1993, 1025-1027.

[70] Mócsy 1974, 99.

[71] Počasni naziv *pia fidelis* dobiva 89. godine, odnosno *pia fidelis Domitiana*, ali nakon smrti cara Domicijana odbacuje *Domitiana.*

[72] Fitz 1993,1026.

of that province, there is a possibility of him performing this duty between AD 209 and AD 211 or between AD 212 and AD 213.[69] It is possible that he performed the duty of consul until the middle of AD 214, after which he assumed government over Pannonia Inferior, but it is also possible that he was named governor of Pannonia as a close associate of Caracalla, without being a consul prior to becoming a proconsul. The inscription from Varaždinske Toplice, which could not have been made before beginning of AD 212, when Caracalla started ruling independently after the murder of Geta in December of AD 211, presents the possibility of Avitianus being the governor of Arabia until AD 213, but also presents new information about his career prior to his government over Pannonia Inferior. The inscription mentions that Avitianus was the legate of the *legio X Gemina*, stationed in Vindobona (Vienna, Austria) from AD 114 until the 5th century,[70] and also confirms that it carried the title *antoniniana* already during the rule of Caracalla due to its allegiance to the emperor.[71] If Avitianus' functions are ordered chronologically on the inscription from Varaždinske Toplice and he was still the governor of Arabia at the time the monument was put into place, that could mean that the date for the monument can be narrowed down to the time from the start of Caracalla's independent rule (end of AD 211/beginning of AD 212) to the beginning of AD 213, when Furnius Iulianus assumed government over the province of Arabia.[72]

However, if Avitianus was the legate of the *legio X Gemina* at the time the monument was put into place, and was the governor of Arabia prior to taking over command of the legion and it is mentioned as an important part of his career (*cursus honorum*), there is a possibility that the inscription should be dated from the beginning of AD 212 to the middle of AD 214, when it is assumed he became the governor of Pannonia Inferior.[73] If one takes into account the context

[69] Fitz 1993, 1025-1027.

[70] Mócsy 1974, 99.

[71] It gained the honorary title of *pia fidelis* in AD 89, or rather *pia fidelis Domitiana*, but the attribute *Domitiana* was dropped after the death of Emperor Domitian.

[72] Fitz 1993,1026

[73] Fitz 1993, 1026

do sredine 214. godine, kada se pretpostavlja da je postao upravitelj Donje Panonije.[73] Ako se uzme u obzir kontekst tadašnje carske politike, očito se radi o osobi vrlo bliskoj caru Karakali, koja je vjerojatno imala važnu ulogu u pripremama za poznati pohod na istok, protiv Parta, a u kojem je sudjelovala i legija X. gemina. Avitijan je vjerojatno bio u najužem krugu carevih osoba od povjerenja koje su ga pratile na njegovim putovanjima i pohodima te su za svoju vjernost bile nagrađene promaknućima u službi. Tako je poznato da su npr. *Caius Octavius Appius Suetrius Sabinus i Caius Iulius Avitus Alexianus*, nakon vojnih i drugih funkcija, završili karijeru kao upravitelji provincija.[74]

Pretpostavlja se da je Karakala u proljeće 213. godine krenuo iz Rima preko Galije i Gornje Germanije u kaznenu ekspediciju protiv Alamana, a što spominje i Dion Kasije,[75] dok se na epigrafskim spomenicima taj pohod naziva – *expeditio Germanica.*[76] Poznato je da se tijekom putovanja zaustavio u lječilištu *Aquae* (Baden-Baden) i u lječilištu *Phoebiana* (Faimingen), gdje je bilo Apolonovo svetište (*Apollo Granus*).[77] Kasije Dion opisuje da se Karakala nakon ubojstva svoga brata Gete razbolio i očajnički tražio pomoć Apolona, Asklepija i Serapisa te da je tijekom putovanja preko svojih izaslanika slao zavjetne darove tim božanstvima u razna svetišta, gdje je i osobno odlazio u nadi da će svojim prisustvom ozdraviti.[78] Upravo se u taj opis može uklopiti akvejazejsko svetište i nalaz koji je za zdravlje i pobjede cara Karakale postavio njegov izaslanik Avitijan. Naravno, postoji mogućnost da je bolesni car i osobno posjetio akvejazejsko svetište u kojem su štovana njegova omiljena božanstva Asklepije, Apolon i Serapis, a to bi moglo biti u vrijeme nakon rata s Alamanima (rujan 213.)[79], ako se prije odlaska na istok

of imperial politics at the time, it becomes obvious that he was a person who was close to Emperor Caracalla, playing an important role in the emperor's famous march to the East against the Parts, in which the *legio X Gemina* also took part. Avitianus was probably a member of the emperor's circle of most trusted advisors, who accompanied him in his travels and military campaigns, and were rewarded for their loyalty by advancing in rank. It is known that e.g. *Caius Octavius Appius Suetrius Sabinus* and *Caius Iulius Avitus Alexianus* were appointed governors of provinces after performing various military and state functions.[74]

It is assumed that Caracalla marched from Rome across Roman Gaul and Germania Superior in the spring of AD 213 to punish the Alemanni, also referenced by Cassius Dio,[75] while epigraphic monuments reference it as *expeditio Germanica.*[76] The emperor stopped in *Aquae* (Baden-Baden) and *Phoebiana* (Faimingen), where a sanctuary of Apollo was located (*Apollo Granus*).[77] Cassius Dio writes that Caracalla grew ill after the murder of his brother Geta and desperately sought help from Apollo, Asclepius, and Serapis. During his travels, he would send votive offerings to the deities through his emissaries to various sanctuaries, and went there personally in the hope that he would be healed.[78] This description is in accordance with the inscription found in the sanctuary of Varaždinske Toplice, commissioned by Caracalla's servant Avitianus for the emperor's health and victories. Naturally, there is a possibility that the ill emperor himself visited the sanctuary in Aquae Iasae, dedicated to his favourite deities Asclepius, Apollo, and Serapis after his war against the Alemanni in September of AD 213[79] if he was on his way to Rome before heading east, as well as if he was staying in Pannonia.[80] In any case, the quality of the relief and the type of the inscription show that it is an official dedication asking for the em-

[73] Fitz 1993, 1026.
[74] Królczyk 2011, 211-213.
[75] Cass. Dio, 73.13.6
[76] CIL, VI, 41194: CIL, X, 5178; CIL X, 5398 itd.
[77] Mráv 2000, 86.
[78] Cass. Dio 78, 5-7.
[79] Królczyk 2011, 215.

[74] Królczyk 2011, 211-213.
[75] Cass.Dio, 73.13.6
[76] CIL, VI, 41194: CIL, X, 5178; CIL X, 5398 etc.
[77] Mráv 2000, 86.
[78] Cass. Dio 78, 5-7.
[79] Królczyk 2011, 215.
[80] Kovacs 2012, 381-393.

vraćao u Rim, ali i ako je nastavio boravak u Panoniji.[80] U svakom slučaju, kvaliteta reljefa i tip natpisa ukazuje na to da je riječ o službenoj molbi za carevo ozdravljene, najvjerojatnije postavljeno na carevu osobnu inicijativu.

Oblik formule *pro salute et victoriis,* na kojem je "pobjeda" izražena u množini, razlikuje se od poznatih natpisa u Panoniji posvećenih caru *pro salute et victoria*[81], i *pro salute et Victoria Germanica*[82]*,* koji su tumačeni kao pobjede u ratu protiv Alamana (u jesen 213. godine)[83], odnosno neke od njih dio autora povezuje s ratom protiv Kvada 214. godine.[84] Također, i zbog funkcija Avitijana koje se spominju na ploči iz Varaždinskih Toplica, taj se natpis ne može niti vremenski smjestiti u grupu sličnih natpisa iz sjeverne Panonije, među kojima je natpis iz Piliscéva, gdje se Avitijan spominje kao upravitelj Panonije. Ako se prihvati datacija tih natpisa u 214. godinu, natpis iz Varaždinskih Toplica mogao bi biti u vezi s ratom protiv Alamana (u jesen 213. god.), ali moguće je da se odnosi i na neke druge događaje.[85] Možda se odgovor na to krije upravo u spomenutim funkcijama donatora, kao upravitelja Arabije i legata X. legije. Budući da je caru Karakali bio iznimno važan pohod protiv Parta, u kojem je sudjelovala i legija X. gemina, vrlo je vjerojatno u pripremama za taj rat uloga Avitijana bila važna, pa je molba za careve pobjede vezana uz te događaje. S obzirom na neke nove spoznaje, koje upućuju na to da je Karakala već u prosincu 213. godine bio u Nikomediji,[86] što bi značilo da se nakon rata s Alamanima nije vraćao u Rim, postoji mogućnost da se natpis iz Varaždinskih Toplica veže uz taj pohod na istok. U svakom slučaju, precizna

[80] Kovacs 2012, 381-393.

[81] CIL III 3637; RIU 3 753; RIU 3 645.

[82] RIU 1139.

[83] Kovacs 2012, 387; Królczyk 2011, 218.

[84] Mrav 2000, 88; Fitz 1960.

[85] Sintagma *pro salute et victoriis* pojavljuje se i na natpisima posvećenim Karakali u Siriji (CIL III 138; 138a; 138b; 14385b), ali zbog mjesta nalaza, kao i njihove datacije od 211. do 217. godine, teško je utvrditi odnosi li se na iste događaje kao natpis iz Varaždinskih Toplica.

[86] Opreanu 2015, 16-23, Kovacs 2012, 387.

peror's good health, probably put in place by the emperor's own orders.

The formula *pro salute et victoriis*, in which "victory" is in the plural, differs from the known inscriptions from Pannonia dedicated to the emperor *pro salute et victoria*[81], and *pro salute et Victoria Germanica*,[82] interpreted as victories against the Alemanni in the fall of AD 213,[83] while others connect them with the war against the Quadi in AD 214.[84] The functions of Avitianus listed on the inscription from Varaždinske Toplice also make it impossible to assign the inscription to the same time frame as the similar inscriptions from northern Pannonia, including the inscription from Piliscév referencing Avitianus as the governor of Pannonia. If we accept the inscriptions as being from AD 214, the inscription from Varaždinske Toplice could be referencing the war against the Alemanni in the fall of AD 213, but it is also possible that it is referencing some other events.[85] The answer may lie in the aforementioned functions of the donator being the governor of the province of Arabia and the legate of the *legio X Gemina*. Since the campaign against the Parths was of extreme importance to Caracalla, in which the *legio X Gemina* also took part, it is probable that Avitianus was crucial in the preparations for the war, and that the victories asked for on the monument pertain to those events. New findings indicate that Caracalla was in Nicomedia as early as December AD 213,[86] which would mean that he did not return to Rome after his war against the Alemanni and that the inscription from Varaždinske Toplice may be referencing his march to the east. In any case, the precise date for the inscription from Varaždinske Toplice is linked to the dates for similar inscriptions, as well as the military campaigns of Emperor Caracalla, for which there is

[81] CIL III 3637; RIU 3 753; RIU 3 645;

[82] RIU 1139:

[83] Kovacs 2012, 387; Królczyk 2011, 218.

[84] Mrav 2000, 88; Fitz 1960.

[85] The phrase *pro salute et victoriis* also appears on inscriptions dedicated to Caracalla from Syria (CIL III 138; 138a; 138b; 14385b), but the location of the inscriptions and the dates ranging from AD 211 to AD 217 makes it difficult to determine whether they reference the same events as the inscription from Varaždinske Toplice.

[86] Opreanu 2015, 16-23, Kovacs 2012, 387.

datacija natpisa iz Varaždinskih Toplica povezana je s datacijom ostalih sličnih natpisa, kao i pohodima cara Karakale, o čemu u stručnoj literaturi nema jedinstvenog mišljenja.[87] Zbog toga se jedino sa sigurnošću može reći da nije nastao prije samog kraja 211. godine, odnosno početka 212. godine, kada započinje samostalna vladavina cara Karakale, a ostaje otvorena mogućnost njegove datacije u 213. i eventualno dio 214. godine.

Apolon

Prije istraživanja provedenih 2011. godine, kada su u konstrukciji sjevernog zida izvorišnog bazena pronađeni dijelovi skulpture i dva natpisa, nije se mnogo znalo o kultu boga Apolona u akvejazejskom svetištu. Najvjerojatnije je taj materijal sekundarno iskorišten početkom 4. stoljeća, kada je izvedena rekonstrukcija zida i kada su brojni kameni spomenici iskorišteni kao obični građevinski materijal. Usporedno s gradnjom zida, zatrpavan je teren s njegove stražnje strane i u tome su sloju, uz razne dijelove arhitekture, reljefa i drugoga obrađenog kamenja pronađeni i dijelovi skulpture boga Apolona, ali i nekoliko dijelova skulpture božice Dijane (sl. 15, 17). Svi spomenici pronađeni u ovoj konstrukciji mogu se datirati u 2. i 3. stoljeće, kao i novac pronađen u slojevima zatrpavanja.[88]

Prisustvo Apolona, kao boga liječenja, potpuno je logično u ovoj vrsti svetišta, dok nalaz njegove skulpture pokazuje da je štovan i kao bog Sunca te proroštva. Skulptura prikazuje Apolona – Sola, mladog boga, sa zrakastom krunom na glavi, koji se oslanja na tronožac obavijen zmijom (sl. 16).[89] U utoru na vrhu tronošca možda je bila uglavljena lira na koju se Apolon oslanjao savijenom rukom u laktu, pa bi se radilo o varijanti tipa

[87] Królczyk 2011; Kovacs 2012; Mrav 2000; Fitz 1960.

[88] Nemeth-Ehrlich, Kušan Špalj 2014, 31, 45; Nemeth-Ehrlich, Kušan Špalj 2015, 31, 45.

[89] Nemeth-Ehrlich, Kušan Špalj 2014, kat. br. 71; Nemeth-Ehrlich, Kušan Špalj 2015, kat. br. 71; Privremena pohrana: AMZ, VTks-2. Visina skulpture cca 170 cm.

no consensus within the scientific community.[87] In conclusion, it can be said with certainty that the inscription was not made before the end of AD 211, i.e. the beginning of AD 212, when Caracalla became the only emperor, and that there is a possibility that it was made in AD 213 or possibly at the beginning of AD 214.

Apollo

Not much was known about the cult of Apollo in the Aquae Iasae sanctuary before the excavations in 2011, when the pieces of a sculpture and two inscriptions were found inside the structure of the north wall of the spring reservoir. The material was most likely reused at the beginning of the 4th century when the wall was reconstructed and many of the stone monuments were used as regular building material. At the same time as the wall was being built, the terrain behind it was filled in, and in that layer, along with some architectural parts, reliefs and other cut stones, pieces of a statue of the god Apollo were found, as were several pieces of a statue of the goddess Diana (Fig. 15, 17). All of the monuments found inside the structure can be dated to the 2nd and 3rd century, as can the coins found within the layers of soil.[88]

The presence of Apollo, the god of healing, is completely logical in this type of sanctuary, while the discovery of his statue indicates that he was also worshipped as the god of the Sun and of prophecy. The statue depicts Apollo/Sol, a young god, with a crown of sunbeams, leaning on a tripod around which a snake has wrapped itself (Fig, 16).[89] The indentation on the top of the tripod might have held a lyre on which Apollo leaned, his arm bent at the elbow,

[87] Królczyk 2011; Kovacs 2012; Mrav 2000; Fitz 1960

[88] Nemeth-Ehrlich, Kušan Špalj 2014, 31, 45; Nemeth-Ehrlich, Kušan Špalj 2015, 31, 45;

[89] Nemeth-Ehrlich, Kušan Špalj 2014, Cat. no. 71; Nemeth-Ehrlich, Kušan Špalj 2015, Cat. no. 71.; Temporary storage: AMZ, VTks-2. Height of the statue: c. 170 cm

Slika / Figure 15: Dio skulpture boga Apolona-Sola, tijekom istraživanja 2011. god. (snimila D. Nemeth-Ehrlich). / A segment of a sculpture of Apollo-Sol, the 2011 excavations (photo by D. Nemeth-Ehrlich).

Slika / Figure 16: Skulptura boga Apolona-Sola, poč. 3. st., na izložbi, 2014. u Cankarjevom domu, Ljubljana (snimio Cankarjev dom, Ljubljana). / A sculpture of Apollo-Sol, early 3rd c., on an exhibition in the Cankarjev dom, Ljubljana, 2014 (photo by Cankarjev dom, Ljubljana).

Apolona Kitaroda.[90] Desna je ruka vjerojatno bila spuštena, tek lagano odmaknuta od tijela. Apolon je prikazan u kontrapostu, s osloncem na lijevoj nozi i, premda nije sačuvan gležanj i stopalo desne noge, naslućuje se, prema prstima na postamentu, da je desna noga bila oslonjena samo vrhovima prstiju na podlogu. Položaj tijela, s osloncem na lijevu nogu, omogućio je lagani pokret desne noge i blago uvijanje osi figure, odnosno zdjelice i ramena, čime je postignut dojam prirodnog položaja u stanju između laganog pokreta i mirovanja. Takvim položajem tijela postignut je i dojam odvažnog držanja, naglašen i izrazom lica emotivno distanciranog božanstva, svjesnog svoje

[90] Bieber 1955, 160.

which would make this a variant of the Apollo Citharoedus type.[90] The right arm was most likely lowered, and moved slightly away from the body. Apollo is shown in contrapposto, leaning on his left foot and, although the right foot and ankle have not been preserved, the toes on the pedestal indicate that the right foot leaned onto the surface only with the toes. The position of the body, with its weight on the left leg, allowed for the light movement of the right leg and the slight twist in the figure's axis, i.e. the pelvis and the shoulders, which creates the impression of a natural posture, in a state between light movement and standing still. This kind of posture also creates the impression of a bold demeanour, which is accentuated by the

[90] Bieber 1955, 160.

Slika / Figure 17: Dijelovi skulptura Apolona-Sola i Dijane-Lune, tijekom istraživanja 2011. godine (snimila D. Nemeth-Ehrlich) / Fragments of the sculptures of Apollo-Sol and Diana-Luna, the 2011 excavations (photo by D. Nemeth-Ehrlich).

Slika / Figure 17a: Dio skulpture božice Dijane Lune, početak 3. st., nakon konzervatorsko-restauratorskih radova (snimio Zottmann Gmbh, Austrija). / Fragment of a figure of Diana Luna, early 3rd c., after conservation-restauration work (photo by Zottmann Gmbh, Austria).

ljepote. Elegancija je skulpture postignuta skladnim odnosom veličine glave u odnosu na tijelo, u tradiciji klasičnoga grčkog kiparstva, gotovo u omjeru 1:7. Frizura s velikim pramenovima kose odražava karakteristike skulpture s početka 3. stoljeća u kojem je često prisutna igra svjetla i sjene. Radi se o tipu frizure koja se pojavljuje na Lizipovim portretima Aleksandra Velikog. Uz Apolonovu lijevu nogu prikazan je tronožac – tripod s omotanom zmijom, a što upućuje da ga se željelo prikazati i kao boga proricanja (Apolon Pitijski). To svakako ukazuje na mogućnost da su se u ovome svetištu oko izvora termalne vode odvijali rituali vezani uz proricanje budućnosti, a što i ne čudi s obzirom na specifičnu geološku situaciju, razne plinove i neprestano isparavanje vrućeg izvora.

Vezano uz skulpturu Apolona – Sola treba promatrati i dijelove skulpture božice Dijane, od koje je sačuvana glava i oštećeni gornji dio tijela (sl. 17a), a vjerojatno joj pripada

facial expression of an emotionally distant god aware of his beauty. The elegance of the statue is achieved through the harmonious proportion of the size of the head to the body, in the tradition of classical Greek sculpture, in a ratio of almost 1:7. The hair with the large locks reflects the characteristics of early-third-century sculpture, which makes prominent use of light and shadow. This type of hairstyle can also be seen in Lysippos' portrait of Alexander the Great. A tripod with a snake wrapped around it is shown next to Apollo's left leg, which indicates the wish to also depict him as the god of prophecy (Pythian Apollo). This certainly points to the possibility that divination rituals were performed in this sanctuary, around the thermal spring, which is not surprising considering the specific geological structure, the various gases present, and the constant vapours rising from the hot spring.

In relation to the statue of Apollo/Sol, it is also important to consider the pieces of the statue of the goddess Diana, of which the head and damaged torso have been preserved (Fig. 17a),

i lijevo stopalo pronađeno također u sloju zatrpavanja sjeverno od izvorišnog bazena.[91]

Dobro sačuvana glava božice Dijane, kao i glava Apolona, s mekano oblikovanim linijama lica i s jako izraženim lukom iznad očiju, pokazuju karakteristike idealizma u prikazivanju božanskih lica, u tradiciji grčkog kiparstva. Prema sačuvanom dijelu tobolca vidljivo je da je božica prikazana u skladu s grčkom ikonografijom, kao Artemida, božica lova, kojoj je pridodan polumjesec – atribut Selene – Lune. Očito je riječ o skulpturama koje su izrađene istovremeno, s vrlo sličnom izvedbom detalja u obradi lica te prikazuju božanski par – blizance, Apolona – Sola i Dijanu – Lunu.

Helije, u grčkoj mitologiji bog Sunca, poistovjećivan je s Apolonom,[92] a njegova sestra blizanka Artemida sa Selenom, božicom Mjeseca,[93] a ti složeni sinkretistički procesi nastavljaju se u rimskom periodu, povezujući Apolona sa solarnim božanstvom, Solom i Dijanu s božicom Mjeseca Lunom, u smislu kompleksnih identifikacija božanstava.[94] Ti su kultovi vrlo popularni u doba Carstva, a što se može pratiti i na raznim emisijama novca tog vremena.[95] Rimski pisac Opijan iz Apameje, u svojem djelu posvećenom Karakali,[96] uspoređuje cara s bogom Sunca, a njegovu majku s božicom Mjeseca, što vjerojatno predstavlja i odraz službene politike toga vremena. Razni aspekti solarnog kulta i sinkretizam značajne su karakteristike službene religije toga vremena, pa se tako vrhovno božanstvo Serapis, na temelju solarnog karaktera, poistovjećuje s Jupiterom[97], pretpostavlja se i s Mitrom[98], a i sam car Karakala prikazuje se sa solarnom (zrakastom) krunom.[99] Ovi složeni sinkretistički procesi, karakteristični za vladavinu cara Karakale, imali su odra-

[91] Kušan Špalj 2014, 77,101 (kat. br. 72); Kušan Špalj 2015, 77, 101 (kat. br. 72). Privremena pohrana: AMZ, VTks- 3, 4.
[92] Ps.-Eratosth. *Cat.* 24.
[93] Soph. OT 207.
[94] Ando 2005, 49
[95] Bilić 2011, 45-64.
[96] Opp. *Kyneg.* I.
[97] CIL III, 3637
[98] Malaise 1972, 465.
[99] Mráv 2000, 85.

along with, most likely, the left foot found also in the soil north of the spring reservoir.[91]

The well-preserved Diana's head, as well as Apollo's head, with the soft-shaped facial features and strongly arched brow, exhibits the characteristics of idealism in the depiction of the faces of the gods in the tradition of Greek sculpture. From the preserved piece of the quiver, it is obvious that the goddess was depicted in accordance with Greek iconography, as Artemis, the goddess of the hunt, to whom a crescent moon has been added, which is an attribute of Selene/Luna. It is obvious that these statues were made at the same time, with similar details in the shape of the face, and depict the divine pair of twins, Apollo/Sol and Diana/Luna.

Helios, the god of the Sun in Greek mythology, was identified with Apollo,[92] while his twin sister Artemis was identified with Selene, the goddess of the moon,[93] and these complex syncretic processes continued into the Roman period, connecting Apollo with the sun god Sol and Diana with the moon goddess Luna, in the complex identification of deities.[94] These cults were very popular in the Roman Empire, which can be traced through the various iterations of coins during that period.[95] The Roman poet Oppian of Apamea, in his work dedicated to the sanctified Caracalla,[96] compares the emperor himself with the god of the Sun, and his mother to the goddess of the Moon, which likely reflects the official policy of the time. The various aspects of the sun cult and syncretism are prominent characteristics of the official religion of the time, so that the supreme deity Serapis is identified with Jupiter,[97] and presumably with Mithra,[98] while the emperor Caracalla himself was depicted with a crown of sunbeams.[99] These complex syncretic processes, characteristic of the reign of emperor Caracalla, were also reflected in the rituals in the Aquae Iasae sanctuary; the newly

[91] Kušan Špalj 2014, 77,101 (Cat. no. 72); Kušan Špalj 2015, 77,101 (Cat. no. 72). Temporary storage: AMZ, VTks- 3,4.
[92] Ps.-Eratosth.*Cat.*24
[93] Soph. OT 207.
[94] Ando 2005, 49
[95] Bilić 2011, 45-64.
[96] Opp. *Kyneg.* I.
[97] CIL III, 3637
[98] Malaise 1972, 465.
[99] Mráv 2000, 85.

za i na rituale u akvejazejskom svetištu, pa i nove nalaze skulptura Apolona – Sola i Dijane – Lune treba promatrati u kontekstu toga vremena. Precizniju dataciju olakšava usporedba skulptura Apolona – Sola i Dijane – Lune s reljefnim prikazom Eskulapa i Salus (Higije) jer se uočavaju mnoge sličnosti. Prije svega to je vidljivo u oblikovanju frizura Apolona i Eskulapa, po uzoru na Aleksandra Velikog. Postoji i sličnost u oblikovanju lica božica, izvedbi detalja lica, ali i frizurama, koje nisu potpuno istog tipa, ali su modelirane na sličan način, dubljim i plićim utorima. Za razliku od lica Eskulapa, koji ima karakteristike portreta, s naglašenim jagodicama i izražajnim obrvama, lica Apolona, Dijane i Salus (Higije) izvedena su u skladu s idealizmom u prikazu božanstava. U svakom slučaju, i reljef i skulpture odaju karakteristike koje ih smještaju u isto vremensko razdoblje, a vjerojatno su nastale i u istoj radionici. Vjerojatno nije riječ o kopijama određenih grčkih kipova, već su izrađeni prema načelima grčkog kiparstva i ikonografije, a u skladu sa službenom religijom. Likovi božanstava Eskulapa i Apolona, omiljenih kultova cara Karakale, i njihov prikaz, koji u mnogim elementima podsjeća na prikazivanje Aleksandra Velikog, odraz su službene politike i ikonografije. Očito je da su vješti rimski majstori proizvodili kombinirajući načela i elemente klasičnoga grčkog kiparstva i helenizma, sa zahtjevima svog vremena. Plasičnost modelacije mišića na skulpturi Apolona, ali i reljefu Eskulapa, pokazuje vrhunsko poznavanje anatomije tijela te činjenicu da se ovdje ne radi o običnom serijskom proizvodu, već o djelu vrlo vještog majstora i njegovu umjetničkom ostvarenju. S obzirom na to da je mramor od kojeg su izrađene skulpture i reljef alpskog porijekla[100], treba isključiti da se radi o spomenicima dovezenim iz nekih udaljenijih centara ili samog Rima. Očito je riječ o djelima nastalim u nekoj od obližnjih radionica gdje su djelovali vrsni, ali i dobro plaćeni majstori koji su mogli prihvatiti

[100] Analizu je proveo prof. Rohatschu (TU Wien) u suradnji s tvrtkom Zottmmann GmbH, koja je izvela konzervatorsko-restauratorske radove na spomenicima.

discovered statues of Apollo/Sol and Diana/Luna have to, therefore, be considered within the context of that period. The finds can be more precisely dated by comparing the statues of Apollo/Sol and Diana/Luna with the relief depiction of Aesculapius and Salus/Hygia, seeing as many similarities can be observed. It is visible, first and foremost, in the shape of the hair of Apollo and Aesculapius, which is modelled after Alexander the Great. There are also similarities in the shapes of the goddess' faces, the details, and also the hairstyles, which are not of the exact same type, but are similarly modelled, with deep and shallow indentations. As opposed to Aesculapius' face, which has the characteristics of a portrait, with prominent cheekbones and expressive eyebrows, the faces of Apollo, Diana and Salus/Hygia were made in accordance with an idealistic depiction of deities. In any case, both the relief and the statues exhibit characteristics which place them in the same time period, and perhaps they were even made in the same workshop. They are most likely not copies of specific Greek statues, but were made according to the principles of Greek sculpture and iconography, and in accordance with the official religion. The figures of Aesculapius and Apollo, the favourite cults of the emperor Caracalla, and their depiction, which in many of its elements calls to mind the depiction of Alexander the Great, reflect the official policy and iconography. It is obvious that skilled Roman master craftsmen approached sculpting by combining the principles and elements of classical Greek sculpture and Hellenism with the demands of the period. The life-like shape of the muscles on the statue of Apollo and the relief of Aesculapius points to a masterful knowledge of human anatomy, as well as the fact that this is not merely a serialized product, but the artwork of a very skilled master craftsman. The fact that the marble from which the statues and relief were made came from the Alps[100] rules out the possibility that the monuments were imported from some more remote place, or even Rome itself. It is obvious that these works were made in some of the nearby workshops, which were run by excellent

[100] The analysis was carried out by Prof. Rohatschu (TU Wien) in collaboration with the company Zottmmann GmbH, which carried out the conservation and restoration work on the monuments.

narudžbu osoba vrlo bliskih caru (možda i samog cara).

Da je postojalo štovanje Apolona i Dijane i izvan okvira službenoga državnog kulta, pokazuju natpisi posvećeni samoj božici Dijani,[101] ponekad i zajedno s nimfama,[102] te novi nalazi s posvetama Apolonu i Dijani, zajedno s drugim božanstvima. Tako je 2011. godine u sjevernom zidu izvorišnog bazena pronađen jedan vrlo oštećen natpis posvećen Apolonu, Dijani i nimfama (sl. 18, 19), a što svjedoči o vrlo specifičnom obliku kulta karakterističnom za ovo svetište.[103] Natpis je izrađen od lokalnog kamena, gustoga sitnozrnatoga litotamnijskog vapenca, ali je zbog utjecaja sumporne vode i težine gornjih redova zida, u koji je bio ugrađen, pronađen oštećen i u više dijelova. Radi se o monolitnom bloku na kojem je u gornjem dijelu urezanim linijama oblikovano krunište. Nedostaje gornji desni ugao, a donji dio (s dijelom natpisa) bio je otklesan zbog prilagodbe za ugradnju u zid.[104] Najveća su oštećenja bila upravo na samom natpisu tako da je tek nakon spajanja svih dijelova i konzervatorsko-restauratorskih radova provedenih 2015. godine bilo moguće cjelovitije interpretirati natpis. Nakon što je provedeno detaljno čišćenje površine, pokazalo se da je u slovima sačuvana crna boja.

APOLLI[ni]
DIANAE[et?]
NYMPH[is]
L(ucius) ARRIVS
FLORENTIN[u]S
SPECULATOR
LEG(ionis) XIIII GEMI(nae)

Natpis je Apolonu, Dijani i nimfama posvetio Lucije Arije Florentin, spekulator u legiji XIIII. gemini. Funkcija je spekulatora obuhvaćala razna zaduženja, od neke vrsta

[101] Iljug 1166; Vikić-Belančić, Gorenc 1958, 114, fig. 62; AIJ 459.

[102] AIJ 460; Rendić Miočević 1992, 71.

[103] Kušan Špalj 2014, 76, 100; Kušan Špalj 2015, 76, 100.

[104] Najviši sačuvani dio je 94 cm, širina je 52,5 cm, a debljina 37 cm. Visina slova: 1. red – 7,5 cm, 2., 3., 6., 7. red – 5,2 cm, 4. red – 4,8 – 5,2 cm, 5. red – 5,0 cm; Privremena pohrana: AMZ, VTks-8.

and well-paid master craftsmen, who could accept an order from persons very close to the emperor (and perhaps even the emperor himself).

That Apollo and Diana were also worshipped outside the official state cult is evidenced by the inscriptions dedicated to Diana,[101] sometimes together with nymphs,[102] as well as the new finds with dedications to Apollo, Diana, and other deities. Thus, in 2011, a badly damaged inscription dedicated to Apollo, Diana, and the nymphs was discovered in the north wall of the spring reservoir (Fig. 18,19), which points to a very specific form of the cult, characteristic of this sanctuary.[103] The inscription was made from locally mined stone, a dense, small-grained lithothamnium limestone, but because of the effects of sulphur water, as well as the weight of the upper rows of the wall into which it was built, it was found badly damaged and broken into several pieces. It is a monolithic block whose upper part has been shaped by carving. The right corner is missing, and the bottom part (with the part of the inscription) was chipped off to make it fit into the wall.[104] The stone was most heavily damaged on the inscription itself, so that only after connecting all the pieces and the conservation and restoration work done in 2015 was it possible to more fully interpret the inscription. After a detailed cleaning of the surface, it was discovered that black paint had been preserved inside the letters.

APOLLI[ni]
DIANAE[et?]
NYMPH[is]
L(ucius) ARRIVS
FLORENTIN[u]S
SPECULATOR
LEG(ionis) XIIII GEMI(nae)

The inscription was dedicated to Apollo, Diana, and the nymphs by Lucius Arrius Florentinus, a speculator from the *legio XIV Gemina*. The speculator's title encompassed various

[101] Iljug 1166; Vikić-Belančić, Gorenc 1958, 114, Fig. 62; AIJ 459

[102] AIJ 460; Rendić Miočević 1992, 71.

[103] Kušan Špalj 2014, 76,100; Kušan Špalj 2015, 76,100;

[104] The largest preserved piece is 94 cm, the width is 52.5 cm, and thickness is 37 cm. Height of the letters: first row 7.5 cm, second, third, sixth and seventh row 5.2 cm, fourth row 4.8-5.2 cm, fifth row 5.0 cm; Temporary storage: AMZ, VTks-8.

Slika / Figure 18: Dio natpisa posvećenog Apolonu, Dijani i nimfama, istraživanja 2011. god. (snimila D. Kušan Špalj) / A segment of an inscription dedicated to Apolo, Diana and nymphs, the 2011 excavations (photo by D. Kušan Špalj).

Slika / Figure 19: Natpis posvećen Apolonu, Dijani i nimfama, 2. st, nakon konzervatorsko-restauratorskih radova (snimio I. Krajcar). / An inscription dedicated to Apollo, Diana and nymphs, 2nd c., after conservation-restauration work (photo by I. Krajcar).

izviđača i špijuna pa do raznih službi u legiji i u uredu provincijskih namjesnika.[105] Gentilicij *Arrius* vrlo je čest i rasprostranjen, ponekad među italskim, a kasnije i orijentalnim stanovništvom.[106] Kognomen *Florentinus* također je bio poznat diljem Carstva, a posebno u keltskim provincijama.[107] S obzirom na to da se na ovom natpisu spominje i predime, Lucije, odnosno imenska shema *tria nomina*, vjerojatna je datacija natpisa u 2. stoljeće.

Pripadnici legije XIIII. gemine spominju se na još dva, već ranije nađena natpisa iz Varaždinskih Toplica,[108] a dio jednog natpisa sa spomenom te legije pronađen je kao građevni materijal u zidu zapadnog hrama u istraživanjima 2010. godine.[109]

[105] Breeze 1969, 1; Demicheli 2015, 64-65.

[106] Alfoldy 1969, 61.

[107] Alfoldy 1969, 205; Cajanto 1965, 189.

[108] Rendić-Miočević 1975, 37; ILJug 1172.

[109] Kušan Špalj 2014, (kat. br. 60 c); Kušan Špalj 2015, (kat. br. 60 c).

duties, from being a type of scout and spy, to various services in the legion and the office of a provincial governor.[105] The *nomen gentilicium* Arrius is very common and widespread, sometimes among Italic, and later among Oriental citizens.[106] The *cognomen* Florentinus was also familiar throughout the Empire, and especially in the Celtic provinces.[107] Seeing as the inscription also mentions a *praenomen*, Lucius, i.e. the *tria nomina* naming convention, the inscription most likely dates back to the 2nd century.

The members of the *legio XIV Gemina* are mentioned in two other inscriptions previously discovered in Varaždinske Toplice,[108] and part of an inscription mentioning the legion was discovered as building material in the wall of the west temple during the 2010 excavations.[109]

[105] Breeze 1969, 1.; Demicheli 2015, 64-65.

[106] Alfoldy 1969, 61

[107] Alfoldy 1969, 205; Cajanto 1965, 189

[108] Rendić-Miočević 1975, 37; ILJug 1172;

[109] Kušan Špalj 2014, (Cat. no. 60 c); Kušan Špalj 2015, (Cat. no. 60 c);

Slika / Figure 20: Natpis posvećen Junoni, Minervi, Apolonu i nimfama, istraživanja 2012. god. (snimila D. Kušan Špalj) / An inscription dedicated to Juno, Minerva, Apollo and nymphs, the 2012 excavations (photo by D. Kušan Špalj).

Slika / Figure 21: Natpis posvećen Junoni, Minervi, Apolonu i nimfama, 2. st., nakon konzervatorsko-restauratorskih radova (snimio I. Krajcar). / An inscription dedicated to Juno, Minerva, Apollo and nymphs, 2nd c., after conservation-restauration work (photo by I. Krajcar).

Svi do sada pronađeni natpisi, koji spominju pripadnike legije XIIII. gemine, datirani su u 2. i 2/3. stoljeće, odnosno u vrijeme kada je ta legija bila stacionirana u Karnuntu.[110]

Još jedan natpis na kojem se spominje Apolon pronađen je u sjevernom zidu izvorišnog bazena (u njegovu istočnom dijelu), a također je bio izrađen od lokalnog kamena – litotamnijskog vapnenca i površina mu je jako oštećena. Radi se također o monolitnom kamenom bloku (od kojeg je sačuvan samo gornji dio), bez profilacija, s djelomično sačuvanim kruništem (desni dio je oštećen) koje je bilo prikazano plitkim urezima (sl. 20, 21).[111] Radi ugradnje u zid, donji je dio natpisa otklesan i nije pronađen. Natpis je posvećen Junoni (kraljici), Minervi, Apo-

All of the inscriptions mentioning the members of the *legio XIV Gemina* discovered thus far have been dated to the 2nd and 3rd centuries, when the legion was stationed in Carnuntum. [110]

Another inscription that mentions Apollo was discovered in the north wall of the spring reservoir (in its eastern part), and was also made from locally mined stone (lithothamnium limestone), whose surface was badly damaged. It is also a monolithic stone block (of which only the upper half has been preserved), with no mouldings, and a partially preserved top piece (the right side is damaged) into which shallow decorative details were carved (Fig. 20, 21).[111] In order to be fitted into the wall, the bottom part of the inscription was chiselled off and has not

[110] Mócsy1959, 49, 83; Radman-Livaja 2012, 163-170.

[111] Najveća sačuvana visina je 87 cm, širina u gornjem dijelu 41 cm (u donjem dijelu 42 cm), debljina 25 cm. Natpis je sačuvan ukupne visine 48 cm. Visina slova: 1. – 3. red: 5 cm, 4., 5. red: 5,5 cm, 6. red: 6 cm, 7. red: sačuvan je dio slova, visina cca 5,5 cm. Privremena pohrana: AMZ, VTks- 82.

[110] Mócsy1959, 49, 83; Radman-Livaja 2012, 163-170;

[111] The largest preserved height is 87 cm, width in the upper part 41 cm (in the lower part 42 cm), thickness 25 cm. The inscription has been preserved with a total height of 48 cm. Height of the letters: first, second, and third row 5 cm, fourth and fifth row 5.5 cm, sixth row 6 cm, in the seventh row only a part of the letters have been preserved, with an approximate height of 5.5 cm. Temporary storage: AMZ, VTks- 82.

lonu i nimfama, i možda se u njemu krije i odgovor kojim su božanstvima, barem u jednom razdoblju, bili posvećeni hramovi.

IVNONI R(eginae) ET
MINERVA[e]
APOLLINI
ET NYMPHI[s]
C(aius) PETR[onius?]
OPTA [tus?]
BE(?) [-----]

Ime dedikanta vrlo je oštećeno te osim sačuvanog predimena, *Caius,* ne može se sa sigurnošću utvrditi kako je glasilo cijelo ime, no s obzirom na trodjelni oblik imena, vjerojatna je datacija u 2. stoljeće. Prema sačuvanim slovima PETR, vjerojatno je riječ o gentiliciju *Petronius*, koji je bio poznat diljem Carstva, čest je i u Dalmaciji među italskim stanovništvom i oslobođenicima.[112] U 6. redu vidljiva su slova OPT, iza kojih vjerojatno slijedi A (vidljiv je gornji dio slova) pa je moguće da se radi o kognomenu *Optatus*, koji je također bio vrlo rasprostranjen, posebno u keltskim provincijama.[113] Naravno, postoji mogućnost i nekih drugih oblika kognomena, među kojima su vjerojatnija ona kraćeg oblika zbog širine natpisnog polja (*Optatius, Optandus, Optanus, Optatianus* itd).[114] U 7. redu djelomično su sačuvana samo dva slova (BE (ili RE), možda BF,[115] što ostavlja razne mogućnosti za preostali sadržaj teksta.

Svi ovi nalazi, koji govore o prisutnosti kulta boga Apolona u akvejazejskom svetištu, a pogotovo skulptura koja ga prikazuje kao boga Sunca, bacaju i novo svjetlo na jedan već ranije pronađeni natpis kojeg je u kontestu novih nalaza moguće interpretirati u okviru kulta Apolona – Sola.[116]

[112] Alföldy1969, 108.
[113] Alföldy 1969, 256; Kajanto 1965, 189.
[114] Lőrincz 2000, 114-115.
[115] *B(ene)F(iciarius*) (?)
[116] Demo 1994, 72, no. 1; Migotti 1999, 56.; Lučić 2013, 234.

been found.The inscription is dedicated to Juno (the queen), Minerva, Apollo, and the nymphs, and perhaps it can answer the question to which deities, at least during a certain period, the temples were dedicated.

IVNONI R(eginae) ET
MINERVA[e]
APOLLINI
ET NYMPHI[s]
C(aius) PETR[onius?]
OPTA [tus?]
BE(?) [-----]

The name of the dedicator is badly damaged and except for the preserved *praenomen*, Caius, we cannot with certainty say what the full name was, but considering the tripartite form of the name, it can most likely be dated to the 2nd century. Considering the preserved letters PETR, it is possible that the *nomen gentilicium* was Petronius, a name that was familiar throughout the Empire, and was common in Dalmatia among Italic citizens and freedmen.[112] The letters OPT are visible in the sixth row, most likely followed by A (the top part of the letter is visible); it is, therefore, possible that the *cognomen* is Optatus, a name which was also very widespread, especially in the Celtic provinces.[113] Of course, some other forms of the *cognomen* are also possible, among which the shorter forms are more probable, due to the width of the writing area (Optatius, Optandus, Optanus, Optatianus, etc.).[114] In the seventh row, only two letters have been partially preserved (BE, or RE, or perhaps BF),[115] and so there are many open possibilities for the rest of the text.

All of these inscriptions which speak of the presence of the cult of Apollo in the Aquae Iasae sanctuary, and especially the statue depicting him as the god of the Sun, shed new light onto a previously discovered inscription, which can, in the context of the new finds, be interpreted from the vantage point of the cult of Apollo/Sol.[116]

[112] Alföldy 1969, 108.
[113] Alföldy 1969, 256; Kajanto 1965, 189.
[114] Lőrincz 2000, 114-115.
[115] *B(ene)F(iciarius*) (?)
[116] Demo 1994, 72, no. 1; Migotti 1999, 56.; Lučić 2013, 234.

Serapis

Novi nalazi potvrđuju da su u svetištu *Aquae Iasae* u razdoblju s 2. na 3. stoljeće, među božanstvima od kojih se tražilo ozdravljenje i pomoć, štovana i egipatska božanstva Izida i Serapis. Izida, kao izvorno egipatsko božanstvo, potpuno je preoblikovana u helenizmu, kada joj je kao suprug dodan Serapis. Preobrazba Izide nije se očitovala samo u ikonografiji već i u novim božanskim funkcijama koje joj se pripisuju, kao sveopćem božanstvu,[117] među kojima se posebno ističu one vezane uz liječenje.[118] Helenistička je ikonografija Izide i Serapisa preuzeta i u rimskom svijetu, kao i povezanost s misterijima, višim oblikom duhovnosti, ali najčešće se vjerovanje ipak zadržavalo na vrlo praktičnoj razini i bilo je zavjetnog karaktera. Širenje Izidina kulta može se pratiti od 1. stoljeća, iz Akvileje preko Emone u Panoniju, te se postupno prihvaćalo u svim slojevima društva, ali prije svega u okviru privatne religije. No potpuni procvat egipatskih kultova događa se u doba Severa, krajem 2. stoljeća, te posebno početkom 3. stoljeća, kada i Serapis dobiva posebnu ulogu, a zajedno s Izidom uklapa se u državni kult.[119] U to se vrijeme mogu datirati i nalazi iz Varaždinskih Toplica, a njihovu pojavu svakako treba povezati sa štovanjem ovih božanstava u obližnjoj Petovioni, kao jednome od najznačajnijih središta istočnih kultova u ovome dijelu Carstva.[120] Petoviona je bila središte carinskih službi za cijeli Ilirik, a carinski su službenici bili glavni štovatelji kulta Mitre i egipatskih božanstava.[121] Međutim, štovatelji Izide i Serapisa bili su i pripadnici drugih, vrlo često i visokih društvenih krugova, a pogotovo krajem 2. i početkom 3. stoljeća.

[117] Witt 1997, 23; Meza 2006, 161-166; Malaise 2007, 19-39.

[118] Bricault 2014, 105.

[119] Selem 1997, 17-43.

[120] Jerala 2011, 75-86.

[121] Selem 1997, 127.

Serapis

The new finds confirm that in the 2nd and 3rd centuries in the sanctuary of Aquae Iasae, among the deities which were called upon for aid and healing, the Egyptian deities Isis and Serapis were also worshipped. Isis, as an authentic Egyptian deity, was completely refashioned in the Hellenistic period, when Serapis was added as her husband. The transformation of Isis did not manifest itself only in the iconography, but also in the new divine functions attributed to her, as a supreme deity,[117] among which those associated with healing stand out.[118] The Hellenistic iconography of Isis and Serapis was adopted in the Roman world, as was the connection with mysteries, a higher form of spirituality, but worship mostly remained on a very practical level and was votive in nature. The spreading of the cult of Isis can be traced from the 1st century, from Aquileia, across Emona, to Pannonia, and gradually came to be accepted in all strata of society, but first and foremost in the context of a private religion. However, the Egyptian cults did not fully thrive until the time of Severus, at the end of the 2nd century and especially the beginning of the 3rd century, when Serapis gains a special role, and is included in the state cult together with Isis.[119] The finds from Varaždinske Toplice can also be dated to that period, and their presence should certainly be linked to the worship of these deities in the nearby Poetovio, as one of the most important centres of eastern cults in this part of the Empire.[120] Poetovio was the centre for customs services for the whole of Illyricum, and customs officials were the primary followers of the cult of Mithra and the Egyptian deities.[121] However, the worshippers of Isis and Serapis were also members of other, very often high social circles, especially at the end of the 2nd and beginning of the 3rd century.

[117] Witt 1997, 23; Meza 2006, 161-166; Malaise 2007, 19-39.

[118] Bricault 2014, 105.

[119] Selem 1997, 17-43.

[120] Jerala 2011, 75-86.

[121] Selem 1997, 127.

Slika / Figure 22: Natpis posvećen Izidi i Serapisu, druga pol. 2. st. (lijevo: snimio Zottmann Gmbh, Austrija, desno: snimio Cankarjev dom, Slovenija). / An inscription dedicated to Isis and Serapis, second half of the 2nd c. (on the left: photo by Zottmann Gmbh, Austria, on the right: photo by Cankarjev dom, Slovenia).

To potvrđuje i nalaz žrtvenika posvećenog Izidi i Serapisu koji je pronađen 2012. godine u konstrukciji sjevernog zida izvorišta, gdje je bio sekundarno upotrijebljen kao kameni blok u zidu (sl. 22).[122] Riječ je o trodijelnom monolitnom žrtveniku koji se sastoji od gornjeg dijela (kruništa), baze s profilacijom te središnjeg dijela, koji na bočnim stranama ima prikaze kantara s granama vinove loze, a na prednjoj i stražnjoj strani potpuno isti natpis:[123]

[122] Visina 156 cm, širina baze 70 cm, debljina baze 44 cm; Privremena pohrana: AMZ, VTks- 78.

[123] Visina slova: 1. red: 6,5 – 7,9 cm, 2. red: 6 – 6,3 cm, 3. red: 5,5 – 6 cm 4. red: 5 – 5,2 cm, 5. red: 4,7 cm, 6. red: 4,3 – 5,4 cm, 7. red: 3,7 – 4 cm.

This is evidenced by the discovery of the sacrificial altar dedicated to Isis and Serapis, which was found in 2012 in the structure of the northern wall of the spring reservoir, where it was reused as a stone block within the wall (Fig. 22).[122] It is a tripartite monolithic altar, which consists of the upper part, the base with moulding, and a central part, which has images of a cantharus with vine branches on its sides, and has the exact same inscription on its front and back:[123]

[122] Height 156 cm, base width 70 cm, base thickness 44 cm. Temporary storage: AMZ, VTks- 78.

[123] Height of the letters: first row 6.5-7.9 cm, second row 6-6.3 cm, third row 5.5 -6 cm, fourth row 5-5.2 cm, fifth row 4.7 cm, sixth row: 4.3-5.4 cm, seventh row 3.7-4 cm.

ISIDI ET
SERAPI AVG(usti)
SACRVM
C(aius) VAL(erius) PRISCVS
AVG(ustalis) C(oloniae) V(lpiae) T(raianae)
P(oetoviensis) ET
CATIENIA
FORTVNATA CON(iux)
SIVE ORICCLIO
V(otum) S(olvit) L(ibens) M(erito)

Posvećeno uzvišenim bogovima Izidi i Serapisu. Zavjet je rado i po zasluzi ispunio Gaj Valerije Prisk, augustal petovionske kolonije Ulpije Trajane i supruga Katijenija Fortunata, (ili) Oriklion (a?)

Žrtvenik je posvetio *Caius Valerius Priscus*, augustal u gradu Petovioni. Augustali su bili neka vrsta svećenika, zaduženi za carski kult, a najčešće je riječ o bogatim oslobođenicima koji su se na taj način približili utjecajnim krugovima društva i vrlo često na svoj trošak podizali kipove i žrtvenike raznim božanstvima.[124] Dedikant ovog žrtvenika, najvjerojatnije je također bio oslobođenik elitne obitelji *Valerius,* koja je još tijekom 2. stoljeća predstavljala viši društveni sloj u gradu Petovioni.[125] Kognomen *Priscus* pripada vrlo čestim imenima još od ranocarskog razdoblja, posebno na prostoru Italije.[126] Na kraju natpisa spominje se i nadimak (*agnomen*) – *sive Oricclio*, a što je dosta često prisutno kod navođenja imena oslobođenika.[127] Agnomen je bio u funkciji drugog kognomena, radi točnije identifikacije osobe, a uobičajeno je bilo da se ispred imena pojavljuju formule *idem, sive, qui et* i sl., [128] kao što je to slučaj i na natpisu iz Varaždinskih Toplica. Antički pisani izvori spominju da su agnomina oblikovani na karakteristikama fizičkog izgleda i osobnosti ili dostignuća.[129] Slični oblici imena (*Oriclius, Oriclio, Oriculo, Oriclio*) pojavljuju se kao kognomen na nekim natpisima,[130] kao i obli-

[124] Selem 1976, 7.
[125] Alföldy 1964-65, 137-144; Cajanto 1965, 30, 288.
[126] Mócsy 1959, 185; Cajanto 1965, 288.
[127] Cajanto 1967, 25.
[128] Cajanto 1967, 6, 10.
[129] Luhtala 2005, 48.
[130] Lőrincz 2000, 116; Solin 2007, 99-100; O etimološkoj povezanosti agnomena i kognomena: Kajanto 1967, 57.

ISIDI ET
SERAPI AVG(usti)
SACRVM
C(aius) VAL(erius) PRISCVS
AVG(ustalis) C(oloniae) V(lpiae) T(raianae)
P(oetoviensis) ET
CATIENIA
FORTVNATA CON(iux)
SIVE ORICCLIO
V(otum) S(olvit) L(ibens) M(erito)

Dedicated to the exalted deities Isis and Serapis. The vow was gladly and by merit fulfilled by Caius Valerius Priscus, the augustalis of the colony Ulpia Traiana Poetoviensis, and by wife Catienia Fortunata, (or) Oricclius (Oriccliona?)

The altar was dedicated by Caius Valerius Priscus, an augustalis in Poetovio. Augustales were a type of priest, in charge of the Imperial cult, and were most often wealthy freedmen, who, in this manner, approached the more influential social circles, and very often erected statues and sacrificial altars dedicated to various deities at their own expense.[124] The dedicator of this altar was most likely also a freedman from the elite family Valerius, who were in the 2nd century still part of the higher social stratum in Poetovio.[125] The *cognomen* Priscus numbers among very common names since the early Empire, especially on the territory of Italy.[126] The end of the inscription also contains the nickname (*agnomen*) *sive Oricclio*, which is often present when writing down the names of freedmen.[127] The *agnomen* had the function of a second *cognomen*, with the purpose of more accurately identifying the person, and it was usual for the formulae *idem, sive, qui et*, etc., to appear before the name,[128] as is the case with the inscription from Varaždinske Toplice. Ancient written sources mention that *agnomina* were based on physical features, as well as personality or accomplishments.[129] Similar forms of the name (Oriclius, Oriclio, Oriculo, Oriclio) appear as a *cognomen* on certain inscriptions,[130] as

[124] Selem 1976, 7.
[125] Alföldy 1964-65, 137-144; Cajanto 1965, 30, 288.
[126] Mócsy 1959, 185; Cajanto 1965, 288.
[127] Cajanto 1967, 25
[128] Cajanto 1967,6,10
[129] Luhtala 2005, 48.
[130] Lőrincz 2000,116; Solin 2007, 99-100; On the etymological connection between *agnomina* and *cognomina*, see: Kajanto 1967, 57.

ci *Auricula /Oric(u)la* koji se ubrajaju u grupu kognomena nastalih prema nazivima za dijelove tijela (*auricula, auriculae /oricula, oriculae* – ušna resica).[131] Značenje nadimka spomenutog na natpisu iz Varaždinskih Toplica možda se može tražiti u sličnom korijenu latinske riječi premda se razlikuje od navedenih imena jer sadrži dva slova C. Nadimak se nalazi iza ženskog imena pa to sugerira da se radi o obliku ženskog nadimka (Orikliona), mada prema obliku imena (*Oricclio*) ne treba isključiti ni mogućnost da se nadimak odnosi na dedikanta (Orikliona).

Sama izrada žrtvenika, a pogotovo reljefi na bočnim stranama smještaju ga u noričko-panonski radionički krug. Prikazi kantara s vinovom lozom na bočnim stranama žrtvenika pokazuju izrazitu sličnost s prikazima na nadgrobnim edikulama iz Šempetra[132] te se vjerojatno radi o standardnim motivima odabranim u katalogu uzoraka neke radionice na tom području. Izgled ovog žrtvenika, s natpisom na dvije strane, sugerira da se nalazio slobodno u prostoru i očito je bilo važno da natpis bude vidljiv s više strana. Prema stilskim karakteristikama reljefa, kao i obliku imena, nastanak ovog žrtvenika mogao bi se smjestiti u drugu polovicu 2. stoljeća.

O kultu Serapisa u akvejazejskom svetištu svjedoči još jedan natpis pronađen 2011. godine (sl. 23), koji pokazuje i da su službeni kultovi bili uklopljeni u lokalni kult vezan uz termalnu vodu, a simbolizirale su ga nimfe. Natpis je uklesan na monolitnom bloku litotamnijskog vapnenca, bez profilacija, dok je samo u gornjem dijelu, plitko urezano krunište s bočnim akroterijima. Tekst je raspoređen u 10 redova, ali je zbog utjecaja sumporne vode površina jako oštećena, tako da neka slova u potpunosti nedostaju, a neka su sačuvana samo djelomično pa nije moguće u cjelosti interpretirati tekst.[133]

[131] Cajanto 1965, 224.

[132] Klemenc et al. 1972, 47, 53.

[133] Dimenzije: visina 115 cm (dno: širina 49 cm, debljina 26 cm, gornji dio: širina 43 cm, debljina 20 cm). Natpisno polje: visina 51 cm. Veličina slova: 1. red: 4,8 cm, 2. – 8. red: 4 – 4, 5 cm, 9. red: 3 cm, 10. red: 1,7 cm; Privremena pohrana: AMZ, VTks-9.

well as the forms Auricula/Oric(u)la, which are part of a group of *cognomina* formed out of the names of body parts (*auricula, auriculae/oricula, oriculae*, meaning *earlobe*).[131] The meaning of the nickname mentioned in the inscription from Varaždinske Toplice could perhaps be found in the similar root of the Latin word, although it differs from the listed names in that it contains two letters C. The nickname is written after the female name, which would suggest that it is a type of female nickname (Oriccliona?), but judging from the shape of the name (Oricclio), we should not rule out the possibility that the nickname refers to the dedicator (Oricclius).

The craftsmanship of the altar, and especially the reliefs on its sides, place it in the Noricum-Pannonia circle of workshops. The depictions of a cantharus with vine branches on the sides of the altar display a remarkable similarity to the funerary aediculae from Šempeter,[132] so that these are likely standard motifs chosen from a catalogue of patterns of a certain workshop in the area. The appearance of the altar, with an inscription on two sides, suggests that it was placed in an open space and that it was important for the inscription to be visible from multiple sides. Considering the stylistic characteristics of the relief, as well as the form of the name, the creation of this altar might be dated to the second half of the 2nd century.

The cult of Serapis in the sanctuary of Aquae Iasae is evidenced by another inscription, discovered in 2011 (Fig. 23), which shows that official cults were also integrated into the local cult, connected to the thermal water and symbolized by the nymphs. The inscription is carved into a monolithic block of lithothamnium limestone, with no mouldings, and only the upper part has shallow carvings with lateral acroteria. The text is divided into ten rows, but the surface was badly damaged by sulphur water, and certain letters are thus missing entirely, while some have been only partially preserved; it is, therefore, not possible to fully interpret the text.[133]

[131] Cajanto 1965, 224.

[132] Klemenc et al. 1972, 47,53.

[133] Dimensions: height 115 cm (bottom: width 49 cm, thickness 26 cm, upper part: width 43 cm, thickness 20). Inscription plate: height 51 cm. Height of the letters: first row 4.8 cm , second through eighth row 4- 4.5 cm, ninth row 3 cm, tenth row 1.7 cm. Temporary storage: AMZ, VTks-9.

Slika / Figure 23: Natpis posvećen Serapisu i nimfama, druga pol. 2. st., pronađen u urušenju sjevernog zida izvorišnog bazena (snimila D. Nemeth-Ehrlich). / An inscription dedicated to Serapis and nymphs, second half of the 2nd c., found in the rubble of the spring resvoir's northern wall (photo by D. Nemeth-Ehrlich).

SERAPHI
SANCTO ET
NYMPHIS
SALUTARIBUS
C(aius) CAECILIUS
SATURNINUS
[-]EX[--L(?)---]
STINA CVM
CL[--E---]
SABIN(?)[----

Natpis je svetom Serapisu (Serafisu) i ozdravljujućim nimfama postavio Gaj Cecilije Saturnin.

Zanimljiv je neobičan oblik imena božanstva Serapisa na ovom natpisu – *Seraphis* (Serafis), nastao vjerojatno zbog nepoznavanja latinskog jezika. Ubacivanje nepotrebnoga glasa H (tzv. hiperkorektizam) na mjestu gdje nije potrebno, posljedica je nastojanja da se "prekrije" neznanje i nesigurnost u pisanju.[134]

[134] Zović 2015, 192, 193.

SERAPHI
SANCTO ET
NYMPHIS
SALUTARIBUS
C(aius) CAECILIUS
SATURNINUS
[-]EX[--L(?)---]
STINA CVM
CL[--E---]
SABIN(?)[----

The inscription was dedicated to the holy Serapis (Seraphis) and the healing nymphs by Caius Caecilius Saturninus.

What is interesting is the unusual form of the name of the god Serapis on this inscription: *Seraphis*, which most likely stems from poor knowledge of the Latin language. The insertion of the unnecessary H sound (so-called hypercorrection) where it is not necessary is a consequence of an effort to conceal poor knowledge and uncertainty in writing.[134]

[134] Zović 2015, 192,193

Nakon što su 2015. godine provedeni konzervatorsko-restauratorski radovi i spajanje svih sačuvanih dijelova ovog spomenika,[135] te usporedbom sa 3D modelom dobivenim skeniranjem,[136] postao je vidljiv dio slova (najvjerojatnije C) ispred gentilicija, tako da se ovdje ipak radi o obliku *tria nomina*. Gentilno ime donatora bilo je *Caecilius,* vrlo česti oblik, naročito među italskim stanovništvom,[137] a kognomen *Saturninus*, osim u Africi, pojavljuje se i u zapadnoj Panoniji.[138] U 7. redu vidljiva su samo slova EX (moguće je da se radi i o LX), dok je preostali dio natpisa u tome redu jako oštećen i samo se nazire jedno slovo koje bi moglo biti L ili E. U 8. redu vjerojatno se radi o završetku nekoga ženskog imena -STINA i vezniku CVM, što pretpostavlja da se i u 9. redu možda nalazilo neko ime ili naziv člana obitelji, dok su u zadnjem redu sačuvana 4 vrlo sitna i loše očuvana slova (SABIN?). Moguće je da se radi o nekom imenu (možda konzula), ali budući da su preostala slova u tom redu potpuno uništena, to nije moguće utvrditi. Natpis je vjerojatno sadržavao i uobičajenu formulu VSLM koja je možda bila u nastavku 10. reda koji je, prema gruboj obradi kamena u donjem dijelu bloka, vjerojatno bio zadnji red natpisnog polja. S obzirom na oblik imena, koje sadržava i predime, ovaj bi se natpis mogao datirati u 2. polovicu 2. stoljeća.

Štovanje egipatskih božanstava u svetištu *Aquae Iasae*, pogotovo božice Izide, ukazuje na to da su se možda odvijali i neki obredi vezani uz Izidine misterije ili neke svečanosti u njezinu čast. Možda je upravo scena iz takvih obreda prikazana na mramornom reljefu s natpisom, pronađenom 2011. godine (sl. 24).[139] Dijelovi su ovog reljefa pronađeni u konstrukciji južnog i sjevernog zida izvo-

After the conservation and restoration work and putting together all of the preserved pieces of this monument in 2015,[135] as well as a comparison with a 3D model formed through scanning,[136] a part of a letter (most likely C) before the *nomen gentilicium* became visible, so that this is, after all, the naming convention of *tria nomina*. The gentile name of the donor was Caecilius, a very common form, especially among Italic citizens,[137] while the *cognomen* Saturninus, can, besides in Africa, be found in western Pannonia.[138] Only the letters EX (or possibly LX) are visible in the seventh row, while the rest of the inscription in that row is badly damaged, with only one barely discernible letter, possibly an L or an E. The eighth row most likely contains the ending of a female name, -STINA, and the conjunction CVM, which suggests that the ninth row might have contained the name of a family member, while only four very small and poorly preserved letters (SABIN?) have been retained in the last row. It is possible that this is some sort of name (perhaps of a consul), but seeing as the rest of the letters in that row have been completely destroyed, it is not possible to ascertain that. The inscription most likely also contained the usual formula VSLM, perhaps in the rest of the tenth row, which was, judging from the rough finish on the stone in the lower part of the block, most likely the last row of the inscription. Considering the form of the name, which contains a *praenomen*, the inscription could be dated to the second half of the 2nd century.

The worship of Egyptian deities in the Aquae Iasae sanctuary, especially of the goddess Isis, suggests that certain rituals connected to Isis' mysteries might have been performed or that certain festivities in her honour might have been held. Perhaps the depiction on the marble relief with an inscription, discovered in 2011 (Fig. 24), is a scene from those same rituals.[139]

[135] Radove je izvela Jenny Pfeiffruck i tvrtka Zotmann Gmbh (Graz, Austrija).

[136] Skeniranje i model – Vektra, Varaždin.

[137] Alföldy, 1969, 69.

[138] Mócsy 1959, 189.

[139] Privremena pohrana: AMZ, VTks-69; dimenzije mramorne ploče: visina 52 cm, širina 90 cm, debljina 6 – 10 cm; Kušan Špalj 2014, 69, 94-95, kat. br. 74; Kušan Špalj 2015, 69, 94-95, kat. br. 74.

[135] The work was done by Jenny Pfeiffruck and the company Zotmann Gmbh (Graz, Austria).

[136] The scanning and model by Vektra (Varaždin, Croatia).

[137] Alföldy, 1969, 69.

[138] Mócsy 1959, 189.

[139] Temporary storage: AMZ, VTks-69; Dimensions of the marble tablet: height 52 cm, width 90 cm, thickness 6-10 cm; Kušan Špalj 2014, 69, 94-95, Cat. no. 74; Kušan Špalj 2015, 69, 94-95, Cat. no. 74;

Slika / Figure 24: Reljef s prikazom ženskih božanstava (Izide Fortune, Venere i tri nimfe) i natpisom s datumom, postavljen povodom svečanosti 1. lipnja 192. god. (snimio Zottmann Gmbh, Austrija). / A relief with a depiction of female divinities (Isis Fortuna, Venus and three nymphs) and an inscription with a date, erected on the occasion of a festival on 6th June, 192 (photo by Zottmann Gmbh, Austria).

rišnog bazena, u kojima su korišteni kao „kajle" ispod većih blokova, a što pokazuje da su, poput mnogih drugih spomenika, i ovaj reljef iskoristili kao običan građevinski materijal tijekom obnove početkom 4. stoljeća. Na desnoj je strani reljefa prikazana božica Izida Fortuna (ili njezina svećenica), s rogom obilja u lijevoj ruci, u haljini s tzv. Izidinim čvorom i s karakterističnim naglavkom (rogovi i sunčana ploča). U desnoj ruci drži plitku posudu (pateru) i izlijeva žrtvu iznad manjeg plamtećega žrtvenika. Uz nju su prikazana još četiri polugola ženska lika u sjedećem položaju, u odjeći i s frizurama karakterističnim za dosad poznate prikaze nimfi na reljefima iz 2/3. stoljeće pronađenim u Varaždinskim Toplicama.[140] Sva četiri lika imaju prekriveni donji dio tijela – s tkaninom vezanom u čvor na prednjoj strani i obavijenom oko jedne ruke te s obručima na nadlakticama. Međutim, uz

[140] Kušan Špalj 2014, kat. br. 77,78,80; Kušan Špalj 2015, kat. br. 77,78, 80.

The pieces of this relief were discovered in the structure of the southern and northern wall of the spring reservoir, in which they were used as wedges under the larger blocks, which shows that, as with many other monuments, this relief was used during renovation, at the beginning of the 4th century, as regular building material. The right side of the relief shows the goddess Isis/Fortuna (or her priestess) with a cornucopia in her left hand, in a dress with the Knot of Isis and the characteristic headdress (horns and sun halo). In her right hand she is holding a patera and is pouring the offering over a small burning altar. Four other semi-nude female figures are depicted next to her, in a sitting position, with dresses and hairstyles characteristic of known depictions of nymphs on reliefs from the 2nd and 3rd centuries found in Varaždinske Toplice.[140] All four figures have their bottom half covered, with cloth tied into a knot at the front and draped over one arm, and with rings on the

[140] Kušan Špalj 2014, Cat. no. 77,78,80; Kušan Špalj 2015, Cat. no. 77,78, 80.

jednu od prikazanih figura nalazi se Amor s palminom granom pa je vjerojatno riječ o Veneri, dok preostala tri lika prikazuju nimfe. Venera u desnoj ruci drži trsku, kao i jedna od nimfa, dok u lijevoj ruci vjerojatno ima jabuku, koja je vjerojatno i u lijevoj ruci središnje nimfe.

Način na koji su prikazane nimfe na ovom reljefu može se uklopiti u ikonografske tipove prikaza tih božica poznatih i s drugih reljefa pronađenih u Varaždinskim Toplicama.[141] Naime, nimfe su uvijek prikazane kao najade – nimfe izvora, s atributima koji simboliziraju vodu, a razlikuju se dva osnovna tipa kompozicije – stojeće nimfe, kompozicijski prikazane kao Gracije, ikonografski po uzoru na Afroditu (ikonografski tip sa školjkom i tip krunjenja)[142] i sjedeće (tj. polusjedeće ili poluležeće) nimfe, u koje se može uklopiti i ovdje spomenuti reljef.

Prikazivanje nimfi po uzoru na Afroditu može se pratiti u rimskoj umjetnosti od 1. stoljeća pr. Kr, a istovremeno se pojavljuju oba tipa – sjedeće i stojeće nimfe. To potvrđuje i freska u kući Romula i Rema u Pompejima, gdje se pojavljuju dvije stojeće nimfe razgolićena gornjeg tijela s plaštom koji klizi niz bokove, dok je središnja u poluležećem položaju.[143] Stojeće nimfe sa školjkama pojavljuju se u raznim dijelovima Carstva, uz izvore ili fontane, ali česte su i nimfe u sjedećem ili poluležećem položaju, oslonjene na posude s vodom, bilo na reljefima ili pojedinačno kao skulpture.[144]

Ovdje spomenuti reljef svakako potvrđuje usku povezanost ikonografskog prikaza nimfi i Venere, dok kompozicija prikaza i način izrade otkriva da se radi o proizvodu neke domaće radionice u kojoj su majstori nastojali pratiti uobičajena ikonografska pravila, interpretirajući ih na svoj način i u okviru svojih mogućnosti. Zanimljivi su i

[141] Kušan Špalj 2014, 58-66, 84-92, kat. br.2, 77, 78,80, 82; Kušan Špalj 2015, 69, 94-95, kat. br. 2, 77, 78, 80, 82.

[142] Maršić 1998, 112-121.

[143] Bieber 1955, sl. 636.

[144] Giunio 2008, 151-160; Seitz 2005, sl. 481.

forearms. However, one of the figures has Amor with a palm branch next to her, which most likely makes her Venus, while the remaining three figures represent nymphs. Venus is holding a cane in her right hand, as is one of the nymphs, while in her left hand she is most likely holding an apple, as is the nymph in the middle.

The depiction of nymphs on this relief fits into the iconographic types of the depictions of these goddesses known from other reliefs discovered in Varaždinske Toplice.[141] That is to say, the nymphs are always depicted as naiads, nymphs of the spring, with attributes symbolizing water, and we can determine two basic types of composition: the standing nymphs, compositionally depicted as Gratiae, and, in terms of iconography, following the example of Aphrodite (the iconographic type with a shell and the crowning type),[142] and the sitting (that is, half-sitting or half-prone) nymphs, which this relief can be said to belong to.

The depiction of nymphs in the manner of Aphrodite can be traced in Roman art from the 1st century BC, and both types (the sitting and the standing nymphs) appear at the same time. This is confirmed by the fresco in House of Romulus and Remus in Pompeii, where we can find two standing nymphs, with their torsos bared and with a cloak down their hips, while the middle nymph is in a half-prone position.[143] The standing nymphs with shells appear in various parts of the Empire, next to springs or fountains, but sitting or half-prone nymphs are also common, leaning on vessels containing water, both on reliefs and individually as statues.[144]

This relief definitely confirms the close link between the iconographic depictions of nymphs and Venus, while the composition and the craftsmanship reveal that it is a product of a local workshop, in which master craftsmen tried to follow the usual iconographic rules, interpreting them in their own way and to the best of their ability. Also of interest are the traces of

[141] Kušan Špalj 2014, 58-66, 84-92, Cat. no.2, 77 ,78 ,80 , 82; Kušan Špalj 2015, 69, 94-95, Cat. no. 2, 77 ,78 ,80 , 82;

[142] Maršić 1998, 112-121.

[143] Bieber 1955, Fig. 636.

[144] Giunio 2008, 151-160; Seitz 2005, Fig. 481.

tragovi klinova i utora koji pokazuju da je ploča bila pričvršćena na neku vertikalnu plohu, vjerojatno u nekom od hramova ili trjemova svetiša.

Iznad reljefnog prikaza je natpis, koji u stvari predstavlja datum i omogućuje preciznu dataciju ove ploče – 1. lipnja 192. godine, odnosno u vrijeme vladavine cara Komoda (čije ime je naknadno uklonjeno – očit primjer zatiranja uspomene – *damnatio memoriae*).[145]

IMP (eratore) [[Commodo]] VII ET HELVIO PERTENACI
II CO(n)S(ulibus) KAL(endis) IVNIS

U godini sedmog konzulata cara Komoda i drugog konzulata Helvija Pertinaksa, 1. dana mjeseca lipnja (junijske kalende)

Na temelju sačuvanog natpisa i prikaza na reljefu može se pretpostaviti da je ploča postavljena u svetištu povodom neke svečanosti (ili možda misterija) u čast božice Izide Fortune (i drugih ženskih božanstava) te ukazuje na kompleksnost kultova koji su u ovome svetištu oblikovani na specifičan način, usko povezani s prirodnim fenomenom ljekovitosti termalne vode. Glavno božanstvo Izida – Fortuna tako se povezuje s personifikacijama termalne vode – nimfama, a Venera, koja se često pojavljuje s Izidom u helenističko-rimskim hramovima, vjerojatno je u funkciji božice plodnosti i života.[146] Među dosadašnjim nalazima nije bilo spomena ni prikaza božice Venere, tako da reljef u svakom pogledu nadopunjuje dosadašnje spoznaje o prisutnosti žena i ženskih kultova u religijskom životu akvejazejskog svetišta, a što je sigurno bilo usko povezano s ljekovitim svojstvima termalne vode kod ženskih bolesti i plodnosti. Datum svečanosti – junijske kalende, otkriva i povezanost s božicom Junonom, kojoj su kalende bile i posvećene, a čiji je kult tijekom 2. i 3. stoljeća potvrđen i dosadašnjim nalazima u Varaždinskim Toplicama.

[145] Visina slova: 1,3 – 2,3 cm.

[146] Selem 1977, 174.

wedges and grooves, which show that the plate had been fastened to a vertical plane, most likely in one of the temples or on one of the sanctuary's porticos.

Above the relief is an inscription, which actually represents a date and allows for an accurate dating of the plate to June 1st, 192, that is, to the reign of the emperor Commodus (whose name was subsequently removed, and obvious example of a condemnation of memory, or *damnatio memoriae*).[145]

IMP (eratore) [[Commodo]] VII ET HELVIO PERTENACI
II CO(n)S(ulibus) KAL(endis) IVNIS

In the year of the seventh consulate of the emperor Commodus and the second consulate of Helvius Pertinax, on the first day of the month of June (the Kalends of June).

On the basis of the preserved inscription and the depiction on the relief, we can assume that the plate was placed in the sanctuary on the occasion of a festivity (or perhaps a mystery) in honour of the goddess Isis/Fortuna (and other female deities), and points to the complexity of the cults which were, in this sanctuary, formed in a very specific manner, closely linked to the natural phenomenon of the healing powers of thermal water. The supreme deity, Isis/Fortuna, is thus connected to the personifications of thermal water, the nymphs, while Venus, which often appears in Hellenistic-Roman temples together with Isis, is most likely here in the function of the goddess of fertility and life.[146] There was no mention or depiction of Venus in previous finds; this relief, therefore, fills in the gaps in previous findings on the presence of women and female cults in the religious life of the Aquae Iasae sanctuary, which was surely closely linked to the healing properties of thermal water for women's illnesses and fertility. The date of the festivity, the Kalends of June, also reveal a connection to the goddess Juno, to whom the Kalends were dedicated, and whose cult in the 2nd and 3rd centuries has been confirmed in previous findings from Varaždinske Toplice.

[145] Height of the letters: 1.3-2.3 cm.

[146] Selem 1977, 174.

AKVEJAZEJSKO SVETIŠTE U VRIJEME DINASTIJE SEVERA

Novi nalazi kamenih spomenika, koji otkrivaju pristustvo kultova Apolona, Serapisa i Eskulapa u akvejazejskom svetištu, ukazuju na značaj koje je naselje imalo i među najvišim državim službenicima Rimskog Carstva, a pogotovo s 2. na 3. stoljeće, odnosno u razdoblju vladavine dinastije Severa, i to početkom 3. stoljeća, za vrijeme vladavine cara Karakale. S obzirom na povezanost dinastije Severa s Panonijom, vrlo je vjerojatno i car Karakala, koji je inače obilazio razna svetišta svojih omiljenih bogova – Apolona, Eskulapa i Serapisa u raznim dijelovima Rimskog Carstva (npr. hram Apolona u Pergamu,[147] hram Serapisa u Aleksandriji[148]), dobro znao i za akvejazejsko svetište i lječilište te ga možda i obilazio.

[147] Cass. Dio 78, 15,6

[148] Cass. Dio 18,23,2

THE AQUAE IASAE SANCTUARY IN THE TIME OF THE SEVERAN DYNASTY

The new finds of stone monuments which reveal the presence of the cults of Apollo, Serapis and Aesculapius in the Aquae Iasae sanctuary point to the significance of this settlement among the highest officials of the Roman Empire, especially in the 2nd and 3rd centuries, i.e. in the time of the Severan dynasty, and especially at the beginning of the 3rd century, during the reign of the emperor Caracalla. Considering the connection between the Severan dynasty and Pannonia, it is highly likely that emperor Caracalla himself, who was in the habit of visiting various temples dedicated to his favourite deities, Apollo, Asclepius and Serapis, in various parts of the Roman Empire (e.g. the temple of Apollo in Pergamon,[147] and the temple of Serapis in Alexandria[148]), was well-acquainted with the Aquae Iasae sanctuary and baths, and might have frequented it.

Slika / Figure 25: Građevinski natpis s prikazom Viktorije, 2/3.st. (snimio Zottmann Gmbh, Austrija). / Construction inscription with a depiction of Victoria, 2nd/3rd c. (photo by Zottmann Gmbh, Austria).

[147] Cass. Dio 78, 15,6

[148] Cass. Dio 18,23,2

S obzirom i na poznate građevinske zahvate u Panoniji, koje su provodili carevi iz dinastije Severa, moguće je da su na njihovu inicijativu izvršeni neki radovi i u ovome svetištu. O tome možda svjedoči dio građevinskog natpisa, pronađenog 2011. godine, sjeverno od izvorišnog bazena (sl. 25).[149] Ploča je izrađena od mekanoga litotamnijskog vapnenca, lokalnog kamena koji je korišten i za gradnju izvorišnog bazena, a prikazana je Viktorija s palminom granom koja pridržava natpis.

Od natpisa je sačuvano samo nekoliko slova tako da nije moguće rekonstruirati njegov sadržaj.[150] Prikazi božice Viktorije, kao ukrasni elementi uz natpise, tipični su za razdoblje dinastije Severa, a iz Panonije je poznato više sličnih građevinskih natpisa na kojima se spominju donacije građevina Septimija Severa i njegovih sinova.[151] O kakvoj je građevini riječ u Varaždinskim Toplicama, nije moguće utvrditi, no vjerojatno se radilo o manjim intervencijama i opremanju nekih hramova jer veći građevinski zahvati iz tog vremena nisu potvrđeni arheološkim istraživanjima.

ZAKLJUČAK

Svetište *Aquae Iasae* do sada je jedino poznato svetište u Panoniji u kojem su štovana sva tri omiljena božanstva cara Karakale – Apolon, Eskulap i Serapis, pa je možda i car ondje tražio ozdravljenje ili savjete proročišta. Moguće da je to bilo upravo u razdoblju od 212. do 214. godine, kada je vjerojatno bio postavljen reljef s prikazom božanstava zdravlja, a možda su tom prigodom doneseni i neki drugi zavjetni darovi u svetište (npr. skulpture Apolona – Sola i Dijane – Lune). U svakom slučaju, nalazi vezani uz Apolona, Eskulapa i Serapisa pokazuju da su

[149] Kušan Špalj 2014, kat. br. 62; Kušan Špalj 2015, kat. br. 62

[150] Privremena pohrana: AMZ, VTks-19; Dimenzije ploče: visina 55 cm, širina 100 cm, debljina 15 cm; tekst je bio raspoređen u tri reda, a sačuvano je završno slovo u 2. redu – I, te završetak 3. reda – BIVS.

[151] Mráv 2012, 251-278.

Considering, also, the known building projects in Pannonia, undertaken by the emperors of the Severan dynasty, it is possible that certain work was done in this sanctuary on their order, as well. A piece of a construction inscription, discovered north of the spring reservoir in 2011, might speak to this fact (Fig. 25).[149] The plate was made from a soft lithothamnium limestone, a locally mined stone, which was also used for the construction of the spring reservoir, and it depicts Victoria with a palm branch, holding up the inscription.

Only a few letters of the inscription have been preserved, and it is, therefore, not possible to reconstruct its contents.[150] Depictions of the goddess Victoria, as ornamental elements on inscriptions, are typical of the Severan dynasty, and several similar construction inscriptions from Pannonia are extant, mentioning the donation of the buildings by Septimius Severus and his sons.[151] It is not possible to determine what kind of construction work was done in Varaždinske Toplice, but it was most likely some smaller interventions and the furnishing of certain temples, because major construction projects from the time have not been confirmed by archaeological excavations.

CONCLUSION

The Aquae Iasae sanctuary is, thus far, the only sanctuary in Pannonia where all three of emperor Caracalla's favourite deities (Apollo, Asclepius, and Serapis) were worshipped, so it is possible that the emperor himself came here seeking healing or the oracle's advice. It is possible that this occurred in the period from 212 to 214, when the relief with the depiction of the healing deities was most likely installed, and perhaps some other votive offerings were also brought to the sanctuary on this occasion (e.g. the sculptures of Apollo/Sol and Diana/Luna). In any case, the finds connected to Apollo, Aes-

[149] Kušan Špalj 2014, Cat. no. 62; Kušan Špalj 2015, Cat. no. 62.

[150] Temporary storage: AMZ, VTks-19; Plate dimensions: height 55 cm, width 100 cm, thickness 15 cm; The text was divided into three rows, and the final letter in the second row, -I, as well as the end of the third row, –BIVS, have been preserved.

[151] Mráv 2012, 251-278.

njihovi dedikanti uglavnom državni službenici, koji su štovanjem carevima omiljenih kultova pokazivali svoju odanost i odraz su službene religije u vrijeme dinastije Severa. Istovremeno, reljef na kojem je car Karakala prikazan kao Eskulap, s posvetom u kojoj mu se pridodaju božanske karakteristike (carski „*numen*"), odraz je štovanja carskog kulta,[152] u ovom slučaju među državnim službenicima vrlo bliskih caru. Ipak, većina drugih nalaza iz svetišta pokazuje iznimni značaj lokalnog kulta – „svetog izvora" i nimfi, koji je vrlo vjerojatno bio usko povezan i s individualnom, odnosno privatnom religijom pojedinaca, prepoznatljivom prije svega kroz votivne darove iz izvorišta. Spoznaje o kultovima u akvejazejskom svetištu doprinose razumijevanju religijskog života u rimskim provincijama, povezanosti i odnosu službene (državne) religije, koja je stizala preko aristokratske elite, te lokalne i individualne religijske prakse. To svakako ne znači da je država nametala kultove i rituale, već su se oni "uklapali" u okvire specifičnih lokalnih kultova, u skladu s karakterom mjesta, u ovome slučaju vezano uz liječenje i ozdravljenje te su tako postajali sastavni dio religijskog života svetišta.[153]

Spoznaja o prisustvu kultova Apolona, Eskulapa i Serapisa otvara i pitanje o hramovima u svetištu. Premda svojim izgledom hramovi u obliku kapitolija sugeriraju vrhovnu trijadu, [154] a na što su upućivali i nalazi Minervine statue s postamentom[155] u zapadnom hramu te natpis posvećen Junoni (i Fortuni)[156] pronađen ispred istočnog hrama, nedostatak posveta Jupiteru te novi nalazi i rezultati arheoloških istraživanja ukazuju na to da se radilo o specifičnom svetištu u kojem su štovana isključivo božanstva vezana uz liječenje i ozdravljenje. Svakako, to ne znači da treba potpuno odbaciti mogućnost štovanja Jupitera, pogotovo ako se uzmu u obzir i promjene koje su se događale u okviru službene religije, kao npr. kada

culapius, and Serapis show that their dedicators were mostly Imperial officials, who demonstrated their loyalty through the worship of the emperor's favourite cults and are a reflection of the official religion during the Severan dynasty. At the same time, the relief on which emperor Caracalla is depicted as Aesculapius, with a dedication which attributes him divine characteristics (the emperor's *numen*), is a reflection of the worship of the cult of the emperor,[152] in this case among the Imperial officials very close to the emperor himself. On the other hand, most of the other finds from the sanctuary exhibit a strong connection to the local cult of the "sacred spring" and the nymphs, which were most likely closely linked to the individual or private religion of certain individuals, recognizable first and foremost through the votive offerings at the spring reservoir. The findings about the cults at the Aquae Iasae sanctuary contribute to a better understanding of religious life in the Roman provinces, of the connection and relationship between the official (state) religion, which followed the aristocratic elite, and the local and individual religious practice. This definitely does not mean that the Empire imposed cults and rituals, but that they were "integrated" into the contexts of specific local cults, in accordance with the specific character of the place (in this case, with healing), and so became a constituent part of the religious life of the sanctuary.[153]

The discovery of the presence of the cults of Apollo, Aesculapius, and Serapis also brings up the question of the temples in the sanctuary. Although the temples by their appearance, in the shape of the Capitolium, suggest the supreme triad,[154] which is also suggested by Minerva's statue with the pedestal[155] in the western temple and the inscription dedicated to Juno (and Fortuna)[156] discovered in front of the eastern temple, the lack of dedications to Jupiter, as well as the new finds and results of archaeological excavations, suggest that this was a specific sanctuary, in which only deities connected to healing were worshipped. This definitely does

[152] Fishwick 1991, 375-387.
[153] Ando 2007, 444-445.
[154] Sinobad 2010, 251-252.
[155] ILJug 1169; Gorenc 1984, 95-108.
[156] Iljug-02 1168.

[152] Fishwick 1991, 375-387.
[153] Ando 2007, 444-445.
[154] Sinobad 2010, 251-252.
[155] ILJug 1169; Gorenc 1984, 95-108.
[156] Iljug-02 1168.

Slika / Figure 26: Mramorna šaka, dio skulpture (snimio I. Krajcar). / Marble fist, fragment of a sculpture (photo by I. Krajcar).

Serapis u doba cara Karakale dobiva status vrhovnog božanstva i poistovjećuje se s Jupiterom i Asklepijem. Možda upravo nalaz mramorne šake (sl. 26),[157] koja je bila dio jedne velike skulpture, krije odgovor o kipu koji se nalazio u središnjem hramu.

No treba istaknuti da su novija arheološka istraživanja pokazala kako je izgradnjom u 2. stoljeću oblikovano svetište koje je, osim tri hrama, na sjevernoj strani imalo i dvije bočne prostorije.[158] To pokazuje da se radilo o prostoru u kojem je predviđeno štovanje više božanstava, a s obzirom na izrazitu kompleksnost religijskog života u ovome svetištu, vjerojatno je štovano i nekoliko božanstava u zajedničkim hramovima. Već dugo je poznato kako je jedno od glavnih božanstava u svetištu bila božica Minerva, a to su potvrdili i novi nalazi,[159] među kojima je posebno zanimljiv natpis na kojem se ona spominje zajedno s Junonom, Apolonom i nimfama (sl. 20), što svakako ukazuje da su možda upravo njima bili posvećeni neki od hramova. No već ranije nađeni natpis ispred istočnog hrama, na kojem se također spominje Junona, ali zajedno s Fortunom,[160]

[157] Kušan Špalj 2014, kat. br 70; Kušan Špalj 2015, kat. br 70.

[158] Nemeth-Ehrlich, Kušan Špalj 2014, 33-34, 47-48; Nemeth-Ehrlich, Kušan Špalj 2014, 33-34, 47-48.

[159] Kušan Špalj 2014, 57, 66-68, 83, 92- 93, kat. br. 65, 66, 67; Kušan Špalj 2015, 57, 66-68, 83, 92- 93, kat. br. 65, 66, 67.

[160] ILJug 1168.

not mean that we should completely exclude the possibility of the worship of Jupiter, especially if we take into consideration the changes that occurred within the official religion, e.g. when Serapis, during the reign of emperor Caracalla, is given the statues of a supreme deity, and is equated with Jupiter and Asclepius. Perhaps the discovered marble hand (Fig. 26),[157] which was a part of a large sculpture, contains the truth of the statue situated in the central temple.

We should, however, point out that recent excavations have shown that the sanctuary was formed through construction in the 2nd century, and that, besides the three temples, it had two side rooms on the northern side.[158] This shows that it was a space formed for the worship of multiple deities, and considering the extreme complexity of religious life in this sanctuary, it is possible that several deities were worshipped in a single temple. It has long been known that one of the main deities in the sanctuary was the goddess Minerva, and this has been confirmed by the new discoveries,[159] among which an inscription mentioning her together with Juno, Apollo, and the nymphs is especially interesting (Fig. 20), which certainly suggests that perhaps some of the temples were dedicated to them. However, the previously discovered inscription, in front of the eastern temple, which also mentions Juno, but together with Fortuna,[160] might be a confirmation of the possibility that multiple deities were worshipped in a single temple. The known inscriptions confirm that the cult of Fortuna was quite developed in the sanctuary,[161] and the syncretic process, i.e. the connection to Isis, show all of the complexity of the Roman religion at the end of the 2nd and beginning of the 3rd century. The new finds have also contributed interesting data about the presence of Egyptian cults in the second half of the 2nd century, which were obviously quite significant in this sanctuary even outside the official religion, which is evidenced by their connection to the local cult

[157] Kušan Špalj 2014, Cat. no. 70; Kušan Špalj 2015, Cat. no. 70.

[158] Nemeth-Ehrlich, Kušan Špalj 2014, 33-34, 47-48; Nemeth-Ehrlich, Kušan Špalj 2014, 33-34, 47-48.

[159] Kušan Špalj 2014, 57, 66-68,83, 92- 93, Cat. no. 65,66,67; Kušan Špalj 2015, 57, 66-68,83, 92- 93, Cat. no. 65,66,67.

[160] ILJug 1168

[161] AE 1976,0540; Kušan Špalj 2014, 70, 95. Cat. no. 76; Kušan Špalj 2015, 70, 95. Cat. no. 76;

možda upravo potvrđuje mogućnost da je u pojedinom hramu štovano više božanstava. Dosad poznati natpisi potvrđuju da je u svetištu bio razvijen kult božice Fortune,[161] a sinkretistički proces, odnosno povezivanje s Izidom, pokazuje svu složenost rimske religije krajem 2. i početka 3. stoljeća. Novi su nalazi dali i zanimljive podatke o pristustvu egipatskih kultova u 2. polovici 2. stoljeća, koji su očito u ovom svetištu imali velik značaj i izvan službene religije, a o čemu govori i njihovo povezivanje s lokalnim kultom nimfa, kao i svečanosti koje su prisutne već krajem 2. stoljeća (192. godine). Mogućnost da je ovo svetište bilo i proročki centar zapravo i ne čudi s obzirom na plinove i pare što su se izdizale iz vrućeg izvora, a možemo samo pretpostaviti da su se ovdje odvijali i rituali vezani uz Eskulapa (spavanje u hramovima i proricanje snova) ili neki viši oblici duhovnosti vezani uz egipatska božanstva (Izidine misterije).

Prema dosadašnjim nalazima, može se zaključiti da su Rimljani dobro poznavali karakteristike i ljekovitost sumporne vode, a što je vidljivo prema sadržaju zavjetnih natpisa koji otkrivaju da su ovdje dolazili vojnici, vjerojatno kako bi liječili svoje ozljede, a prisustvo žena i ženskih kultova ukazuje na to da se voda koristila i za probleme vezane uz ženske bolesti i plodnost.

U mnogim elementima ovo svetište ima sličnosti sa „svetim izvorima" diljem Rimskog Carstva, prije svega po brojnim votivnim darovima, osobito u novcu, ali zanimljiva su i neka vrlo slična građevinska rješenja kaptaže izvora i štovanja božice Minerve u udaljenome rimskom lječilištu *Aquae Sulis* (Bath, Engleska). No glavna je specifičnost ovoga svetišta jako izražen kult nimfi vezan uz ljekovitu termalnu vodu već od 1. stoljeća te brojnost različitih božanstava vezanih uz zdravlje koji su štovani od 2. do 3. stoljeća. U 4. stoljeću, u doba cara Konstantina, dolazi do velike obnove, koja je bila potrebna, kako se i na samom natpisu spominje,[162] zbog stradanja objekata u požaru. Ponov-

of the nymphs, as well as the festivities which were already held at the end of the 2nd century (in AD 192). The possibility that this sanctuary was also an oracle is not surprising, considering the gases and fumes that rose from the hot spring, and we can only assume that rituals connected to Aesculapius were performed here (sleeping in temples and prophetic dreams), or some higher forms of spirituality connected to Egyptian deities (Isis' mysteries).

Judging from the finds thus far, we can conclude that Romans were well-acquainted with the characteristics and healing power of sulphur water, which is visible from the contents of votive inscriptions, which reveals that soldiers came here, most likely to heal their wounds, while the presence of women and female cults suggests that the water was also used in relation to women's illnesses and fertility.

In many of its elements, this sanctuary is similar to the "sacred springs" from across the Roman Empire, first and foremost in the numerous votive offerings, especially coins, but certain similar construction techniques related to the catchment of thermal water and the worship of the goddess Minerva in the far-away Roman city Aquae Sulis (Bath, England) are also interesting. But the main unique feature of Aquae Iasae sanctuary is the very strong cult of the nymphs connected to the thermal water, from the 1st century, as well as the many different deities related to health that were worshipped in the sanctuary from the 2nd to the 3rd century. In the 4th century, during the reign of emperor Constantine, large-scale renovations took place, which were necessary, as the inscription itself says,[162] due to the buildings being damaged in a fire. The new construction work did not significantly alter the appearance of the sanctuary, so we can assume that there were no significant changes in the religious life. Due to the lack of epigraphic monuments from this period, it is difficult to know all of the deities that were worshipped in the sanctuary. It is possible that prophetic rituals connected to Apollo, or perhaps Asclepius, were still present at the beginning of the 4th century, because it is known that emperor Constantine

[161] AE 1976,0540; Kušan Špalj 2014, 70, 95. kat. br 76; Kušan Špalj 2015, 70, 95. kat. br 76.

[162] CIL III 4121

[162] CIL III 4121

Slika / Figure 27: Termalna voda u izvorišnom bazenu (snimila D. Kušan Špalj). / Thermal water in the spring reservoir (photo by D. Kušan Špalj).

nom izgradnjom ne mijenja se izgled svetišta pa se može pretpostaviti da nije došlo ni do većih promjena u religijskom životu. No zbog nedostatka epigrafskih spomenika iz ove faze, teško je pretpostaviti koja su sve božanstva štovana u svetištu. Moguće da su početkom 4. stoljeća još bili prisutni proročki obredi vezani uz Apolona, ili možda Eskulapa, jer je poznato kako je i car Konstantin obilazio proročka mjesta. Vjerojatno se većina kultova u svetištu gasi u drugoj polovici 4. stoljeća, kada je bazilika preuređena za kršćanski obred[163]. Ipak, neki nalazi pokazuju da je upravo specifična situacija oko termalne vode i njezine ljekovitosti bila razlogom suživota dviju religija. Tako nalaz skulpture božice Minerve u njezinu hramu pokazuje da je stajala u svetištu do samog kraja pa je vjerojatno njezin kult vezan uz ljekoviti izvor bio prisutan i tijekom kršćanstva. Najbolji je dokaz suživota kršćanstva i rimskog kulta izvora prstenje s motivom kristograma, pronađeno zajedno s drugim votivnim darovima u izvorišnom bazenu.[164]

[163] Gorenc, Vikić 1980, 9; Migotti 1994, 51.

[164] Perok 2014, kat. br. 107, 108; Perok 2015, kat. br. 107, 108

himself visited the sites of oracles. However, most likely in the second half of the 4th century, when the basilica was reconstructed for Christian worship,[163] most of the cults in the sanctuary vanished. Nevertheless, some finds show that it was the specific situation surrounding the thermal water and its healing properties that was the reason for the coexistence of the two religions. The discovery statue of the goddess Minerva in her temple thus shows that she stood in the sanctuary until the very end, and that the cult of Minerva connected to the healing spring was most likely also present after the arrival of Christianity. The best proof of the coexistence of Christianity and the Roman cult of the spring are the rings with the motif of the Christogram that were, along with other votive offerings, discovered in the spring reservoir.[164]

[163] Gorenc, Vikić 1980, 9; Migotti 1994, 51;

[164] Perok 2014, Cat. no. 107, 108; Perok 2015, Cat. no. 107, 108.

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O točnom nalazištu i preciznijem mitološkom određenju rimske figurine iz okolice Glamoča

On the exact findspot and a more precise mythological attribution of a Roman statuette from the surroundings of Glamoč

UDK / UDC: 904:739.5(497.6)"652"
Stručni rad / Proffesional paper

U radu se ponovno analizira lijepa rimska brončana figurina koja je davno nađena u okolici Glamoča, a čuva se u Arheološkom muzeju u Zagrebu. Stare zabilješke o tome nalazu u jednom katoličkom shematizmu osvjetljavaju da je figura nađena 1865. u potoku Medvidnjaku, najvjerojatnije kod sela Ćoslija, i da je tom prilikom svjesno i namjerno oštećena. Zbog današnjeg nedostatka atributa u rukama, a zbog podatka da je u desnoj šaci bila strijela, preispituje se predstavlja li figurina boga Dioniza, Bakha ili Libera, kako se dosad smatralo, ili dolazi u obzir mladi Jupiter. Zaključak je da figurina ikonografski zaista predstavlja Dioniza ili Bakha, odnosno u rimskom kontekstu Libera, ali se ne može isključiti i Liberova asimilacija s Jupiterom.

Ključne riječi: *figurina, Glamoč, Dioniz, Liber, Bakho, Jupiter*

The paper offers a new analysis of the beautiful Roman bronze statuette discovered a long time ago in the vicinity of Glamoč and kept in the Archaeological Museum in Zagreb. The old notes concerning the find contained in a Catholic schematism indicate that the figurine was discovered in 1865 in the Medvidnjak stream, most likely in the vicinity of the village of Ćoslija, and that on that occasion it was intentionally and deliberately damaged. Due to the lack of any attributes in its hands, and due to the information that it used to hold an arrow in its right hand, the question arises as to whether this statuette represented the god Dionysius, Bacchus or Liber, as believed to date, or possibly a young Jupiter. The conclusion reached is that, with its iconography, the figurine truly represented either Dionysius or Bacchus, that is Liber in a Roman context, but that Liber's assimilation with Jupiter cannot be ruled out, either.

Key words: *statuette, Glamoč, Dionysius, Liber, Bacchus, Jupiter*

U katalogu antičkih figuralnih brončanih predmeta, koji se čuvaju u Arheološkom muzeju u Zagrebu, Josip Brunšmid je pod rednim brojem 38. objavio predmet sa sljedećim opisom:

„Dionysos. Bronsan kipić. Iz Glamoča u Bosni. Darovao o. Grga Ložić, župnik.

Vis. 131 mm. Odlomljen komad d. ruke, atribut u l. ruci i noge povrh gležanja. Desna ruka na dva mjesta narezana. Ispao veći dio srebrne inkrustacije na krznu.

Napred okrenuti mladi lik pristajao je l. nogom na zemlju a desnu je nešto natrag postavio. Puna mu je duga kosa po srijedi razdijeljena i ostrag u dva manja čvora svezana. U njoj je vijenac od bršljanova lišća i cvijetova, od kojih se povrh čela izdiže jedan veći, koji je negda bio srebrom tauširan. Srebrne oči imaju izbušene zjenice a srebrnim i bakrenim limom bila je negda sprijeda inkrustirana nebrida, koja pokriva jedan dio prsiju i leđa, spuštajuć se s desnoga ramena prema lijevomu kuku. Visoko podignuta d. ruka upirala se je možda o thyrsos, dok je spuštena zatvorena l. ruka valjda držala kantharos.

Običan posao rimskoga carskoga doba. Patina sasma skinuta."[1]

In his catalogue of bronze statues dating from classical antiquity kept in the Archaeological Museum in Zagreb, under no. 38, Josip Brunšmid described an item as follows:

"*Dionysos. Bronze statuette. From Glamoč in Bosnia. Donated by Father Grga Ložić, parish priest.*

H. 131 mm. Part of r. arm, attribute in l. hand and legs from above the ankles down broken off. Right arm cut in two places. Large amount of silver incrustation on hide is missing.

The young figure, facing forwards, stands with his l. foot on the ground, while his right foot is placed somewhat to the rear. His long, abundant hair is parted at the front and tied in two small knots at the back. In his hair, there is a wreath made of laurel leaves and flowers, with a large flower, placed above his forehead, which used to be inlaid with silver. The pupils of the silver eyes are polished, and the front side of the animal hide (nebrys) which partially covers his chest and back, falling from his right shoulder to his left hip, used to be incrusted with silver and copper sheet. The r. hand, raised high, could have leaned against a thyrsos, while the lowered and closed l. hand possibly held a kantharos.

An ordinary work of the Roman Imperial era. The patina completely removed."[1]

Teško je posve se složiti s ocjenom da je ta figurina „običan" rimski carski rad, kako je J. Brunšmid ocijenio mnoge figurine u svome katalogu, koje to zaista jesu. Dovoljno je samo imati u vidu da su pojedini dijelovi brončane figurine iz okolice Glamoča bili tauširani srebrom. Ipak, nije riječ o slučajnom Brunšmidovom spisateljskom ili naknadnom tiskarskom previdu zbog sličnosti riječi *običan* i *odličan*, nego zaista o njegovoj procjeni, jer je u svome radu za najkvalitetnije primjerke koristio izričaj *izvrstan*.

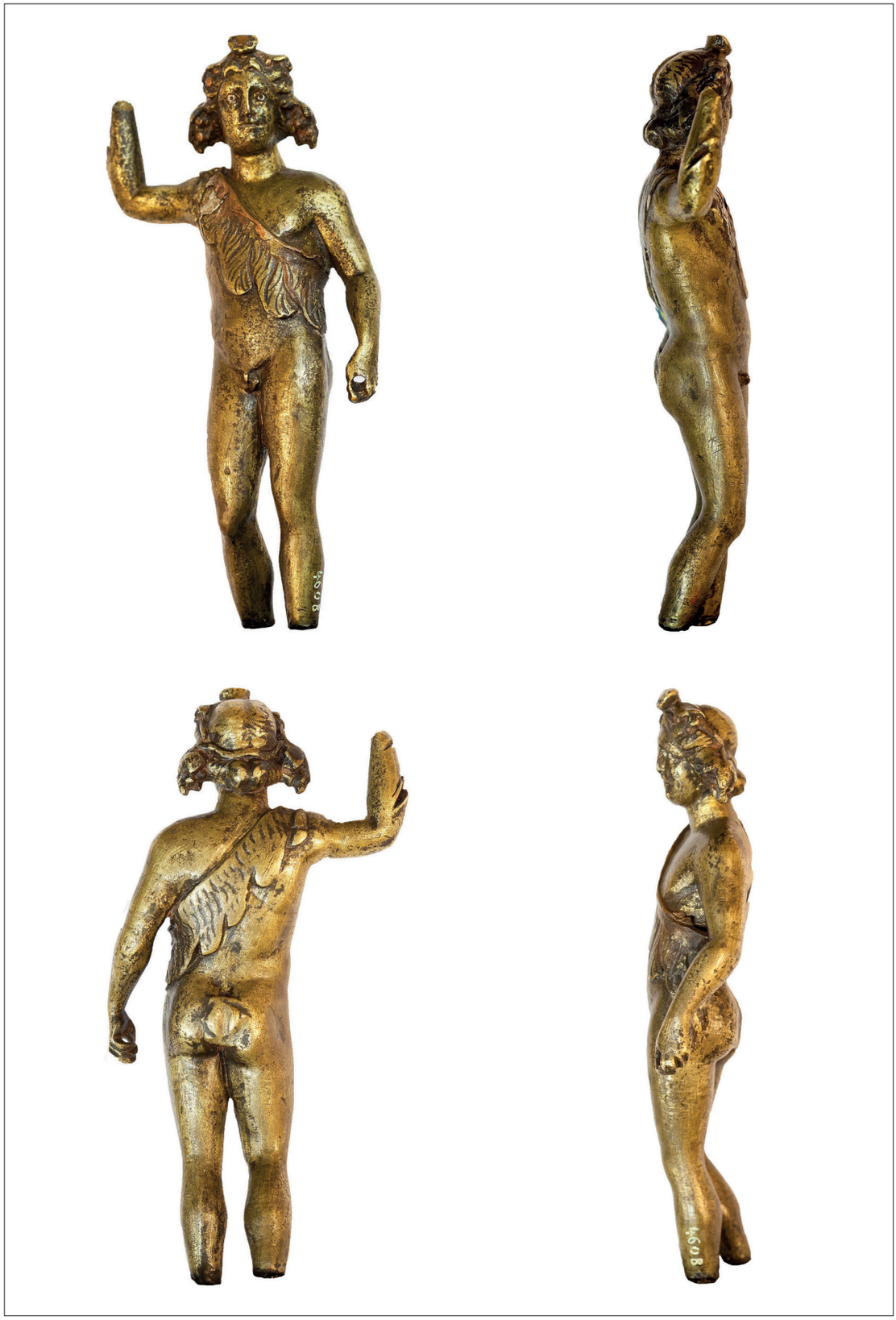
Enver Imamović, Veljko Paškvalin i Ivana Jadrić u svojim su sintetskim djelima o Liberovom kultu na području rimske provincije Dalmacije smatrali da ta figurina, bez obzira na nedostatak atributa u rukama, predstav-

I can hardly agree with the assessment that the statuette is an "ordinary" work of the Roman Imperial era, the label used by Brunšmid to describe many figures in his catalogue, which indeed are ordinary works. It should suffice to note that some parts of the bronze statuette from the vicinity of Glamoč were inlaid with silver. Nonetheless, this was neither an accidental writing error made by Brunšmid nor a subsequent typographical error made in print and caused by the similarity of the words *običan* [Eng. ordinary] and *odličan* [Eng. outstanding]; it was Brunšmid's real estimate, because in his work he described artefacts of the highest quality as *izvrstan* [Eng. excellent].

In their synthetic works discussing the cult of Liber in the Roman province of Dalmatia, Enver Imamović, Veljko Paškvalin and Ivana

[1] Brunšmid 1914, 224, sl. 38.

[1] Brunšmid 1914, 224, Fig. 38.



Slika / Figure 1: Rimska figura iz okolice Glamoča. (snimio: M. Periša) / Roman statuette from the vicinity of Glamoč. (photo by M. Periša).

lja rimskog boga Libera,[2] koji je istobitan grčkom bogu Dionizu. Međutim, u sintetskom djelu o istoj temi Boris Olujić tu figurinu nije uvrstio,[3] ali nije niti izrazio sumnju da je riječ o Liberu. Posljednji je put figurina objavljena u katalogu izložbe *Klasični Rim na tlu Hrvatske* (u kojem je to jedini predmet koji nije s područja današnje Hrvatske) i određena kao prikaz boga Bakha-Dioniza.[4] Nebridu koja prelazi preko prsa ima Dioniz, ali i grčki Pan, što upućuje na helenističke tradicije u izradi te figurine. Međutim, već vijenac od bršljanovog lišća i cvjetova na glavi, a ne od vinove loze s grožđem, dovodi u sumnju neupitnost određenja figurine kao Dioniza ili Libera, iako je taj bog također prikazivan s prvim vijencem. Takvom mitološkom određenju ne ide u prilog ni položaj podlaktice desne ruke, koja je uzdignuta pod pravim kutom tako da izgleda da je nečim zamahivala ili nešto bacala, a ne da se upirala u štap (*thyrsos*).

Stare zabilješke o tom nalazu, prije Brunšmidove objave, kako u arheološkoj literaturi tako i u jednom katoličkom shematizmu, osvjetljavaju figurinu ne samo u pogledu točnog nalazišta, godine i okolnosti u kojima je nađena i oštećena, te dospjela u Zagreb, nego također pokreću raspravu oko preciznijeg mitološkog određenja.

U prvom broju *Viestnika Narodnog muzeja u Zagrebu*, prvog muzejskog (i sadržajem uglavnom arheološkog) časopisa u Hrvatskoj, Šime Ljubić je u popisu darova za 1870. naveo sljedeći podatak: *„M.P.O.* (kratica od *mnogo poštovani otac* – op. a.) *Grgo Lozić, župnik u Glamoču u Bosni, preko M.P.O. Antuna Kneževića u Djakovu – kip mjedeni sv. Ivana Krst., nadjen u Glamoču"*.[5] Nema dvojbe da je riječ o istoj figurini koju je objavio J. Brunšmid, samo što je Š. Ljubić

[2] Imamović 1977, 161, 163, 396, sl. 152; Paškvalin 1989, 168, T. IV/3; Jadrić 2007, 180 (u tom je djelu proizvoljno naveden podatak da je figurina nađena u Halapiću kod Glamoča).

[3] Olujić 1990, 3–30.

[4] Šegvić, Marković (ur.) 2014, 188, 269, kat. br. 136. Autori kataloških jedinica inače nisu potpisani, a u poglavljima u tom katalogu nitko se ne poziva na tu figurinu.

[5] Ljubić 1870, 214.

Jadrić were of the opinion that, irrespective of the lack of attributes in its hands, the statuette represented the Roman god Liber,[2] which corresponds to the Greek god Dionysius. However, Boris Olujić did not mention this statuette in his synthetic work concerning the same topic,[3] although he did not express any doubt that it represented Liber, either. The statuette was published last in the catalogue of the exhibition *Classical Rome in the Territory of Croatia* (where it was the only item listed that had not been discovered in the territory of today's Croatia). In it, it was described as a representation of the god Bacchus-Dionysius.[4] Both Dionysius and the Greek god Pan wear nebryses over their chests, which suggests the presence of Hellenistic tradition in the figure's making. However, the wreath of laurel leaves and flowers on its head (rather than a wreath of vines and grapes) brings a question mark over the certainty of the description of the figure as Dionysius or Liber, although there are representations of the god wearing such a wreath. Such a mythological attribution is not supported by the position of the right forearm either: it is raised at a right angle, making it look as if it used to swing something or throw something, rather than lean against a staff (*thyrsos*).

Some old notes about this find, which can be found both in the archaeological literature and in a Catholic schematism predating Brunšmid's publication, throw light on the statuette's exact findspot, the year of its discovery and the circumstances under which it was found and damaged, and subsequently brought to Zagreb. They also ignite the discussion concerning its more precise mythological determination.

In the first edition of the *Viestnik Narodnog muzeja u Zagrebu [Herald of the National Museum in Zagreb]*, the first Croatian museum journal (whose contents dealt mostly with archaeology), Šime Ljubić published a list of donations for 1870, which included the following: *"The*

[2] Imamović 1977, 161, 163, 396, Fig. 152; Paškvalin 1989, 168, Pl. IV/3; Jadrić 2007, 180 (The text contains the arbitrary information that the statuette was found in Halapić, near Glamoč).

[3] Olujić 1990, 3–30.

[4] Šegvić, Marković (eds.) 2014, 188, 269, Cat. no. 136. Authors of the catalogue items are not named, and the statuette is not referenced in the text of the catalogue.

u njoj, vjerojatno zbog skromne odjeće, pogrešno vidio biblijskog proroka i sveca. Iz tog podatka saznajemo da je figurina nađena posljednjih godina osmanske vladavine u Bosni i Hercegovini.

Moritz Hoernes je neposredno poslije okupacije Bosne i Hercegovine od strane Austro-Ugarske Monarhije 1878., arheološki obišao to područje, pa tako i Glamočko polje, i već 1880. donio sistematizirane podatke o rimskim nalazištima i spomenicima. Između ostalog zabilježio je sljedeći podatak: *„Auch bei dem Orte Za Jarugom, 3 Km. südl. von Jakir, soll eine ähnliche Sculptur gefunden worden sein, in Glamoč selbst aber vor 7-8 Jahren ein Topf mit ca. 500 römischen Münzen und, bei einer anderen Gelegenheit, eine spannenlange Bronzestatuette, die nach Agram* (Zagreb – op. a.) *gekommen sein soll."*[6] Nema dvojbe da je riječ o figurini koju je naveo Š. Ljubić, a objavio J. Brunšmid, a iz bilješke saznajemo da je figurina nađena u neposrednoj okolici gradića Glamoča.

Franjevac Grgo Lozić (Zlosela kod Kupresa, 1810. – Split, 1876.), koji je darovao tu figurinu Arheološkom odjelu Narodnog muzeja u Zagrebu, skrbio se od 1865. do 1874. o mladoj katoličkoj kapelaniji u Glamoču. Između 1865. i 1869. napisao je djelo *Adnotationes variae* o livanjskom, glamočkom, kupreškom i uskopskom kraju, u kojem je, uz niz raznih zanimljivosti, također donio prve vijesti o arheološkim nalazištima i nalazima na tom području. Tako se rješenje svih problema vezanih uz točno nalazište, ali i stvarnu mitološku pripadnost figurine nalazi u sljedećoj bilješci u njegovom djelu: *„Medvid Grad soren dalek po sata* (od Glamoča – op. a.)*. Niže grada teče potok Medvidnjak, a dikoji sada zovu Alina vodica. Medvidnjak voda iznilaje 1865. Idola Peruna /Iovem fulminantem/ salivena od tuča čudnovato glavu okrunjenu ima, a oči su srebrene, et fascia lota priko ramena spojena iz pod drugog ramena priko persa i ledja posrebrena. Rečenog Idola, našlo je djete u pisku vodenom. Ali je bijo vas cern, misleć turci, da je od zlata pripilali su mu obe noge, peržili u žestokoj vatri dok*

[6] Hoernes 1880, 206.

Rev. Father Grgo Lozić, parish priest in Glamoč in Bosnia, through the Rev. Father Antun Knežević in Đakovo - brass statue of St. John the Baptist, found in Glamoč".[5] There is no doubt that this is the same figure published by Brunšmid, but Ljubić saw in it the biblical prophet and saint - a mistake probably caused by its modest garments. The item listed reveals that the statuette was discovered in the final years of the Ottoman rule in Bosnia and Herzegovina.

Immediately after the Austro-Hungarian occupation of Bosnia and Herzegovina, in 1878, Moritz Hoernes made an archaeological reconnaissance tour of the region, including the Glamoč Valley, and as early as 1880 he produced systematized data on Roman sites and monuments. Among other data, he wrote down the following: *"Auch bei dem Orte Za Jarugom, 3 Km. südl. von Jakir, soll eine ähnliche Sculptur gefunden worden sein, in Glamoč selbst aber vor 7–8 Jahren ein Topf mit ca. 500 römischen Münzen und, bei einer anderen Gelegenheit, eine spannenlange Bronzestatuette, die nach Agram* [Zagreb] *gekommen sein soll."*[6] There is no doubt that the statue mentioned is the same listed by Ljubić and also published by Brunšmid. The note reveals that the statuette was discovered in the immediate vicinity of the town of Glamoč.

Franciscan friar Grgo Lozić (Zlosela, near Kupres, 1810 - Split, 1876), who donated the figure to the Department of Archaeology of the National Museum in Zagreb, was in charge of a young Catholic chaplaincy in Glamoč between 1865 and 1874. In the period between 1865 and 1869, he wrote the book *Adnotationes variae,* about the region of Livno, Glamoč, Kupres and Uskoplje, which contained a range of interesting information, including the first reports on archaeological sites and artefacts discovered in the area. Thus, the solution of all the problems regarding the exact findspot of the statuette, and its true mythological attribution, can be found in the following note in that book: *"The ruined Castle of Medvid at a distance of half an hour* [from Glamoč]*. The Medvidnjak stream flows below the castle, nowadays called by some Alina Vodica* [Eng. Ale's Water]*. In 1865, the Med-*

[5] Ljubić 1870, 214.

[6] Hoernes 1880, 206.

nisu vidili da je tuč, i peržeć Ga ruka desna iz šake je odpala, koja derži strilu u ruki. Pak sam ga ja kupio rad starine bosanske."[7]

Dakle, figurina je nađena u potoku Medvidnjaku (Medvjednjaku ili Medvednjaku, ovisno o dijalektu), koji izvire blizu malog srednjovjekovnog burga Medvidgrada, južno od grada Glamoča. Podatak da je figurinu iznio potok Medvidnjak i da ga je našlo dijete upućuje da treba isključiti gornji tok kroz nenaseljeni planinski i šumoviti predjel, i nalazište smjestiti u donji tok koji izbija u Glamočko polje, a to je upravo u selu Ćoslije sjeverozapadno od Glamoča. Vidljiva oštećenja i nedostatak patine na figurini nastali su nasilno poslije otkrića od strane radoznalih muslimana, koji su mogli biti roditelji djeteta-nalaznika u Ćoslijama,[8] ali su to mogli biti i glamočki begovi Filipovići (inače, potomci poznatog poturčenog zagrebačkog kanonika Franje Filipovića), kojima je kao gospodarima tog kraja, prema osmanskom zakonu, figurina na kraju mogla pripasti kao potencijalna dragocjenost.[9]

[7] Manđeralo 1992, 79.

[8] U Ćoslijama je do novijeg doba živjelo uglavnom pravoslavno stanovništvo uz nešto malo katoličkoga. Međutim, u vrijeme kada je nađena ta figurina većinsko stanovništvo bilo je muslimansko. Tako je na prvom popisu stanovništva u Bosni i Hercegovini 1879. zabilježeno da u Ćoslijama živi 86 muslimana i 34 pravoslavca. Usporedi: *Haupt-Uebersicht der politischen Eintheilung von Bosnien und der Hercegovina / Glavni pregled političkoga razdielenja Bosne i Hercegovine*, Sarajevo, 1879, 63.

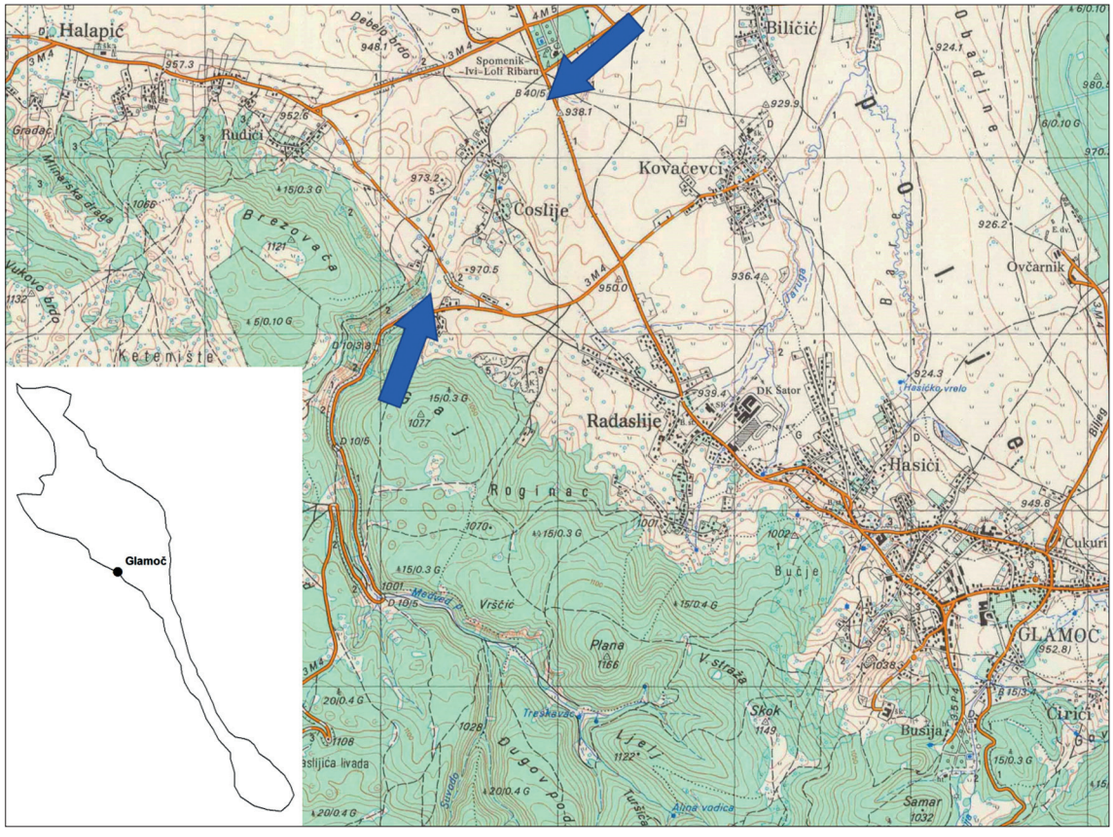
[9] G. Lozić je u svome literarnom djelu namjerno pisao etnonim *Turci* malim početnim slovom, a imenicu *idol* (čak i zamjenicu) velikim, pa treba objasniti pozadinu takvog postupka. Studirao je i završio teologiju i filozofiju na Sveučilištu u Budimu, pa stoga nije riječ o njegovoj slaboj pismenosti, nego o odbojnosti prema osmanskoj islamskoj vlasti. Naime, 1816. jedan je kupreški beg želio oženiti njegovu bližu rođakinju Katu Lozić, a kako se ona nije željela udati za muslimana i tako preći na islam, on ju je s još nekoliko muslimana sasjekao. Kata se u kupreškom kraju od tada štuje kao katolička mučenica. Tijekom 19. st. položaj kršćanskog stanovništva (i katoličkog i pravoslavnog) u Bosanskom pašaluku ponovno je postao jako težak, što je 1831. dovelo do ustanka Hrvata i Srba u Livnu pod vodstvom Luke Cvrka i Luke Kujundžića, kojima je osmanska vlast javno odsjekla glave. Ti su događaji sigurno bili potresli G. Lozića. Kada je 1875. izbio veliki hrvatski i srpski ustanak u Bosni i Hercegovini, već je bio teško bolestan u franjevačkom samostanu na Gorici kod Livna. Ustanak Hrvata u Livnu izbio je upravo zbog ubojstva starog franjevca Lovre Karaule, inače Lozićevog učitelja i duhovnika, od strane livanjskih muslimana, a na čelo ustanka stalo je nekoliko franjevaca. Tako je život, ionako bolesnog, G. Lozića bio ugrožen. Početkom 1876. otišao je u Split na liječenje, ali je ubrzo preminuo. Glamočvidnjak stream brought the Idol of Perun /Iovem fulminantem/ cast in bronze, His head strangely crowned and His eyes silver, et fascia lota over His shoulder and tied under the other shoulder, coated with silver over the chest and back. The said Idol was found by a child in the sand in the stream. But it was all black, as the turks thought it was made of gold, so they sawed both its legs and burned it in fierce fire until they realized it was bronze, and while they scorched it, its right hand, holding an arrow, fell off. I picked it up for the Bosnian heritage."*[7]

Therefore, the statuette was found in the Medvidnjak stream (Medvjednjak or Medvednjak, depending on the dialect), whose source is in the vicinity of the mediaeval castle of Medvidgrad, to the south of Glamoč. The information that the figure was brought by the Medvidnjak stream, and that it was discovered by a child, suggests that the upper flow of the stream should be ruled out, as it passes through an uninhabited, mountainous and forested area, and that the findspot is to locate in the lower flow of the stream, which reaches the Glamoč Valley, precisely in the village of Ćoslije to the northwest of Glamoč. The visible damage to the statuette and the lack of patina on it are results of deliberate actions committed after its discovery by inquisitive Muslims - possibly the parents of the child who had found it in Ćoslije,[8] or the Glamoč landlords (begs) Filipović (who were descendants of the well-known Zagreb canon Franjo Filipović, who converted to Islam). According to Ottoman law, the statuette could have ended up with them, the local landlords, as a potential treasure.[9]

[7] Manđeralo 1992, 79.

[8] Until recently, Ćoslije was inhabited by a mainly Orthodox population, with a small number of Catholics. However, at the time when the statuette was found, the majority of the population were Muslims. In 1879, the first population census in Bosnia and Herzegovina recorded that 86 inhabitants of Ćoslije were Muslims and 34 Orthodox. Cf. *Haupt-Uebersicht der politischen Eintheilung von Bosnien und der Hercegovina / General Overview of the Political Structure of Bosnia and Herzegovina*, Sarajevo, 1879, 63.

[9] In his literary work, G. Lozić deliberately wrote the ethnonym *Turks* with a lowercase letter, and the noun *idol* (and even the pronoun referring to it) with an uppercase letter, and this calls for an explanation. Lozić had a degree in theology and philosophy, which he obtained at the University of Buda, so it could not have been a result of his poor literacy, but rather his aversion to the Ottoman Islamic authorities. In 1816 in Kupres, a landlord (beg) wanted to marry his close relative Kata Lozić, and because she did not want to



Slika / Figure 2: Topografska karta okolice Glamoča. Strelicama označen potez potoka Medvjednjaka na kojem je nađena rimska figurina. / Topographic map of the surroundings of Glamoč. The arrows mark the section of the Medvjednjak stream in which the Roman statuette was found.

Figurina je u desnoj šaci držala predmet u kojem je G. Lozić vidio strijelu, pa je figurinu odredio kao vrhovnog rimskog boga Jupitera i to *fulminatora*, koji je istobitan sa staroslavenskim bogom Perunom. Zbog toga treba preispitati je li riječ o Liberu ili Jupiteru.

Ako je figurina držala strijelu, koja je predstavljala munju, onda je riječ o Jupiteru Munjevitome (*Iuppiter fulgurator*). U dostupnoj znanstvenoj literaturi nema kipa Jupitera koji bi bio analogija toj figurini. Međutim, na rimskom carskom novcu Jupiter Munjeviti prikazan je mladalačkim likom, odnosno bez brade, i kako desnom rukom

In the figure's right hand there was an object which Lozić recognized as an arrow, and thus he

ki Srbi su u kolovozu 1876. napali i spalili Filipovića dvore (selo Odžak) i neke od njih poubijali. Zbog svega navedenoga nije slučajno da G. Lozić opisuje prženje figurine u žestokoj vatri i sječenje njegovih udova od strane muslimana dramatično gotovo kao mučenje i sakaćenje živih ljudi, a etnonim *Turci* (kako se tada nazivalo i slavensko muslimansko stanovništvo) namjerno piše malim slovom.

marry a Muslim and thus be converted to Islam, he, together with several other Muslims, hacked her to death. Kata has been worshipped as a Catholic martyr ever since in the region of Kupres. During the 19th century, the position of Christians in the Bosnian Pashaluk [Ottoman district] was very difficult, resulting in the 1831 uprising of Croats and Serbs in Livno, led by Luka Cvrk and Luka Kujundžić, who were publically beheaded by the Ottoman authorities. These events must have been very stressful for Lozić. At the time of the great Croatian and Serbian uprising in Bosnia and Herzegovina in 1875, he was already gravely ill, and he lived in the Franciscan monastery at Gorica near Livno. The Croatian uprising in Livno was caused precisely by the murder of the old Franciscan friar Lovro Karaula (Lozić's teacher and priest), at the hands of Livno Muslims. The uprising was led by several Franciscan friars. Therefore, the life of Lozić, who was already ill, was in jeopardy. In early 1876 he went to Split for treatment, but he soon died. In August 1876, Serbs from Glamoč attacked and burned down the Filipović Mansion (village of Odžak) and killed some members of the family. Due to all this, it should not surprise us that Lozić describes the figure being burned in fierce fire, and its limbs being sawn off by Muslims nearly as dramatically as the torturing and maiming of living people, and he deliberately writes the ethnonym *Turks* (used at the time to describe the Slavic Muslim population, too) in lower case.

baca munju.[10] Time bi otpala pretpostavka da je u šupljini desne šake od figurine bila posuda *kantaros*, nego bi bio neki Jupiterov atribut. U tom je pogledu znakovita poznata figurina Jupitera-Dolihena na biku iz Karnunta (*Carnuntum*). Jupiter u lijevoj ruci, savijenoj u laktu, drži snop munja dok u uzdignutoj desnoj ruci drži šipku, koja zbog konteksta ipak nije munja nego držak dvojne sjekire.[11] Također, na rimskom carskom novcu Jupiter Uzdržavatelj (*Iuppiter stator*) prikazan je, često mladalačkog lika, sa žezlom u desnoj ruci i snopom munja u lijevoj.[12]

Ipak, u *Margumu* (Dubravica) u rimskoj provinciji Gornjoj Meziji (*Moesia Superior*) nađena je potpuno očuvana brončana figurina, vrlo slična onoj iz okolice Glamoča. Figurina je fiksirana na kvadratno profilirano i dekorirano postolje. Desna je noga je povučena unatrag tako da težina počiva na lijevoj. Na glavi se također nalazi vijenac od lišća, ali i grozdova (*corona convivialis*), dok se od desnog ramena prema lijevom kuku također spušta nebrida košute. U visoko podignutoj desnoj ruci, savijenoj u laktu, figurina drži tirs s češerom koji je u ukošenom položaju, dok u lijevoj ruci drži kantaros čiji je otvor okrenut prema tlu. Pored lijeve noge nalazi se pantera. Milivoje Veličković je figurinu odredio kao Bakha (*Bacchus*) i datirao u 2. ili 3. st.[13] Osim te figurine, u *Walters Art Museum* (*Gallery*) u Baltimoru čuva se još jedna slična figurina Bakha i to sa srebrnom inkrustacijom, upravo kao primjerak iz okolice Glamoča, s pretpostavljenim datiranjem u 3. st.[14] Dakle, nema dvojbe da i figurina iz okolice Glamoča, predstavlja Bakha, odnosno Dioniza ili Libera ovisno o religiji. Dakle, G. Lozić je u tirsu u desnoj

[10] Na primjer aurej (*aureus*) cara Dioklecijana: RIC V/2, 146.

[11] Ertl 2006, 360.

[12] Na primjer aureji careva Antonina Pija i Gordijana III.: RIC III, 72c; RIC IV, 99.

[13] Veličković, *Bah*, u: Popović *et al*. 1969, 95, sl. 110; Veličković 1972, 47–48, sl. 66. Najnovija objava: Pilipović 2011, 163–164, T. IX/33.

[14] LIMC IV/1, 912; LIMC IV/2, 617, nr. 85.

determined that it represented the supreme Roman deity Jupiter, more precisely *Jupiter Fulminator*, which corresponds to the Old Slavic god Perun. Because of this, it is worth reviewing the issue of whether the figure represents Liber or Jupiter.

If it indeed held an arrow, symbolizing a thunderbolt, then it represented *Jupiter Fulgurator*. The available scientific literature makes no mention of any Jupiter statue which would correspond to this figure. However, on a Roman Imperial coin, Jupiter Fulgurator is represented as a beardless youthful figure, throwing a thunderbolt with his right fist.[10] This would preclude the assumption that the figure held a kantharos in its right hand; it would rather have been one of Jupiter's attributes. In this respect, the well-known statuette from Carnuntum of Jupiter Dolichenus standing on a bull is significant. With his left arm bent at the elbow, Jupiter holds a sheaf of thunderbolts in his left hand, while in his right hand, held up high, he holds a rod, which the context suggests is not a thunderbolt but the handle of a double-headed axe.[11] Furthermore, Jupiter Stator was often portrayed on Roman Imperial coins as a youthful figure, with a sceptre in his right hand and a sheaf of thunderbolts in his left.[12]

Nonetheless, a completely preserved bronze statuette, very similar to the one discovered in the vicinity of Glamoč, has been found in *Margum* (Dubravica), in the Roman province of *Moesia Superior*. The statuette is fixed on a profiled and decorated square base. Its right leg is placed to the rear so that its weight sits on its left leg. In this case, too, there is a wreath of leaves on the figure's head, but also of grapes (*corona convivialis*), and there is a doe's hide (*nebrys*) falling from its right shoulder towards the left hip. In its right hand, lifted high and bent at the elbow, the figure holds a slanted staff with a cone, while in its left hand there is a kantharos, its mouth turned downwards. Next to its left foot there is a panther. Milivoje Veličković determined that the statuette represented Bacchus, and dated it to

[10] For example, the aureus of emperor Diocletian: RIC V/2, 146.

[11] Ertl 2006, 360.

[12] For example, the aurei of emperors Antoninus Pius and Gordian III: RIC III, 72c; RIC IV, 99.

ruci pogrešno vidio strijelu, posebno ako je tirs bio prelomljen i imao češer. To ne znači da je on sasvim pogriješio što je u figurini vidio Jupitera.

Jupiter je bio prastaro italsko božanstvo neba, (meteorološkog) vremena i munja te vrhovni bog rimskog panteona, čiji je kult imao najveće državno i političko značenje. Kao bogu svjetlosti i neba, Jupiteru su posvećeni i praznici grožđa – ploda koji najviše ovisi o vremenskim prilikama. Po vinogradima je 19. augusta u njegovu čast slavljen praznik *Vinalia rustica*, a na početku berbe grožđa, vrhovni je svećenik Jupiteru žrtvovao janje. Kraj je berbe također obilježen Jupiterovim praznikom *Meditrinalia*, koji je svetkovan 11. oktobra. S tim se praznikom prvi put točilo slatko, neprevrelo vino (mošt), a s trećim Jupiterovim praznikom, *Vinalia priora*, koji se održavao 23. aprila, u grad se unosilo i točilo prevrelo prošlogodišnje vino.[15] Kao i Jupiter, Liber je staroitalsko božanstvo, a zatim rimski bog plodnosti, posebno vinove loze. Liber je isprva bio samostalno božanstvo plodnosti, a zatim je asimiliran s Jupiterom (Jupiter Liber) i poistovjećen s Dionizom ili Bakhom. Asimilacijom s Dionizom ili Bakhom, Liber je prije svega postao bog vinove loze i vina.[16] Asimilacija Libera s Dionizom ili Bakhom dogodila se u rimsko kasno republikansko doba, vjerojatno zahvaljujući ulozi Bakha kao pokrovitelja duša.[17] Poput drugih staroitalskih bogova i božanstava, Liber nije imao svoj mit i njegova se ikonografija zasnivala, odnosno ujednačavala, s onom Dioniza ili Bakha. Liberov je karakter tako imao sve aspekte svog grčkog prototipa.[18]

Kultna zajednica Jupitera i Libera nije neobična i poznata je u raznim dijelovima Rimskog Carstva jer su oba boga smatrana zaštitnicima vinove loze i vina, što potvrđuje jedan latinski natpis iz sjeverne Italije.

[15] Srejović, Cermanović-Kuzmanović 1989, 183.

[16] Srejović, Cermanović-Kuzmanović 1989, 233–234.

[17] Pilipović 2011, 16.

[18] Pilipović 2011, 20.

the 2nd or 3rd c.[13] In addition to this statuette, the Baltimore *Walters Art Museum* (*Gallery*) keeps another similar statuette of Bacchus, incrusted with silver just like the one from the vicinity of Glamoč, and presumably dating from the 3rd c.[14] Therefore, there can be no doubt that the statuette from the vicinity of Glamoč also represents Bacchus, that is Dionysius or Liber, depending on the religion in question. Thus, Lozić was mistaken when he interpreted the staff in its right hand as an arrow, especially if the staff were broken and included a cone. But it does not mean that he was completely mistaken in interpreting the statuette as Jupiter.

Jupiter was an ancient Italian deity of the sky, weather and lightning, and the supreme god of the Roman pantheon, whose cult was of the highest state and political importance. Festivities of grapes - fruits which are most vulnerable to weather conditions - were dedicated to Jupiter as the god of light and the sky. On August 19th, the feast of *Vinalia rustica* was celebrated in vineyards in his honour, and at the beginning of the grape harvest, the supreme priest would sacrifice a lamb to Jupiter. The end of the harvest was also marked by Jupiter's festivity of *Meditrinalia*, which was celebrated on October 11th. On this occasion, the sweet unfermented wine (must) was poured for the first time, while on the third festivity of Jupiter, *Vinalia priora*, celebrated on April 23rd, the fermented wine produced last year would be brought into the town and poured.[15] Much like Jupiter, Liber is an Old Italian deity, and also a Roman god of fertility, and especially of vines. At first, Liber was an independent deity of fertility, and later was assimilated to Jupiter (Jupiter Liber) and identified with Dionysius or Bacchus. Through that assimilation with Dionysius or Bacchus, Liber became primarily the god of vines and wine.[16] The assimilation occurred in the Roman Late Republican era, probably due to Bacchus's role of the sponsor of souls.[17] Like other Old Italian

[13] Veličković, *Bah*, in: Popović *et al.* 1969, 95, Fig. 110; Veličković 1972, 47–48, Fig. 66. The most recent publication: Pilipović 2011, 163–164, Pl. IX/33.

[14] LIMC IV/1, 912; LIMC IV/2, 617, no. 85.

[15] Srejović, Cermanović-Kuzmanović 1989, 183.

[16] Srejović, Cermanović-Kuzmanović 1989, 233–234.

[17] Pilipović 2011, 16.

Jupiter je bio zaštitnik sakrificijalnog vina (*vinum inferium*), a Liber profanog vina (*vinum spurcum*), neprikladnog za libacije zato što je bilo nečisto.[19]

Dakle, lijepa figurina iz Ćoslija kod Glamoča ikonografski predstavlja Bakha u širem smislu. Mitološki ili religijski predstavlja Dioniza ako je štovatelj bio rimskodobni Grk, odnosno Libera ako je štovatelj bio Rimljanin. Štovanje Libera na Glamočkom polju potvrđeno je reljefom iz Šumnjaka.[20] Međutim, za figurinu se ne može isključiti i Liberova asimilacija s (mladim) Jupiterom, bogom inače potvrđenim na više od deset rimskih posvetnih natpisa s Glamočkog polja, većinom iz Halapića.[21] U tom bi slučaju vlasnik i štovatelj bio neki doseljeni konzervativni Italik. U Ćoslijama nisu nađeni arheološki ostaci rimskog naselja, a nisu ni u samom Glamoču, ali upravo u selu Halapiću, zapadno od Ćoslija, nalazilo se najveće rimsko naselje na Glamočkom polju, u kojem je bila putna stanica Salvij (*Salvium*, *Salviae*), očito i sjedište istoimenog municipija. Ta je figurina očito bila vlasništvo nekog stanovnika tog municipija i sljedbenika kulta vezanog uz vinovu lozu i vino.[22]

[19] Pilipović 2011, 66–67.

[20] Bojanovski 1986, 104–105; Paškvalin 1986, 65–66. Taj i drugi sličan spomenik iz Vašarovina kod Livna također nisu uvršteni u: Olujić 1990.

[21] Imamović 1977, 356–359, 382–383; Bojanovski 1986, 92–105.

[22] Ovaj sam rad predstavio na znanstvenom skupu *Glamoč u arheologiji i istoriji*, održanom 28. srpnja 2012. u Glamoču. Unatoč izvrsnoj organizaciji tog skupa od strane Skupštine općine Glamoč i arheologinje Milke Đukić, referati nisu nikad prikupljeni i objavljeni u zasebnom zborniku. Zbog toga sam prinuđen poslije više godina čekanja svoj rad objaviti na drugome mjestu. *Vjesnik Arheološkog muzeja u Zagrebu*, časopis muzeja u kojem se čuva ta figura, najidealniji je za objavu.

gods and deities, Liber did not have a myth of his own, and his iconography was based, and often identified, with that of Dionysius or Bacchus. Thus, the figure of Liber featured all the aspects of the Greek prototype.[18]

The cult unity of Jupiter and Liber is not unusual; it was familiar in various parts of the Roman Empire, because both gods were seen as patrons of vines, as evidenced by a Latin inscription from northern Italy. Jupiter was the patron of sacrificial wine (*vinum inferium*), and Liber of ordinary wine (*vinum spurcum*), inappropriate for libations since it was impure.[19]

Therefore, in terms of iconography, the beautiful statuette from Ćoslije, near Glamoč, represents Bacchus in the widest sense. In terms of mythology or religion, it represented Dionysius if the worshipper was a Roman-period Greek, or Liber if the worshipper was a Roman. The cult of Liber in the Glamoč Valley has been confirmed by a relief from Šumnjak.[20] However, as regards this statuette, the assimilation of Liber with (a young) Jupiter cannot be ruled out, and Jupiter has been confirmed in more than ten Roman consecration inscriptions in the Glamoč Valley, mostly from Halapić.[21] In such a case, the owner and worshipper would have been an immigrant conservative Italian. No archaeological traces of a Roman settlement have been found in Ćoslije, nor in Glamoč, but the village of Halapić, to the west of Ćoslije, was the location of the largest Roman settlement in the Glamoč Valley, which included the road station *Salvium (*or *Salviae*), clearly the centre of the *municipium* of the same name. The statuette was evidently owned by an inhabitant of the *municipium* who followed the cult of vines and wine.[22]

[18] Pilipović 2011, 20.

[19] Pilipović 2011, 66–67.

[20] Bojanovski 1986, 104–105; Paškvalin 1986, 65–66. This and other similar monuments from Vašarovine, near Livno, have not been included either in: Olujić 1990.

[21] Imamović 1977, 356–359, 382–383; Bojanovski 1986, 92–105.

[22] I presented this work at the scientific conference *Glamoč in Archaeology and History*, held in Glamoč on 28 July 2012. Despite the excellent organization of the conference by the Municipal Assembly of Glamoč and the archaeologist Milka Đukić, the papers have never been collected and published in conference proceedings. Thus, after years of waiting, I have been forced to publish my work elsewhere, and *Vjesnik Arheološkog muzeja u Zagrebu*, a journal issued by the Museum in which the statuette is kept, is the ideal publication for it.

KRATICE / ABBREVIATIONS

LIMC IV = *Lexikon Iconographicum Mithologiae Classicae*, IV, 1–2, *Eros-Herakles et addenda Cernunnos, Demeter, Ceres, Bacchus (in peripheria occidentali), Erechtheus*, Artemis Verlag Zürich und München, 1988.

RIC III = H. Mattingly, E. A. Sydenham, *Roman Imperial Coinage*. *Antoninus Pius – Commodus*, London, 1930.

RIC IV = H. Mattingly, E. A. Sydenham, C. H. V. Sutherland, *Roman Imperial Coinage. Gordian III – Uranius Antoninus*, London, 1949.

RIC V/2 = P. H. Webb, *Roman Imperial Coinage. Marcus Aurelius Probus – Maximian*, London, 1933.

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Nalazište AN10B Novi Čeminac-Jagodnjačka strana – periferija rimskog naselja u Baranji

The AN10B Novi Čeminac-Jagodnjačka strana site – the periphery of a Roman settlement in the Baranja region

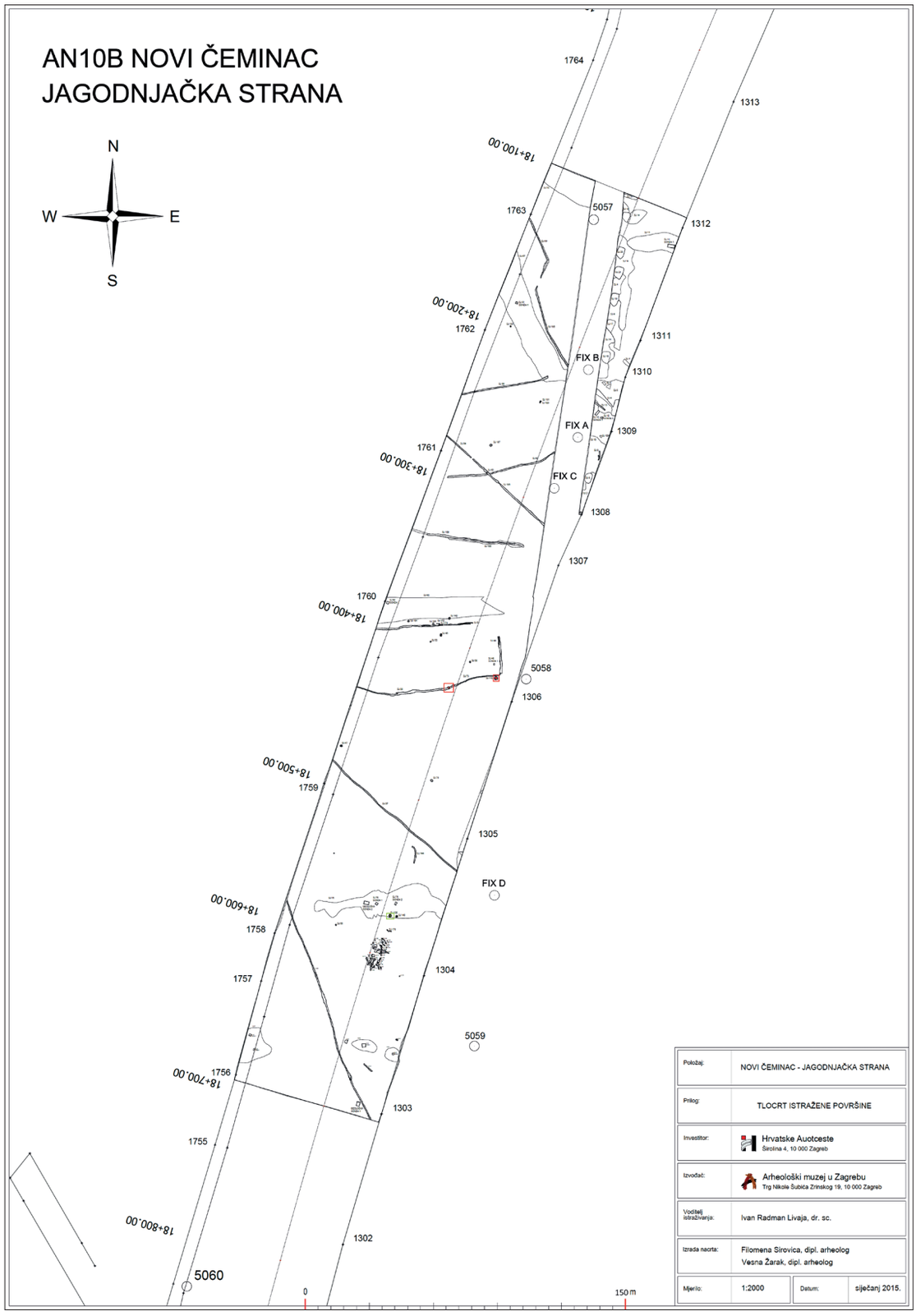
UDK / UDC: 904(497.5 Čeminac)"652"
Stručni rad / Proffesional paper

Arheološko nalazište AN10B Novi Čeminac-Jagodnjačka strana može se okarakterizirati kao periferija rimskog naselja iz 1. st., koje se nalazilo negdje u blizini, vjerojatno na susjednom lokalitetu AN10A Novi Čeminac-Jauhov salaš. Osim otpadnih jama iz antičkog vremena, koje su sadržavale keramiku i ostatke građevinskog materijala, na lokalitetu je pronađena jama koju se, prema nalazu keramičke lule, može datirati u 19. st.

Ključne riječi: *antika, antička keramika, 1. stoljeće, 19. stoljeće, keramička lula*

The archaeological site of AN10B Novi Čeminac-Jagodnjačka strana can be characterized as the periphery of a Roman settlement dated to the 1st century which was located somewhere in the vicinity, probably on the neighbouring site of AN10A Novi Čeminac-Jauhov salaš. Apart from waste pits that contained Roman pottery and the remains of building material, the site also yielded a pit that, based on the find of a ceramic smoking pipe, can be dated to the 19th century.

Key words: *Classical Antiquity, Roman pottery, 1st century, 19th century, ceramic pipe*



Slika / Figure 1: Plan lokaliteta s prikazom svih definiranih stratigrafskih jedinica; crvenom su bojom označene strukture s antičkim, a zelenom s materijalom iz 19. st. (izradile F. Sirovica, V. Žarak; obradila A. Đukić). / Site layout with all defined stratigraphic units; the colour red marks features with Roman material, and green those with material dated to the 19th century (made by F. Sirovica, V. Žarak; edited by A. Đukić).

UVOD

Arheološko je nalazište AN10B Novi Čeminac-Jagodnjačka strana definirano terenskim pregledima tijekom kojih je potvrđeno postojanje materijalnih tragova iz više razdoblja – antike, ranoga i kasnoga srednjeg vijeka.[1] Arheološki je muzej u Zagrebu proveo zaštitna arheološka istraživanja na lokalitetu AN10B Novi Čeminac-Jagodnjačka strana u razdoblju od 20. listopada do 16. studenoga 2014. godine. Istraživanja je vodio dr. sc. Ivan Radman-Livaja,[2] a istražena je površina od 51 976 m^2 (stacionaže od 18 + 100,00 do 18 + 700,00) na trasi autoceste A5 Beli Manastir – Osijek – Svilaj, dionica Osijek – Beli Manastir.[3]

Istraživanjima su definirane dvije vrste tvorevina – prirodne i antropogene. Prirodne tvorevine uključuju djelovanje životinja, strvinu konja, naplavine, tj. paleokanale i geološke slojeve, dok antropogene uključuju slojeve nastale djelovanjem čovjeka, strojne ukope, probni rov iz 2013. godine, melioracijske kanale, jame i kanale nastale ljudskom rukom te konkretne arheološke strukture (sl. 1).

PRIRODNE TVOREVINE

Na južnome dijelu terena ustanovljen je veći broj zapuna i ukopa koje je moguće interpretirati kao životinjske prokope, a osim njih, definirani su skeletni ostaci konja koji su poslani na analizu (datum je recentan). Prema sraštavanju proksimalnih epifiza humerusa i femura te sačuvanim zubima, može se zaključiti da je jedinka bila stara oko četiri godine. Na kostima nema tragova ljudskog djelovanja.[4] Treća su vrsta prirodnih tvorevina, ustanovljena na lokalitetu AN10B, naplavine, tj. paleokanali – ostaci kanala kojima je tekla rijeka ili potok, a koji

[1] Madiraca, Koprivnjak 2013, 3.

[2] Ovom bih se prilikom voljela zahvaliti dr. sc. Ivanu Radmanu-Livaji što mi je ustupio materijal iz ovih istraživanja te mi pomogao korisnim savjetima i sugestijama.

[3] Radman-Livaja 2015, 2.

[4] Analizu kostiju izvršila je Maja Grgurić kojoj se ovom prilikom zahvaljujem.

INTRODUCTION

The archaeological site of AN10B Novi Čeminac-Jagodnjačka strana was defined in field surveys confirming the existence of material traces dated to several periods: Antiquity, Early and Late Middle Ages.[1] The Archaeological Museum in Zagreb conducted rescue archaeological excavations at the AN10B Novi Čeminac-Jagodnjačka strana site between 20 October and 16 November 2014. The excavations were led by Dr Ivan Radman-Livaja,[2] and the excavations covered an area of 51 976 m^2 (chainages 18+100,00 - 18+700,00) on the route of the A5 Beli Manastir – Osijek – Svilaj motorway, the Osijek – Beli Manastir section.[3]

The excavations yielded two types of features: natural and anthropogenic. Natural features include traces of animal activities, the remains of a horse, alluviums or palaeo-channels, and geological layers, while anthropogenic features include man-made layers, machine-made structures, the 2013 test trench, amelioration channels, man-made pits and channels, and definitive archaeological structures (Fig. 1).

NATURAL FEATURES

The southern part of the site revealed a large number of fills and cuts that can be interpreted as animal burrows, and, besides these, the site includes the skeletal remains of a horse that were taken for further analyses. (The date obtained indicates that this is a modern-day find.) Based on the degree of bone conglutination between the proximal epiphyses and the femurs, it can be concluded that the animal was about four years old. The bones did not reveal traces of human activities.[4] The third kind of natural features established at the AN10B site are alluviums, i.e. palaeo-channels: the remains of river or stream beds filled with more recent

[1] Madiraca, Koprivnjak 2013, 3.

[2] I would like to thank Dr Ivan Radman-Livaja for allowing me to work on this material, as well as for giving me useful advice and suggestions.

[3] Radman-Livaja 2015, 2.

[4] Bone analyses were conducted by Maja Grgurić, whom I would like to thank.

su zapunjeni mlađim sedimentima.[5] Definirano je pet različitih pedoloških, odnosno arheološki sterilnih slojeva (SJ 3, 4, 5, 40, 49). U svim je slučajevima riječ o kombinaciji gline i pijeska u različitim omjerima koji variraju u boji od svijetložutih preko sivih do maslinastih tonova, ovisno o dijelu terena. Slojevi nisu istraživani, već su u njima rađene probne sonde kako bi se sa sigurnošću utvrdilo jesu li sterilni. Istraživanjima je potvrđeno kako su arheološke strukture ukopavane izravno u definirane zdravice. Osim ovih tvorevina, definirani su i recentni slojevi (nasip prilazne ceste), melioracijski kanali iz 1980-ih godina, strojni ukopi (vjerojatno za artiljeriju iz Drugoga svjetskog rata) te konkretne arheološke strukture.

ARHEOLOŠKE STRUKTURE

U istraživanjima su definirane tri strukture čiji arheološki karakter nije dvojben. Riječ je o jamama SJ 137/138, SJ 38=43/39=44 i SJ 169, 177/170.

Jama SJ 137/138

Jama, definirana kao SJ 137/138 (sl. 2), kružnog je oblika, promjera oko 180 cm, sa zakošenim stijenkama koje se uz sjeverni, zapadni i južni rub ukopa spuštaju prema prvome dnu koje se javlja na dubini od 20 cm. Ukop se u istočnom dijelu produbljuje dodatnih 40 cm. U jami je pronađena keramička lula, pet ulomaka prozirnog stakla (veće zdjele koja na jednom dijelu ima izraženu profilaciju) i tri vrlo sitna ulomka keramike grube fakture koji su loše pečeni, drobivi i koje nije bilo moguće tipološki ni kronološki okarakterizirati.

Najzanimljiviji nalaz iz ove jame svakako je keramička lula (T. 2: 10) koja pripada tzv. istočnom, odnosno mediteranskom tipu lula s većom čašicom i manjim tuljcem,[6] kakve su izrađivane u drvenim dvodijelnim kalupima, obloženima metalnom podlo-

[5] Woltemade 1994; Wredge, Daniel, Callahan 2001; Slingerland, Smith 2004, 257.

[6] Bekić 2000, 259; Zejnihodžić 2012, 166.

sediments.[5] The excavations revealed five different pedological – that is, archaeologically sterile – layers (SU 3, 4, 5, 40, 49). All of the recorded cases consist of a mixture of clay and sand in different ratios, varying in colour from light yellow to grey and olive tones, depending on the section of the site. These layers were not excavated, but test trenches were made in each one to determine definitively whether they were sterile, and the excavations confirmed that all archaeological structures were dug directly into the defined sterile layers. Apart from the listed features, modern-day layers (foundations for the access road), melioration canals from the 1980s, machine-made structures (probably for WWII artillery), and definitive archaeological features were recorded.

ARCHAEOLOGICAL FEATURES

The excavations yielded three structures that are undoubtedly of archaeological character: pits SU 137/138, SU 38=43/39=44, and SU 169, 177/170.

Pit SU 137/138

The pit defined as SU 137/138 (Fig. 2) is circular in shape, about 180 cm in diameter, and has slanting edges which go down to the first bottom level at a depth of about 20 cm along the western and southern part of the cut. The cut is about 40 cm deeper in the eastern part. The pit yielded a ceramic smoking pipe, five pieces of transparent glass (a larger markedly profiled bowl), and three tiny crushable fragments of poorly-fired coarse pottery that could not be typologically or chronologically defined.

Certainly the most interesting find from this pit is a ceramic pipe (Pl. 2: 10) ascribed to the so-called eastern, i.e. Mediterranean, type of pipes with a larger bowl and a smaller shank[6] that were made from high-quality clay varying in colour between red and black after firing in two-part wooden moulds encased in metal.[7] The bowl was attached to the shank through

[5] Woltemade 1994; Wredge, Daniel, Callahan 2001; Slingerland, Smith 2004, 257.

[6] Bekić 2000, 259; Zejnihodžić 2012, 166.

[7] Gačić 2009, 14.

Slika / Figure 2: Zapuna jame SJ 137 (snimio I. Radman-Livaja). / The fill of pit SU 137 (photo by I. Radman-Livaja).

gom, od visokokvalitetne gline, u rasponu od nijansi crvene do crne boje pečenja.[7] Čašica je na tuljac vezana jednom rupom za duhan koja se nalazi u stijenci u donjem dijelu čašice na čiji se otvor često stavljao metalni poklopac za zatvaranje.[8] Na lokalitetu AN10B radi se o luli kojoj nije očuvan rub i dio čašice, a koja je ukrašena različitim motivima i na tuljcu ima dva pečata. Čašica je lule ukrašena tankim plastičnim prstenom, zatim nizom od šest cvjetova s po sedam i osam latica, koji okružuju čašicu na prijelazu u greben. Greben i stražnji dio tuljca lule u obliku su školjke koja na tuljcu završava naglašenim tankim prstenom. Prstenom naglašeni obruč tuljca dodatno je ukrašen nizom malih cvjetova sa po osam latica. Na tuljcu lule, ispod obruča, nalazi se pečat u obliku polumjeseca, a osim motiva

[7] Gačić 2009, 14.

[8] Zejnihodžić 2012, 166.

a tobacco hole in the lower part of the bowl, which was often covered by a metal lid.[8] Of the pipe from the site of AN10B, the rim and part of the bowl have not been preserved, and it is decorated with various motifs on the bowl, and two stamps on the shank. The bowl of the pipe is decorated with a thin plastic ring, and a line of six flowers with seven or eight petals surrounding the bowl on the transition into the crest. The crest and the back of the bowl are in the shape of a sea shell, which ends on the shank with a thin plastic ring. The shank ferrule, emphasized by the ring, is additionally decorated with a series of small flowers with eight petals each. Under the ferrule, the shank is decorated with a stamp in the shape of a crescent, as well as a rectangular stamp with the name of the manufacturer (JACOB REINITZ) placed next to a leaf motif. The diameter of the shank opening is 0.9 cm, the height of the bowl is 4.2 cm, and the thickness of

[8] Zejnihodžić 2012, 166.

lista, na tuljcu je pravokutni pečat s imenom proizvođača – JACOB REINITZ. Promjer je otvora tuljca lule 0,9 cm, visina čašice je 4,2 cm, a debljina stijenke na otvoru čašice 0,2 cm. Keramička lula s oznakom istog majstora pronađena je na lokalitetu Nitra u Slovačkoj,[9] gdje je pronađeno i nekoliko lula sličnog oblika iz radionica u Banskoj Štiavnici (njem. Schemnitz) koje su datirane u 19. st.[10] i koje su često bile napravljene od crne gline te su imale visoku čašicu i kratki tuljac.[11] Lula s lokaliteta AN10B narančaste je boje, što je možda posljedica toga što nije proizvedena u originalnoj radionici. Naime, Jacob Reinitz iz Pape u Mađarskoj u literaturi se navodi kao jedan od proizvođača koji su imitirali lule austrijsko-mađarske proizvodnje iz Banske Štiavnice u Slovačkoj.[12] Pojava imitacija lula iz ovakvih radionica[13] ne treba čuditi s obzirom na povijest uživanja duhana u Europi još od vremena pojave te biljke.[14] Početkom 19. st. austrijsko-mađarska proizvodnja počela se koncentrirati u velikim gradovima, poput Banske Štiavnice, Bratislave, Nitre i ostalih gradova u Slovačkoj. Riječ je o vremenu kada su proizvođači na lule počeli stavljati pečate kako bi se reklamirali, ali i zaštitili svoj ugled od imitacija i kopija. Prema mađarskome nacionalnom popisu proizvođača, 1882. godine u Banaskoj Štiavnici postojalo je čak pet radionica, do 1890. godine taj se broj popeo na više od 20, a 1910. godine zabilježeno je njih 25. Već i sami ti brojevi svjedoče o ugledu koji su tamošnje radionice stekle diljem Europe pa ne treba čuditi što su mnogi austrijski i mađarski obrtnici počeli izrađivati imitacije ovih modela koje su ponekad i označavali imenima radionica čiji su rad imitirali.[15] O dobrom poslovanju radionice u Banskoj Štiavnici svjedoči i devet lula ovog tipa s lokaliteta Zoljani-Čemešac I u Općini Oprisavci u Brodsko-posavskoj županiji,

[9] Bielich, Čurný 2009, 349, Fig. 10: f.
[10] Bielich, Čurný 2009, 345, Fig. 7: b, c.
[11] Bekić 2000, 252.
[12] Nagy 2001, 201, T. 64: P7; Bielich, Čurný 2009, 348.
[13] Gusar 2009, 217.
[14] Bekić 2000, 249.
[15] Bielich, Čurný 2009, 340, 343, 344, 348.

the bowl opening is 0.2 cm. A ceramic pipe with the mark of the same producer was found at the site of Nitra in Slovakia,[9] which also yielded several similarly-shaped pipes from the workshops in Banská Štiavnica (Ger. Schemnitz) that have been dated to the 19th century,[10] and which were often made out of black clay and had a tall bowl and a short shank.[11] The pipe from AN10B is orange in colour, possibly because it was not made in the original workshop. Indeed, Jacob Reinitz, of Papa in Hungary, is listed in publications as one of those manufacturers who imitated pipes of the Austro-Hungarian production from Banská Štiavnica in Slovakia.[12] The sheer existence of imitations of pipes from these workshops[13] is not surprising, considering the history of tobacco use in Europe ever since the plant was first introduced.[14] At the beginning of the 19th century, Austro-Hungarian production was concentrated in large cities like Banská Štiavnica, Bratislava, Nitra and other cities in Slovakia. It was a time when producers started to put stamps on their pipes in order not only to advertise, but also to protect their reputation from imitations and copies. According to the Hungarian national list of manufacturers, in 1882, Banská Štiavnica had five workshops; by 1890 the number had risen to over 20; and, in 1910, 25 workshops were recorded. These numbers in themselves testify to the reputation of these workshops all over Europe, and it is not surprising that many Austrian and Hungarian entrepreneurs started to make copies of these models, which they sometimes marked with the names of the workshops they were imitating.[15] The profitable business of workshops in Banská Štiavnica is attested to by nine finds of this type of pipe at the site of Zoljani-Čemešac I in the municipality of Oprisavci in Brod-Posavina County, all of which bear the name of the same workshop in German: SCHEMNITZ.[16] So far, the pipe from the site of Novi Čeminac-Jagodnjačka strana is the

[9] Bielich, Čurný 2009, 349, Fig. 10: f.
[10] Bielich, Čurný 2009, 345, Fig. 7: b, c.
[11] Bekić 2000, 252.
[12] Nagy 2001, 201, T. 64: P7; Bielich, Čurný 2009, 348.
[13] Gusar 2009, 217.
[14] Bekić 2000, 249.
[15] Bielich, Čurný 2009, 340, 343, 344, 348.
[16] Šiša-Vivek, Filipec 2015, 313.

a koje na sebi nose pečat iste radionice na njemačkom jeziku – SCHEMNITZ.[16] Lula s lokaliteta Novi Čeminac-Jagodnjačka strana zasad je jedini nalaz proizvođača Jacoba Reinitza na prostoru Republike Hrvatske, a izostanak ostalog materijala u jami daje naslutiti da se radi o izgubljenom, ili pak predmetu koji je namjerno odbačen nakon pucanja.

Kanal/jama SJ 38=43/39=44

Stratigrafska jedinica 38=43/39=44 prvotno je definirana kao kanal dužine oko 120 metara koji nije u cijelosti istražen jer se pruža i izvan istraživanog područja. Kanal se u istočnom dijelu pruža u smjeru sjever – jug u dužini od 25 metara, nakon čega pod relativno pravim kutom skreće prema zapadu. Svi su nalazi bili koncentrirani na manjem dijelu kanala promjera oko 40 cm, što navodi na zaključak da se zapravo radi o otpadnoj jami koja je kasnije presječena melioracijskim kanalom. Naime, nešto je južnije definirana otpadna jama SJ 169/170 koja je sadržavala keramiku istih karakteristika i tipova.

U jami SJ 38=43/39=44 pronađena su dva fragmentirana primjerka životinjskih kostiju koje su površinski vrlo abradirane, a vjerojatno je riječ o metakarpusu goveda. Osim kostiju, pronađena je i manja količina ulomaka keramike koji se prema karakteristikama mogu datirati u razdoblje antike, odnosno u 1. st. Riječ je o rimskoj provincijalnoj keramici[17] zastupljenoj s devet ulomaka koji su pripadali posudama za skladištenje hrane (dolijima) i posudama tanjih stijenki (moguće loncima ili zdjelama). Važno je napomenuti da se u oba slučaja radi o keramici izrađenoj rukom koja je prilično loše pečena zbog čega ima izrazito trusnu i mekanu površinu. Ulomci su izvana narančaste, a u presjeku tamnije, sive boje. Ulomci dolija uključuju pet ulomaka trbuha te jedan zadebljali ravni rub, postavljen okomito na os posude, koji je ukrašen jedan

[16] Šiša-Vivek, Filipec 2015, 313.

[17] Ožanić Roguljić 2009, 99.

only find made by Jacob Reinitz from the territory of Croatia, and the lack of other material in the pit suggests that this was a lost item, or one that was intentionally discarded after it broke.

Channel/pit SU 38=43/39=44

Stratigraphic unit 38=43/39=44 was originally defined as a channel, measuring 120 m in length, that was not fully excavated, because it extended outside the excavated area. In the eastern part, the channel runs from north to south for about 25 metres, and then turns to the west at an almost right angle. All of the finds were concentrated in a small portion of the channel, measuring about 40 cm in diameter, suggesting this was originally a waste pit that was later cut by a melioration channel. In fact, somewhat further to the south, waste pit SU 169/170 was defined, and it contained pottery with the same characteristics and the same types.

Pit SU 38=43/39=44 yielded two fragmented animal bones with much-abraded surfaces, probably the remains of a bovine metacarpus. Besides the bones, a small number of pottery fragments were found that can, based on their characteristics, be dated to the Roman period, i.e. to the 1st century. The pottery includes Roman provincial ware:[17] nine fragments of vessels used for storing food (*dolia*) and vessels with thinner walls (possibly pots or bowls). It is important to note that, in both cases, the pottery was made by hand and is poorly fired, giving it an exceptionally unstable and soft surface. The fragments are orange on the outside and dark grey in cross-section. The fragments of *dolia* include five parts of vessel bodies and one thickened straight rim positioned perpendicularly to the axis of the vessel, decorated with a single wavy line made by using a stick or a similar object on the part which goes towards the vessel body (Pl. 1: 4). On the basis of the shape

[17] Ožanić Roguljić 2009, 99.

nostrukom valovnicom izvedenom štapićem ili sličnim predmetom na dijelu prema trbuhu (T. 1: 4). Oblikom ruba, ove ulomke možemo smatrati istovjetnima i istovremenima onima iz jame SJ 169, 177/170, odnosno iznimno sličnima nalazima s lokaliteta Liskovac koji su datirani u drugu polovicu 1. st.[18] Ukras izveden štapićem naslijeđe je domorodačkoga latenskog stanovništva,[19] dok je oblik posuda rimskoga karaktera. Debljina stijenke ovih ulomaka je oko 1 cm. Ulomci keramičkih posuda tanjih stijenki malih su dimenzija zbog čega je nemoguće precizno odrediti tip, a uključuju tri ulomka trbuha posuda (lonci ili zdjele?) narančaste boje kojima debljina stijenke iznosi 0,5 cm.

of this rim, the pottery fragments are similar and contemporaneous with those found in pit SU 169, 177/170, that is, with the exceptionally similar finds from the site of Liskovac dated to the second half of the 1st century.[18] Decorations made by using a stick are the legacy of domestic La Tène inhabitants,[19] and the shape of the vessels is Roman in character. The wall thickness of these fragments is about 1 cm. Fragments of vessels with thinner walls are small, making it impossible to precisely determine types. These include three orange fragments of vessel bodies (pots or bowls), and the thickness of their walls is 0.5 cm.

Jama SJ 169, 177/170

Istraživanjem je ustanovljeno postojanje jame koja je, prema svemu sudeći, rabljena u dva navrata. Naime, unutar ukopa definiranog kao SJ 170, bile su vidljive dvije zapune – SJ 169 i SJ 177. Zapuna SJ 177 nije sadržavala nalaze, a u zapuni SJ 169 pronađen je pokretni arheološki materijal nedvojbeno rimskog karaktera, prije svega keramika (T. 1: 1–3, 5–9). Jama je pronađena na prostoru koji je definiran kao arheološki areal i tijekom probnih istraživanja,[20] a u njoj je, osim keramike, pronađen i građevinski materijal u obliku 12 manjih komada kućnog lijepa bez tragova pruća, osam većih komada lijepa s tragovima pruća, kao i ostaci žbuke (sl. 3). Slični su nalazi i kontekst zabilježeni na lokalitetu Liskovac kod Vinkovaca, gdje je upravo takav materijal poslužio za kronološku atribuciju s obzirom na nedostatak konkretnih stambenih objekata koji bi ukazivali na pravi karakter naselja,[21] što se posebno odnosi na jame SJ 26/27 i SJ 62/63 u kojima su, osim keramike, pronađeni i ostaci građevinskog materijala u obliku lijepa, razbijenih imbreksa i tegula.[22]

[18] Ožanić Roguljić 2009, T. 10: 6; T. 21: 6; T. 22: 1.
[19] Ožanić 1998, 38; Ožanić Roguljić 2009, 86.
[20] Madiraca, Koprivnjak 2013.
[21] Ožanić Roguljić 2009, 99.
[22] Ožanić Roguljić 2009, 106, 111.

Pit SU 169, 177/170

The excavations revealed the existence of a pit that was, apparently, used on two occasions. That is, the cut defined as SU 170 contained two fills: SU 169 and SU 177. Fill SU 177 did not contain any finds, and fill SU 169 yielded movable archaeological material of unquestionably Roman characteristics, primarily pottery (Pl. 1: 1–3, 5–9). The pit was discovered on the part of the site defined as the archaeological distribution area in test excavations,[20] and, besides the pottery, it also yielded building material: 12 smaller pieces of daub without traces of wattle, eight larger pieces of daub with visible traces of wattle, and some lime plaster (Fig. 3). Similar finds and contexts were found at Liskovac, near Vinkovci, where precisely this type of material was used for chronological attribution, because there were no preserved habitational structures indicating the true character of the site,[21] especially pits SU 26/27 and SU 62/63, which, besides pottery, yielded remains of building material: daub, fragmented imbrices and *tegulae*.[22]

Analizom, klasifikacijom i podjelom nalaza ulomaka keramike iz jame SJ 168, 177/170, ustanovljene su dvije kategorije: siva (naslijeđe lokalnih latenskih tradicija) i provincijalna keramika. S obzirom na mali broj nalaza, ovakva je jednostavna statistička klasifikacija dostatna za obradu jer je statistički uzorak premalen za detaljnije analize i prikaze.

Specifična siva keramika latenske tradicije zastupljena je sa 10 ulomaka zdjela S-profilacije, od kojih su neki ukrašeni vodoravnim linijama izvedenim štapićem (T. 1: 3, 8). Na lokalitetu Novi Čeminac-Jagodnjačka strana ovaj tip zdjele zastupljen je dvama rubovima (T. 1: 1, 2), jednim neukrašenim i trima trbusima ukrašenim vodoravnim linijama koje su izvedene štapićem ili nekim drugim tankim alatom, dok se preostala če-

The analysis, classification and division of pottery fragments from pit SU 169, 177/170 revealed two categories: grey (legacy of local La Tène traditions) and provincial pottery. Considering the small number of finds, this simple statistical classification is sufficient for the analysis, because the sample is too small for more detailed analyses and representations.

The characteristic grey pottery of La Tène tradition is represented by 10 fragments of S-profiled bowls, some of which are decorated with a wavy line made by using a stick (Pl. 1: 3, 8). At Novi Čeminac-Jagodnjačka strana, this type of bowl is represented by two rims (Pl. 1: 1, 2), one undecorated, and three vessel bodies decorated with horizontal lines made by using a stick or some other thin tool, while the remaining four fragments of grey pottery could not be attributed to a certain type of vessel. These bowls ap-

Slika / Figure 3: Ostaci građevinskog materijala u zapuni SJ 169 (snimio I. Radman-Livaja). / The remains of building material in fill SU 169 (photo by I. Radman-Livaja).

tiri ulomka sive keramike ne mogu pripisati određenom tipu posude. Ovakve zdjele pojavile su se u 3. st. pr. Kr.,[23] a tijekom 2. i 1. st. pr. Kr. postale su najbrojniji keramički oblik izrađivan na lončarskom kolu.[24] U latenskim kontekstima, pronađene su na Dirovu brijegu, Ervenici i Damića gradini[25], Gradini kraj Orolika[26], Gradini u Privlaci[27], Ivanovcima Gorjanskim-Palanka[28], Donjem gradu u Osijeku[29], Vukovaru[30] i Ciglani-Zeleno polje u Osijeku.[31] Produkcija zdjela S-profilacije nastavljena je i u 1. st. u naseljima sa snažnom autohtonom komponentom, primjerice u Dumbovu,[32] a osim u naseljima, pronađene su u grobovima, primjerice u grobu iz Iloka.[33] U ranorimsko doba ovaj se tip javlja u više inačica, ali i dalje oblikom i izvedbom pokazuje jak lokalni latenski utjecaj,[34] primjerice u Vinkovcima, gdje su datirane u 1. i 2. st.,[35] Srijemskoj Mitrovici, gdje se pojavljuju u najstarijim rimskim slojevima, ali i u kontekstima datiranim u flavijevsko razdoblje,[36] na Gomolavi u fazi VIc naselja iz 1. st.,[37] na lokalitetu Liskovac, gdje su datirane u drugu polovicu 1. st.,[38] ili pak kod Rume, Šimanovaca i Srijemske Mitrovice u Srijemu, gdje su bile u kontekstu nalaza 1. st.[39] Opisani oblik zdjele tako predstavlja

[23] Ožanić Roguljić 2009, 81.

[24] Dizdar 2001, 58.

[25] Dizdar 2001, 58, 63; T. 8: 7; T. 9: 3; T. 10: 5; T. 13: 4; T. 15: 2; T. 16: 1, 2; T. 19: 1; T. 21: 1–3; T. 25: 4; T. 28: 4; T. 34: 2; T. 37: 2.

[26] Majnarić-Pandžić 1970, 55–56; T. 53: 3; T. 54: 2; 1996, 260; sl. 3: 1, 2, 4, 7, 9, 12, 13, 16, 17, 18, 34, 36, 49, 50.

[27] Majnarić-Pandžić 1984, 25; T. 3: 1.

[28] Drnić 2007, 170; T. 4: 1–7.

[29] Bulat 1977, 18–19; T. 5: 1–3, 7.

[30] Majnarić-Pandžić 1970, 52; T. 50: 6; T. 51: 3, 4.

[31] Drnić, Skelac 2008, T. 2: 1–10.

[32] Brukner 1981, T. 4: 2; Sladić 1986, 44.

[33] Dizdar, Šoštarić, Jelinčić 2003, 62; T. 2: 1.

[34] Todorović 1974, 66; Brukner 1981, 91; T. 77; Šaranović-Svetek 1981, 24; Ožanić 2004, 78–79; Drnić 2007, 171.

[35] Šaranović-Svetek 1981, 24.

[36] Brukner 1983, 19; T. 3: 3; 1987, 31; T. 25: 2–7.

[37] Jovanović, Jovanović 1988, prilog 5, 13; Brukner 1992, T. 10.

[38] Ožanić Roguljić 2009, 79; T. 8: 19; T. 9: 20; T. 10: 5; T. 16: 6; T. 18: 9; T. 24; T. 26; T. 27.

[39] Brukner 1995, 100–103; T. 19: 192; T. 22: 224

peared in the 3rd century BC[23] and became the most numerous pottery form made on the potter's wheel during the 2nd and 1st centuries BC.[24] In La Tène contexts, they were found at Dirov brijeg, Ervenica, Damića gradina,[25] Gradina near Orolik,[26] Gradina in Privlaka,[27] Ivanovci Gorjanski-Palanka,[28] Donji grad in Osijek,[29] Vukovar,[30] and Ciglana-Zeleno polje in Osijek.[31] The production of S-profiled bowls continued in the 1st century AD, in settlements with strong autochthonous influences, e.g. in Dumbovo,[32] and they were discovered in graves, as well as settlements: e.g. in a grave in Ilok.[33] In early Roman times, this type appears in several variants, but its shape and form reflect strong local La Tène influences:[34] for example, in Vinkovci, where it was dated to the 1st and 2nd centuries;[35] in Srijemska Mitrovica, where it appears not only in the oldest Roman layers, but also in contexts dated to the Flavian era;[36] at Gomolava, in phase VIc of the 1st-century settlement;[37] at the site of Liskovac, where it was dated to the second half of the 1st century;[38] and near Ruma, Šimanovci and Srijemska Mitrovica in Syrmia, where it was in context with 1st century finds.[39] The form of bowl described is, therefore, a continuation of La Tène traditions,[40] and appears in several variants that have been dated through compari-

[23] Ožanić Roguljić 2009, 81.

[24] Dizdar 2001, 58.

[25] Dizdar 2001, 58, 63; T. 8: 7; T. 9: 3; T. 10: 5; T. 13: 4; T. 15: 2; T. 16: 1, 2; T. 19: 1; T. 21: 1–3; T. 25: 4; T. 28: 4; T. 34: 2; T. 37: 2.

[26] Majnarić-Pandžić 1970, 55–56; T. 53: 3; T. 54: 2; 1996, 260; sl. 3: 1, 2, 4, 7, 9, 12, 13, 16, 17, 18, 34, 36, 49, 50.

[27] Majnarić-Pandžić 1984, 25; T. 3: 1.

[28] Drnić 2007, 170; T. 4: 1–7.

[29] Bulat 1977, 18–19; T. 5: 1–3, 7.

[30] Majnarić-Pandžić 1970, 52; T. 50: 6; T. 51: 3, 4.

[31] Drnić, Skelac 2008, T. 2: 1–10.

[32] Brukner 1981, T. 4: 2; Sladić 1986, 44.

[33] Dizdar, Šoštarić, Jelinčić 2003, 62; T. 2: 1.

[34] Todorović 1974, 66; Brukner 1981, 91; T. 77; Šaranović-Svetek 1981, 24; Ožanić 2004, 78–79; Drnić 2007, 171.

[35] Šaranović-Svetek 1981, 24.

[36] Brukner 1983, 19; T. 3: 3; 1987, 31; T. 25: 2–7.

[37] Jovanović, Jovanović 1988, prilog 5, 13; Brukner 1992, T. 10.

[38] Ožanić Roguljić 2009, 79; T. 8: 19; T. 9: 20; T. 10: 5; T. 16: 6; T. 18: 9; T. 24; T. 26; T. 27.

[39] Brukner 1995, 100–103; T. 19: 192; T. 22: 224.

[40] Ožanić Roguljić 2008, 186, sl. 2.

nastavak latenskih tradicija,[40] a pojavljuje se u više različitih varijanti koje su datirane usporednim nalazima *terra sigillate* i ranorimskim provincijalnim oblicima u 1. st.[41] Iako dulje ostaju u upotrebi, postupno im se mijenjaju oblik i struktura gline te se na raznim lokalitetima pojavljuju sve do druge polovine 4. st.[42]

Pod pojmom provincijalne keramike[43] obuhvaćena je rimska uporabna keramika (engl. *locally produced functional ceramics*) koja se koristila za kuhanje, čuvanje i serviranje hrane, a koja je proizvedena unutar naselja, ili u njegovoj blizini, te nije bila namijenjena za prodaju na udaljenim tržištima.[44] Na nalazištu Novi Čeminac-Jagodnjačka strana ova je vrsta keramike zastupljena dvama tipovima posuda – dolijima i loncima, i to s ukupno osam ulomaka. Dolijima se može pripisati šest, a loncima dva ulomka. U svim se slučajevima radi o keramici iznimno grube fakture i trusne površine koja je rađena rukom i loše pečena, s tim da se na ulomcima dolija jasno vidi razlika između crvene boje površine i tamnosivog presjeka, dok su ulomci lonaca jednolične narančastocrvene boje, što je vjerojatno posljedica znatno tanjih stijenki. Izostanak ukrasa ne treba čuditi jer je uporabna keramika lokalne proizvodnje prije svega morala zadovoljiti praktične i tehnološke uvjete, posebno u slučaju posuda koje su služile za kuhanje.[45] Doliji, odnosno posude za čuvanje/skladištenje krutih i tekućih namirnica[46] zastupljeni su šesterim ulomcima – dvama neukrašenim ravnim rubovima koji su postavljeni okomito na os posude (T. 1: 5; T. 1: 9), jednim ravnim rubom postavljenim okomito na os posude, koji je ukrašen jednostrukom valovnicom na dijelu prema trbuhu (T. 1: 8), dvama ulomcima trbuha bez

[40] Ožanić Roguljić 2008, 186, sl. 2.

[41] Brukner 1981, 39; T. 4: 2, 3; T. 5; 1988, 96, sl. 4; T. 1: 2; Dizdar, Šoštarić, Jelinčić 2003, 63.

[42] Gabler-Ottományi 1990, 177, 181; Ottományi 2005, 97–98; Ožanić Roguljić 2009, 81.

[43] Ožanić Roguljić 2009, 100.

[44] Jelinčić 2009, 10.

[45] Jelinčić 2015, 120.

[46] Jelinčić 2015, 105.

sons with finds of *terra sigillata* and early Roman provincial forms to the 1st century,[41] even though they remained in use much longer, with changes in shape and clay composition, on various sites where they can be traced until the second half of the 4th century.[42]

The term 'provincial pottery'[43] includes locally-produced functional ceramics, used for cooking, preserving and serving food, which were made within settlements or in close proximity and were not intended for selling at distant markets.[44] At Novi Čeminac-Jagodnjačka strana, this kind of pottery is represented through two types of vessels – *dolia* and pots – with a total of eight fragments. Six fragments can be ascribed to *dolia*, and two to pots. In all cases, the pottery has a very coarse structure and a sensitive surface, it was modelled by hand, and it was poorly fired. *Dolia* fragments have a clearly visible difference between the red surface and the dark-grey cross-section, while the pot fragments have a uniform orange-red colour, probably as a result of having significantly thinner walls. The lack of decoration is not surprising, because functional ceramics primarily had to meet practical and technological needs, especially in the case of vessels used for cooking.[45] *Dolia*, i.e. vessels used for keeping/storing solid and liquid foods,[46] are represented by six fragments: two undecorated straight rims positioned perpendicular to the axis of the vessel (Pl. 1: 5; Pl. 1: 9), one straight rim perpendicular to the axis of the vessel decorated with a single wavy line on the part transitioning towards the body (Pl. 1: 8), two fragments of undecorated vessel bodies, and one fragment of a vessel bottom with decoration on the lower side (Pl. 1: 6). These large vessels for storing food often have a wide distribution, as is the case in Pannonia, and can largely be seen as locally-produced commodities.[47] The poor quality of the pottery from Novi

[41] Brukner 1981, 39; T. 4: 2, 3; T. 5; 1988, 96, sl. 4; T. 1: 2; Dizdar, Šoštarić, Jelinčić 2003, 63.

[42] Gabler-Ottományi 1990, 177, 181; Ottományi 2005, 97–98; Ožanić Roguljić 2009, 81.

[43] Ožanić Roguljić 2009, 100.

[44] Jelinčić 2009, 10.

[45] Jelinčić 2015, 120.

[46] Jelinčić 2015, 105.

[47] Vikić-Belančić 1965, 109; Jelinčić 2015, 160.

ukrasa i jednim ulomkom dna s ukrasom na donjoj strani (T. 1: 6). Ovakve su velike posude za čuvanje hrane česte i široko rasprostranjene, pa ih se tako nalazi i u Panoniji, te se većim dijelom mogu smatrati proizvodima lokalnih radionica,[47] na što u slučaju lokaliteta Novi Čeminac-Jagodnjačka strana dodatno ukazuje i loša kvaliteta keramike. Na lokalitetu Liskovac pronađeno je nekoliko ulomaka dolija s vrlo slično izvedenim rubovima,[48] a na jednom je ulomku trbuha istog tipa posude vidljiv ukras jednostruke valovnice i vodoravnih traka izveden tankim štapićem ili nekim drugim oštrim alatom,[49] baš kao na primjerku s ovdje analiziranog lokaliteta na kojem je vidljiva samo valovnica. Prema obliku i izvedbi ruba, nalazi s lokaliteta Novi Čeminac-Jagodnjačka strana uklapaju se u panonsku produkciju 1. do 2. st. koja pokazuje više varijanti izrade ruba s više varijanti ukrasa koji može biti na najširem, ali i na gornjem dijelu trbuha posude.[50] Lonci su zastupljeni dvama ulomcima, jednim ulomkom trbuha, koji se ne može pripisati određenom tipu, i jednim ulomkom ruba koji oblikom podsjeća na one pronađene na lokalitetu Liskovac,[51] osobito na tip 4.8. lonca s naglašeno izvijenim rubom i kratkim vratom koji se prema analogijama iz Siska može datirati u kraj. 1. i početak 2. st.[52] Lonac s lokaliteta Novi Čeminac-Jagodnjačka strana oblikom podsjeća na pretpovijesnu produkciju, a analogije su pronađene u grobovima 116, 136, 137, 181, 182, i 187 u Novome Mestu, [53] zatim u Topuskom,[54], Ljubljani,[55] Varaždinskim

[47] Vikić-Belančić 1965, 109; Jelinčić 2015, 160.

[48] Ožanić Roguljić 2009, T. 10: 6; T. 21: 6; T. 22: 1.

[49] Ožanić Roguljić 2009, T. 12: 12.

[50] Brukner 1981, 42–43; Vidošević 2003, 23; Ožanić Roguljić 2009, 96.

[51] Ožanić Roguljić 2009, T. 5: 1; T. 7: 9, 10; T. 13: 18; T. 19: 15; T. 24: 20.

[52] Wiewegh 2003, 42; T. 3: 13; Ožanić Roguljić 2009, 88; T. 24: 20.

[53] Knez 1992, 49, 53, 62–63; T. 41: 7, 12; T. 49: 6, 8; T. 50: 2; T. 65: 7; T. 66: 2, 13, 14.

[54] Šarić 1980, 131, 141; T. 7: 6.

[55] Vičič 1993, 156, 167; T. 1: 14, 15.

Čeminac-Jagodnjačka strana additionally supports this conclusion. The site of Liskovac yielded several fragments of *dolia* with very similar rims,[48] and one fragment of the same type of vessel is decorated with a single wavy line made by using a thin stick or some other sharp tool,[49] just like the example from the herein-analysed fragment that has a visible wavy line. On the basis of the shape and form of this rim, the finds from Novi Čeminac-Jagodnjačka strana fit into the Pannonian production from the 1st to the 2nd century, which displays more variants of the rim, with different decorations placed not only on the widest part of the vessel body, but also on its upper part.[50] Pots are represented by two fragments: one part of a vessel body that cannot be attributed to a specific type, and one rim fragment that resembles those found at Liskovac,[51] especially type 4.8 pots, with a pronouncedly inverted rim and a short neck, which have been dated to the 2nd century and the end of the 1st on the basis of analogies from Sisak.[52] The form of the pot from Novi Čeminac-Jagodnjačka strana resembles prehistoric production, and analogies have been found in graves 116, 136, 137, 181, 182 and 187 in Novo Mesto,[53] in Topusko,[54] Ljubljana,[55] Varaždinske Toplice,[56] Sisak,[57] Drenje[58] and Osječenica,[59] and at many other sites. Because they exhibit features of La Tène traditions, they are dated to the period between the middle of the 1st century and the middle of the 2nd.[60]

[48] Ožanić Roguljić 2009, T. 10: 6; T. 21: 6; T. 22: 1.

[49] Ožanić Roguljić 2009, T. 12: 12.

[50] Brukner 1981, 42–43; Vidošević 2003, 23; Ožanić Roguljić 2009, 96.

[51] Ožanić Roguljić 2009, T. 5: 1; T. 7: 9, 10; T. 13: 18; T. 19: 15; T. 24: 20.

[52] Wiewegh 2003, 42; T. 3: 13; Ožanić Roguljić 2009, 88; T. 24: 20.

[53] Knez 1992, 49, 53, 62–63; T. 41: 7, 12; T. 49: 6, 8; T. 50: 2; T. 65: 7; T. 66: 2, 13, 14.

[54] Šarić 1980, 131, 141; T. 7: 6.

[55] Vičič 1993, 156, 167; T. 1: 14, 15.

[56] Vikić-Belančić 1973, 104; T. 16: 4.

[57] Jelinčić 2009, T. 114: 2, 3, 4; T. 115; T. 116; T. 117: 1, 2; T. 122: 2, 3; T. 123: 1, 2.

[58] Škoberne, Koščević, Makjanić 1987, 28; T. 2: 8, 10.

[59] Ožanić 1998, 50; T. 19: 1.

[60] Vikić-Belančić 1968, 85-86; T. 5: 5; Jelinčić 2015, 132–133.

Toplicama,[56] Sisku,[57] Drenju,[58] Osječenici[59] i mnogim drugim lokalitetima, a zbog vidljive latenske tradicije datira ih se od sredine 1. do sredine 2. st.[60]

Nakon analize ulomaka keramike iz otpadne jame SJ 169, 177/170 jasno je da se radi o rimskoj keramici koju se može datirati u 1. st, a koja pokazuje pretpovijesnu tradiciju u oblicima (rubovi i profilacija zdjela, lonaca i dolija) i tehnologiji izrade (siva keramika, loše pečena provincijalna keramika, oblikovana rukom).

ZAKLJUČNA RAZMATRANJA

Istraživanjima na lokalitetu Novi Čeminac-Jagodnjačka strana, koja su trajala nešto manje od mjesec dana, otkrivene su mnoge prirodne, ali i nekolicina antropogenih struktura.

Antropogene tvorevine uključuju slojeve nastale djelovanjem čovjeka, strojne ukope, probni rov iz istraživanja 2013. godine, niz melioracijskih kanala, kanale i jame napravljene ljudskom rukom, bez arheoloških nalaza i sigurnog konteksta, i tri konkretne arheološke strukture (jame SJ 137/138, SJ 38=43/39=44 i SJ 169, 177/170).

Jama SJ 137/138 zanimljiva je s arheološkog, povijesnog i kulturološkog aspekta, a nalaz koji se posebno ističe keramička je lula koja na sebi nosi pečat s imenom proizvođača – Jacob Reinitz, a koji se u literaturi spominje kao mađarski proizvođač imitacija lula iz poznate i popularne radionice 19. st koja se nalazila u Banaskoj Štiavnici u Slovačkoj. Lula se tipološki može pripisati tzv. istočnom, odnosno mediteranskom tipu keramičkih lula s većom čašicom i manjim tuljcem, a zasad je jedinstveni primjerak ovog proizvođača pronađen na prostoru Republike Hrvatske.

[56] Vikić-Belančić 1973, 104; T. 16: 4.

[57] Jelinčić 2009, T. 114: 2, 3, 4; T. 115; T. 116; T. 117: 1, 2; T. 122: 2, 3; T. 123: 1, 2.

[58] Škoberne, Koščević, Makjanić 1987, 28; T. 2: 8, 10.

[59] Ožanić 1998, 50; T. 19: 1.

[60] Vikić-Belančić 1968, 85–86; T. 5: 5; Jelinčić 2015, 132–133.

After analysing pottery fragments from waste pit SU 169, 177/170, it can be established that this is Roman pottery dated to the 1st century, which displays prehistoric traditions through shapes (bowl, pot and *dolium* rims and profiles) and production technology (grey pottery, poorly-fired provincial pottery modelled by hand).

CONCLUDING REMARKS

The excavations of Novi Čeminac-Jagodnjačka strana lasted for under a month, but they revealed many natural features, as well as some that are anthropogenic.

The anthropogenic features include man-made layers, machine-made structures, the 2013 test trench, a series of melioration channels, man-made channels and pits without archaeological finds and ascertainable contexts, as well as three definitively archaeological structures (pits SU 137/138, SU 38=43/39=44 and SU 169, 177/170).

Pit SU 137/138 is interesting from the viewpoint of archaeology, history and culture, and an exceptionally interesting find is the ceramic pipe stamped with the name of the producer: Jacob Reinitz, a person mentioned in publications as a Hungarian manufacturer who made imitations of pipes from the popular 19th-century workshop in Banská Štiavnica in Slovakia. The pipe can be typologically ascribed to the so-called eastern, i.e. Mediterranean, type with a larger bowl and a smaller shank, and is thus far the only find made by this manufacturer discovered in the territory of the Republic of Croatia.

Pit SU 169, 177/170 is the only defined feature that is unquestionably archaeological, and it contained fragments of Roman pottery and some remains of building material: crushed *tegulae* and daub. Considering the exceedingly small number of fragments and the complete lack of any other Roman structure in the vicinity of the pit, it is difficult to discuss the organiza-

Jama SJ 169, 177/170 jedina je konkretno definirana arheološka struktura, a radi se o strukturi koja je sadržavala ulomke antičke keramike i ostatke građevinskog materijala u obliku drobljenih tegula i komada kućnog lijepa. S obzirom na izrazito mali broj ulomaka i potpuni izostanak drugih antičkih struktura u blizini ove jame, teško je govoriti o organizaciji života, pa i samom postojanju naselja na lokalitetu Novi Čeminac-Jagodnjačka strana. Ipak, keramika pokazuje standardnu rimsku provincijalnu produkciju 1. i 2. st., a može se podijeliti na sivu i rimsku provincijalnu keramiku. Siva je keramika prisutna u vidu zdjela S-profilacije koje porijeklo vuku iz lokalnih latenskih tradicija, dok se provincijalna keramika očituje kroz dolije i lonce koji također ukazuju na dataciju do sredine 2. st. Kao i na lokalitetu Liskovac kod Vinkovaca, istražena jama ovalnog je oblika i poslužila je za otpad.[61] Osvrnemo li se na odnos sive i provincijalne keramike, postaje jasno da, iako se radi o malom broju ulomaka, siva keramika latenske tradicije prevladava, što govori u prilog ranijoj dataciji. Slična je situacija zabilježena i na kasnolatenskom/ranorimskom lokalitetu Budarös u Mađarskoj, u kojemu unutar zatvorenih cjelina (stambenih objekata) prevladava siva keramika,[62] u grobu iz Iloka, koji je datiran novcem Klaudija,[63] te na brojnim nalazištima u Srijemu, koja su datirana od kraja 1. st. pr. Kr. do kraja 1. st. po. Kr. (Voganj-Bare, Livade kod Srijemske Mitrovice, Kuzmin, Adaševci, Pećinci, Žirovac, Šumadinci, Mitrovačke livade).[64] Osim u jami SJ 169, 177/170, rimska keramika datirana u vrijeme do polovice 2. st. pronađena je i u dijelu melioracijskog kanala SJ 38=43/39=44. S obzirom na to da su svi ulomci keramike iz tog dijela kanala pronađeni koncentrirani na jednome mjestu, može se tvrditi kako je i u ovom slučaju riječ o rimskoj otpadnoj jami koja je kasnije presječena melioracijskim kanalom. Kera-

[61] Ožanić Roguljić 2009, 97.

[62] Ottományi 2005, 74, 81; Ožanić Roguljić 2009, 98.

[63] Dizdar, Šoštarić, Jelinčić, 2003.

[64] Brukner 1995, 92–103; Ožanić Roguljić 2009, 99.

tion of life and the sheer existence of a settlement at the site of Novi Čeminac-Jagodnjačka strana. However, the pottery exhibits standardized Roman 1st – and 2nd-century provincial production, and can be divided into grey and Roman provincial pottery. Grey pottery is represented through S-profiled bowls that originated from local La Tène traditions, and provincial ware is represented through *dolia* and pots that also indicate a datation up to the middle of the 2nd century. Just as at the site of Liskovac, near Vinokovci, the excavated pit is of oval shape and was used as a waste pit.[61] Looking at the ratio between grey and provincial pottery, it becomes clear that, although the sample is small, grey pottery of the La Tène tradition dominates, speaking in favour of an earlier datation. A similar situation was noted at the late La Tène / early Roman-age site of Budarös in Hungary, where, within closed units (habitational structures), grey pottery prevails,[62] in the grave in Ilok dated by a coin of Claudius,[63] and on numerous sites in Syrmia dated to the time between the end of the 1st century BC and the end of the 1st century AD (Voganj-Bare, Livade kod Srijemske Mitrovice, Kuzmin, Adaševci, Pećinci, Žirovac, Šumadinci, Mitrovačke livade).[64] Besides in pit SU 169, 177/170, 1st-century Roman pottery was found in part of melioration channel SU 38=43/39=44. Because all of the fragments from that part of the channel were found concentrated in one area, it can be said that this was originally a Roman-era waste pit that was later destroyed by the melioration channel. The pottery material displays the same characteristics and can be ascribed to the same type of *dolium* as the one from pit SU 169, 177/170.

Finally, the area of the AN10B Novi Čeminac-Jagodnjačka strana site can be defined as the periphery of a nearby settled area, most probably the neighbouring site of AN10A Novi Čeminac-Jauhov salaš, which also yielded traces of habitation from the Roman era. Apart from the closed units of two defined Roman waste pits and one 19th-century pit, the surface of several modern-

[61] Ožanić Roguljić 2009, 97.

[62] Ottományi 2005, 74, 81; Ožanić Roguljić 2009, 98.

[63] Dizdar, Šoštarić, Jelinčić, 2003.

[64] Brukner 1995, 92–103; Ožanić Roguljić 2009, 99.

mika pokazuje iste karakteristike i može se pripisati istom tipu dolija kao ona iz jame SJ 169, 177/170.

Naposljetku, prostor lokaliteta AN10B Novi Čeminac-Jagodnjačka strana može se definirati kao periferija naseljenog prostora istraživanog u neposrednoj blizini, najizglednije na lokalitetu AN10A Novi Čeminac-Jauhov salaš, a gdje su također pronađeni tragovi naseljavanja iz rimskog razdoblja. Osim u zatvorenim cjelinama dviju definiranih antičkih otpadnih jama i jedne jame iz 19. st., materijal je pronađen i na površini nekoliko recentnih melioracijskih kanala te u površinskom sloju (oranici). Može se zaključiti kako je onamo došao zahvaljujući intenzivnim poljoprivrednim radovima, a njegovo izvorište treba tražiti na susjednom arheološkome lokalitetu AN10A, gdje je jasno utvrđeno postojanje bogate horizontalne arheološke stratigrafije, od pretpovijesti do kasnoga srednjeg vijeka. U prilog postojanju antičkog naselja u neposrednoj blizini lokaliteta govori i činjenica da se ranosrednjovjekovna naselja redovito nalaze na prostorima gdje je već postojala infrastruktura iz antičkog vremena, a stariji terenski pregledi daju naslutiti da je na prostoru Čeminca i uže okolice postojala sporedna rimska cesta, koja se koristila u razdobljima poplava, kada nije bilo moguće prolaziti glavnom cestom prema Nemetinu, a koja je prolazila kroz okolicu Bilja i obližnje selo Čeminac.[65]

day melioration channels and the surface layer (ploughed field) also yielded archaeological material. It can be concluded that the material got there due to intensive agricultural activities, and it could have originated from the neighbouring AN10A site, where the existence of a rich horizontal archaeological stratigraphy was clearly defined, covering periods from prehistory to the Late Middle Ages. The existence of a Roman settlement in the immediate vicinity is additionally attested to by the fact that early mediaeval settlements regularly emerge in areas with a pre-existing Roman infrastructure. Previous field surveys suggest there was a secondary Roman road somewhere around Čeminac and the immediate vicinity, and which was used during the periods when, due to flooding, it was impossible to use the main road leading towards Nemetin through Bilje and Čeminac.[65]

KATALOG [66]

Tabla 1

1. SJ 169; siva keramika latenske tradicije, bez vidljivih primjesa; ulomak izvučenog ruba zdjele S-profilacije; boja: siva; visina: 6,4 cm; širina: 12,8 cm; debljina: 0,4 cm.

2. SJ 169; siva keramika latenske tradicije, bez vidljivih primjesa; ulomak izvučenog ruba zdjele S-profilacije; boja: siva; visina: 2,6 cm; širina: 11 cm; debljina: 0,5 cm.

[65] Gračanin 2010, 12.

[66] Table je nacrtala Miljenka Galić iz Arheološkog muzeja u Zagrebu; dodatnu obradu napravio je Marin Mađerić.

CATALOGUE[66]

Plate 1

1. SU 169: grey pottery of La Tène tradition, no visible inclusions; fragment of an outward-facing rim of an S-profiled bowl; colour: grey; height 6.4 cm, width 12.8 cm, thickness 0.4 cm

2. SU 169: grey pottery of La Tène tradition, no visible inclusions; fragment of an outward-facing rim of an S-profiled bowl; colour: grey; height 2.6 cm, width 11 cm, thickness 0.5 cm

[65] Gračanin 2010, 12.

[66] The plates were drawn by Miljenka Galić of the Archaeological Museum in Zagreb; additional editing was done by Marin Mađerić.

3. SJ 169; siva keramika latenske tradicije, bez vidljivih primjesa; ulomak tijela posude, vjerojatno zdjele S-profilacije; ukrašen linijom izvedenom štapićem; boja: siva; visina: 4,9 cm; širina: 4,5 cm; debljina: 0,8 cm.

4. SJ 43; rimska provincijalna keramika, vidljive sitne primjese kvarca; ulomak zadebljanoga ravnog ruba dolija, postavljen okomito na os posude; ukrašen valovnicom izvedenom štapićem; boja: tamnonarančasta; visina: 4,7 cm; širina: 12,9 cm; debljina: 1,9 cm.

5. SJ 169; rimska provincijalna keramika, vidljive sitne primjese kvarca; ulomak zadebljanoga ravnog ruba dolija, postavljen okomito na os posude; boja: narančasta izvana, siva u presjeku; visina: 2,7 cm; širina: 10,2 cm; debljina: 0,7 cm.

6. SJ 169; rimska provincijalna keramika, vidljive sitne primjese kvarca; ulomak dna dolija; ukrašen trima linijama izvedenim štapićem na donjoj strani; boja: narančasta izvana, siva u presjeku; širina: 5,9 cm; dužina: 10,6 cm; debljina: 1,2 cm.

7. SJ 169; siva keramika latenske tradicije, bez vidljivih primjesa; ulomak tijela posude, vjerojatno zdjele S-profilacije; ukrašen linijom izvedenom štapićem; boja: siva; visina: 5,4 cm; širina: 11,3 cm; debljina: 0,8 cm.

8. SJ 169; rimska provincijalna keramika, vidljive sitne primjese kvarca; ulomak zadebljanoga ravnog ruba dolija, postavljen okomito na os posude; ukrašen valovnicom izvedenom štapićem; boja: tamnonarančasta; visina: 5,9 cm; širina: 6,2 cm; debljina: 0,9 cm.

9. SJ 169; rimska provincijalna keramika, vidljive sitne primjese kvarca; ulomak zadebljanoga ravnog ruba dolija, postavljen okomito na os posude; boja: narančasta izvana, siva u presjeku; visina: 5,3 cm; širina: 4 cm; debljina: 0,8 cm.

Tabla 2

10. SJ 137; ukrašena keramička lula; boja: narančasta; visina: 4,2 cm; promjer tuljca: 1,6 cm; debljina: 0,3 cm.

3. SU 169: grey pottery of La Tène tradition, no visible inclusions; fragment of a vessel body, probably of an S-profiled bowl; decorated with a line made using a stick; color: grey; height 4.9 cm, width 4.5 cm, thickness 0.8 cm

4. SU 43: Roman provincial pottery, visible inclusions of quartz; fragment of a thickened straight rim of a *dolium*, positioned perpendicular to the axis of the vessel; decorated with a wavy line made using a stick; colour: dark orange; height 4.7 cm, width 12.9 cm, thickness 1.9 cm

5. SU 169: Roman provincial pottery, visible inclusions of quartz; fragment of a thickened straight rim of a *dolium*, positioned perpendicular to the axis of the vessel; colour: orange on the outside, grey in cross-section; height 2.7 cm, width 10.2 cm, thickness 0.7 cm

6. SU 169: Roman provincial pottery, visible inclusions of quartz; fragment of a bottom of a *dolium*; decorated with three lines made using a stick on the bottom part; colour: orange on the outside, grey in cross-section; width 5.9 cm, length 10.6 cm, thickness 1.2 cm

7. SU 169: grey pottery of La Tène tradition, no visible inclusions; fragment of a vessel body, probably an S-profiled bowl; decorated with a line made using a stick; colour: grey; height 5.4 cm, width 11.3 cm, thickness 0.8 cm

8. SU 169: Roman provincial pottery, visible inclusions of quartz; fragment of a thickened straight rim of a *dolium*, positioned perpendicular to the axis of the vessel; decorated with a wavy line made using a stick; colour: dark orange; height 5.9 cm, width 6.2 cm, thickness 0.9 cm

9. SU 169: Roman provincial pottery, visible inclusions of quartz; fragment of a thickened straight rim of a *dolium*, positioned perpendicular to the axis of the vessel; colour: orange on the outside, grey in cross-section; height 5.3 cm, width 4 cm, thickness 0.8 cm.

Plate 2

10. SU 137: decorated ceramic pipe; colour: orange; height 4.2 cm, shank diameter 1.6 cm, thickness 0.3 cm.

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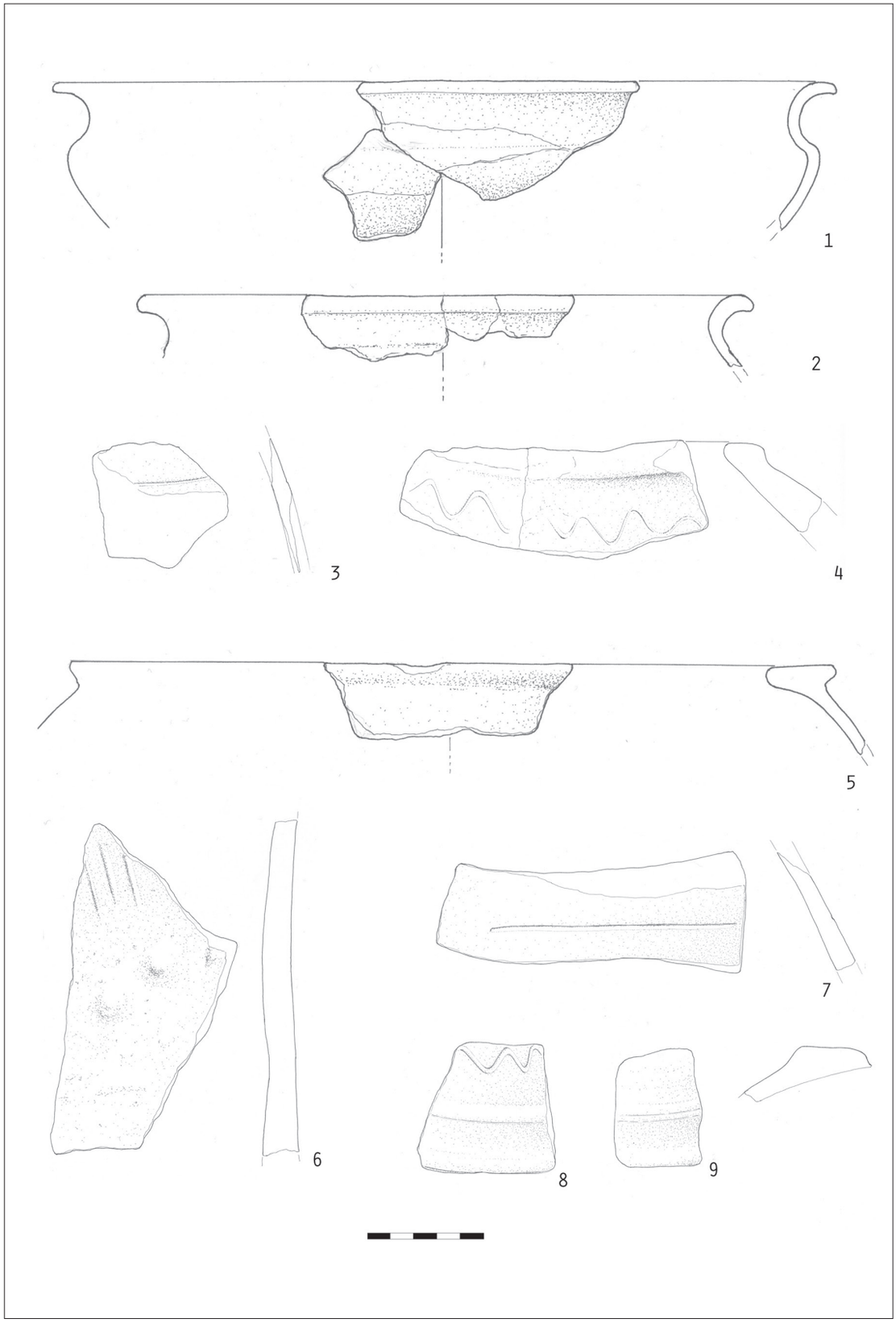

Tabla / Plate 1

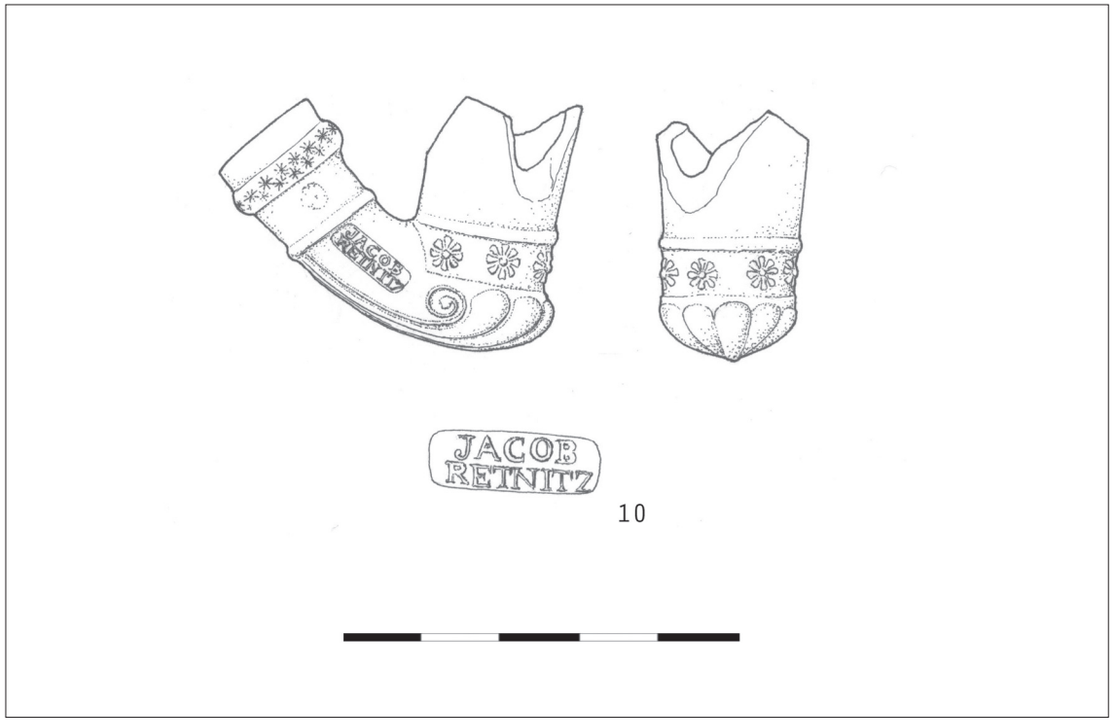

Tabla / Plate 2

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Bilić 2011b, 47.

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Gregl, Lazar 2008, 53, sl. 3; Bilić 2011, 451, bilj. 9.

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Gregl, Lazar 2008; Bilić 2011.

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Gregl, Lazar 2008, 53, Fig. 3; Bilić 2011, 451, n. 9.

The supplements following the texts should be referred to in parentheses. The author should indicate the abbreviation (Fig. = figure; Pl. = plate; Map = map; Tab. = table; cat. no. = catalogue number) together with its serial number.
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