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Podravski lokalitet Virje sa svoja dva položaja, Volarskim bregom i Sušinama, poznat je kao arheološko nalazište već više desetljeća, a zaštitna su se iskopavanja provodila od 2008. do 2014. godine. U višegodišnjim istraživanjima koja je proveo Institut za arheologiju pronađeni su ostaci talioničke radionice, ali i naseobinski ostaci iz ranoga i razvijenoga srednjeg vijeka te kasne antike, dok su u onima provedenim od strane Muzeja grada Koprivnice (2010. g.) pronađeni tragovi naselja iz starijeg i mlađega željeznog doba.

Tijekom proljeća 2014. g. na položaju Sušine, blagom uzvišenju uz kanal Čivičevac, provedena su geofizička istraživanja na temelju čijih rezultata je odabrana pozicija za zaštitna arheološka iskopavanja koja su se odvijala početkom studenoga iste godine. Ciljano odabrana sonda, pozicionirana na mjestu pretpostavljenog objekta, dala je vrijedne rezultate. Pronađen je veći ukopan objekt pravokutnog oblika tlocrta. U njegovom sjevernom dijelu bio je smješten tkalački stan, čiji su ostaci pronađeni in situ *u vidu tridesetak većih cjelovito očuvanih glinenih utega. Nakon uklanjanja utega, uz okomite stjenke objekta, uočena je sivkasta tvorevina za koju se pretpostavlja da je trag istrunule pravilne drvene grede koja je činila sastavni dio tkalačkog stana. Na istočnom i zapadnom dijelu ukopa objekta pronađena su dva željezna predmeta čiju namjenu nije moguće sa sigurnošću utvrditi.*

Razlike u oblikovanju i težini utega te njihov položaj unutar istražene cjeline kao i tragovi uporabe na pojedinim od njih, potakli su autorice na eksperimentalni pristup sagledavanja izgleda pronađenog tkalačkog stana. Na temelju provedenih eksperimenata zaključuje se o mogućem načinu korištenja utega, odnosno tkalačkog stana, vrsti i debljini pređe te izgledu tkanja i tkanine. O vremenu korištenja tkalačkog stana zaključuje se na temelju prikupljenih keramičkih ulomaka iz objekta koji se vežu uz latensko razdoblje.

Ključne riječi: Virje–Sušine, glineni utezi, vertikalni tkalački stan na utege, pršljen, keramika, latenski objekt

Virje, a site in the Podravina region, with its two positions – Volarski breg and Sušine – has been known as an archaeological site for several decades. Salvage excavations were carried out there between 2008 and 2014. The several-year-long excavations by the Institute of Archaeology yielded the remains of a smelting workshop, in addition to the habitation remains from the Early and High Middle Ages and Late Antiquity, while the 2010 excavations, carried out by the Koprivnica Municipal Museum, revealed traces of a settlement from the Early and Late Iron Ages.

Based on the results of a geophysical research carried out in spring 2014 at Sušine, a gentle elevation next to the Čivičevac canal, a position was selected for subsequent salvage archaeological excavations, which were carried out in November the same year. The trench, carefully positioned at the place of a supposed structure, yielded valuable results: a large sunken structure of rectangular plan. Its northern part had accommodated a loom, with in situ remains consisting of around thirty completely preserved clay weights. After the weights had been removed, a greyish feature was observed by the edge of the structure, presumably the remains of a decayed straight wooden beam that formed part of the loom. The function of the two iron objects found in the eastern and western parts of the trench cannot be ascertained.

Differences in the shape and mass of the weights, in addition to their position in the excavated context, as well as the usewear traces on some weights, inspired the authors to adopt an experimental approach in the interpretation of the appearance of the loom. Based on the conducted experiments, conclusions are put forward regarding the possible way the weights and loom were used, the type and thickness of the thread and the appearance of the weaving and the fabric. The conclusion about the date in which the loom was used is based on the collected pottery fragments from the structure, which belong to the La Tène period.

Key words: Virje–Sušine, clay weights, warp - weighted loom, spindle-whorl, pottery, La Tène structure

Podravski lokalitet Virje (sl. 1), sa svoja dva položaja – Volarskim bregom i Sušinama – poznat je kao arheološko nalazište već više desetljeća, a zaštitna se iskopavanja provode od 2008. godine (Volarski breg: Sekelj Ivančan 2007; 2008; 2009; 2010; 2011a; 2011b; 2013), odnosno od 2012. godine (Sušine: Sekelj Ivančan 2013; 2014a).[1] U višegodišnjim istraživanjima koja je proveo Institut za arheologiju pronađeni su ostaci talioničke radionice, ali i naseobinski ostaci iz ranog i razvijenoga srednjeg vijeka te kasne antike, dok su u onima provedenim od strane Muzeja grada Koprivnice (2010.) pronađeni tragovi naselja iz starijeg i mlađega željeznog doba.[2]

Sl. 1 Karta Republike Hrvatske s označenim položajem lokaliteta Virje u Koprivničko-križevačkoj županiji

Fig. 1 Map of the Republic of Croatia with a marked position of the Virje site in the Koprivnica-Križevci County

Kako je u slučaju položaja Sušine riječ o većoj površini koju čini blago uzvišenje udaljeno oko 700 metara od Volarskog brega, od 2013. godine na tom su lokalitetu provedena i neinvanzivna, geofizička istraživanja radi prepoznavanja različitih struktura očuvanih ispod humusa s ciljem preciznijeg odabira pozicija koje bi u budućim arheološkim iskopavanjima dale što više izvornih podataka o karakteru i izgledu nalazišta (Mušič et al. 2014a; Sekelj Ivančan, Mušič 2014). Prema dosad provedenim istraživanjima može se zaključiti kako lokalitet ima naseobinski karakter, ali je prepoznat i kao talionička radionica za taljenje željezne rude, postupak koji se na obje pozicije odvijalo u više različitih razdoblja (Sekelj Ivančan 2014b).

Istraživanja koja se prezentiraju u ovom radu, rezultat

1 Kao višeslojno arheološko nalazište Volarski breg, blago uzvišenje smješteno sjeveroistočno od Virja, prepoznato je još 80-ih godina 20. stoljeća (Marković 1982), a nova pozicija na Sušinama otkrivena je prilikom rekognosciranja 2012. godine, nakon čega su provedena i prva iskopavanja na toj poziciji.

2 Tijekom 2010. započelo se s izgradnjom farme na položaju Volarski breg te je tom prigodom zaštitna istraživanja proveo Muzej grada Koprivnice (Čimin 2011).

Virje (Fig. 1), a site in the Podravina region, with its two positions – Volarski breg and Sušine – has been known as an archaeological site for several decades. Rescue excavations have been carried out there since 2008 (Volarski breg: Sekelj Ivančan 2007; 2008; 2009; 2010; 2011a; 2011b; 2013), that is, since 2012 (Sušine: Sekelj Ivančan 2013; 2014a).[1] The several-year-long excavations by the Institute of Archaeology yielded the remains of a smelting workshop, in addition to the habitation remains from the Early and High Middle Ages and Late Antiquity, while the 2010 excavations carried out by the Koprivnica Municipal Museum revealed traces of a settlement from the Early and Late Iron Age.[2]

Since the Sušine site occupies a large surface consisting of a gentle elevation lying around 700 m from Volarski breg, since 2013 the research at the site included also non-invasive geophysical surveys aimed at recognizing different structures preserved beneath the topsoil, in order to carefully choose the positions where future archaeological excavations would yield as much new data as possible on the character and appearance of the site (Mušič et al. 2014a; Sekelj Ivančan, Mušič 2014). The excavations carried out so far allow the conclusion that this was a habitation site, which also had a workshop for smelting iron ore, which was practiced at both these positions through several different periods (Sekelj Ivančan 2014b).

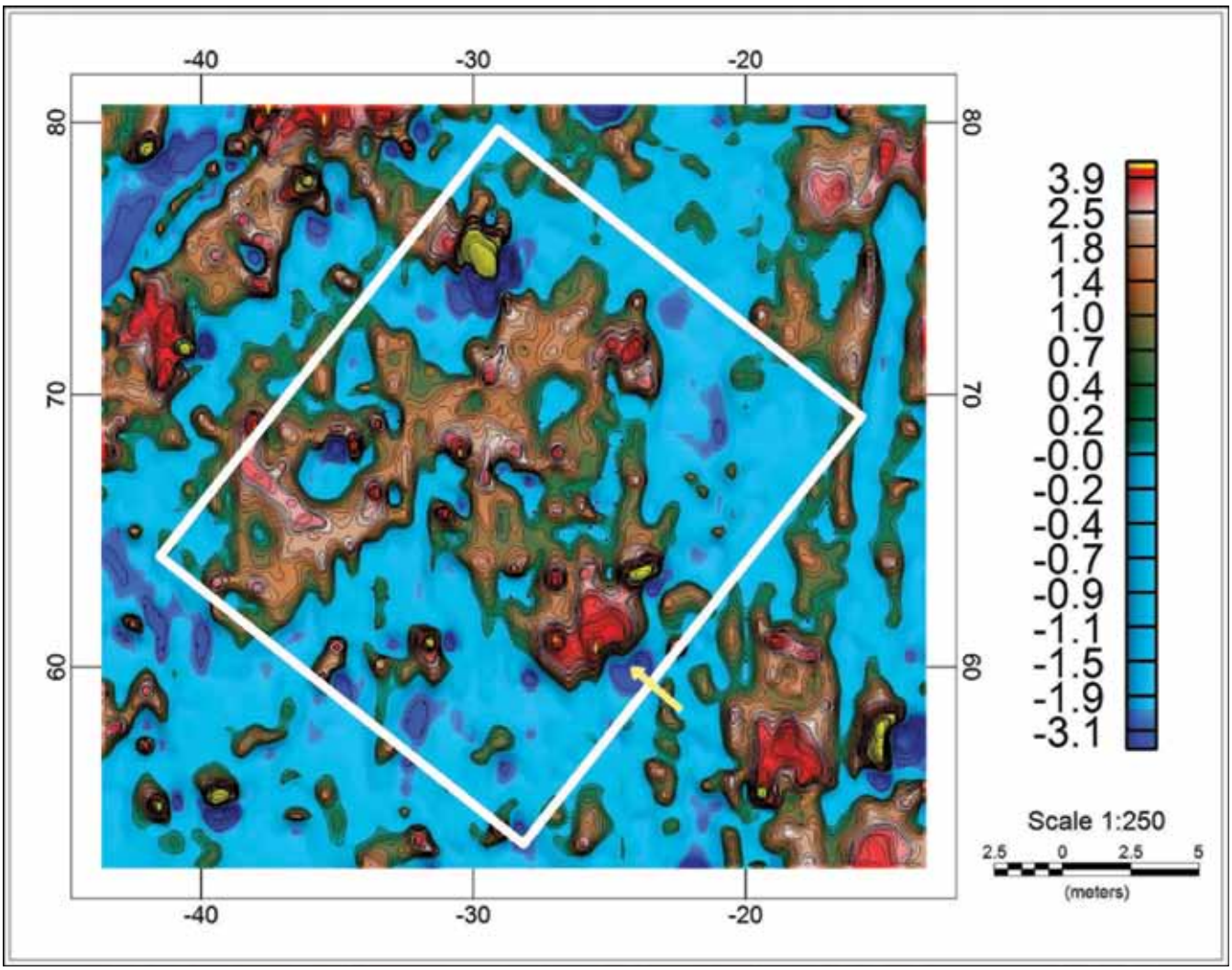
This paper presents the results of the research carried out in 2014.[3] First, colleagues from the Gearh d.o.o. company from Maribor, Republic of Slovenia, carried out a geophysical survey (Mušič et al. 2014b), which was followed in November 2014 by an archaeological excavation (Sekelj Ivančan 2015). Trench no. 10 (covering an area of 470 m^2) was excavated that year in the southernmost part of the ploughfield at Sušine, and the spot to excavate was chosen on the basis of the geophysical results, exhibiting clear anomalies at that place in the shape of a rectangular feature (Fig. 2).

The biggest archaeological context documented by non-invasive research was corroborated by archaeological excavation in trench 10. It was elongated east-west, situated in the northern part of the trench next to the northern profile. A dark grey sandy fill was observed immediately below the ploughsoil, dug into the pre-virgin soil layer in the we-

1 Volarski breg, a gentle elevation lying north-east of Virje, was recognized as a stratified archaeological site as early as the 1980s (Marković 1982), while the new site at Sušine was discovered in the 2012 survey, which was followed by the first excavation at that site.

2 In 2010 a farm started to be built at Volarski breg, whereupon the Koprivnica Municipal Museum carried out a salvage excavation (Čimin 2011).

3 Right after the completion of the 2014 archaeological excavations, the campaign was presented as a poster at the *Days of Experimental Archaeology*, organized by the Institute of Archaeology at the Archaeological Museum in Zagreb on 25th November 2014.



Sl. 2 Virje–Sušine, površina Sonde 10: rezultati magnetometrije s vidljivom anomalijom pravokutnog oblika (Izvor: Gearh d.o.o., Maribor 2014.)

Fig. 2 Virje–Sušine, surface of trench 10: magnetometric results with a visible rectangular anomaly (source: Gearh d.o.o., Maribor, 2014).

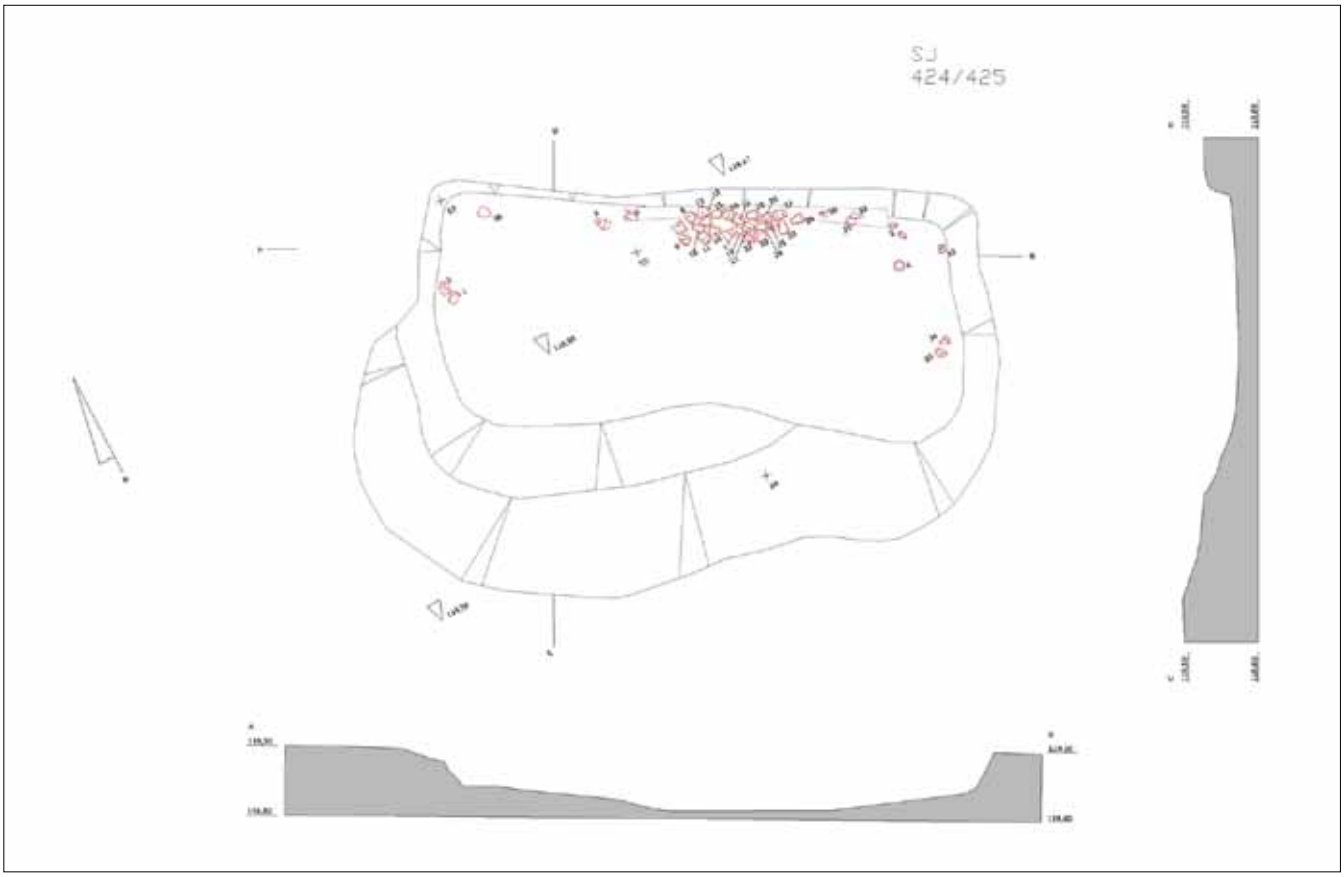
su aktivnosti provedenih tijekom 2014. godine.[3] Prvo je tijekom svibnja provedeno geofizičko istraživanje od strane kolega iz firme Gearh d. o. o. iz Maribora, Republika Slovenija (Mušič et al. 2014b), a potom je u studenome 2014. provedeno arheološko iskopavanje (Sekelj Ivančan 2015). Sonda br. 10 (ukupne površine 470 m^2) te je godine postavljena na krajnjem južnom dijelu oranice na Sušinama, a odabir mjesta iskopa uvjetovan je upravo rezultatima geofizike prema kojima su na mjestu iskopa jasno bile izražene anomalije u vidu pravokutne tvorevine (sl. 2).

Najveća arheološka cjelina evidentirana neinvanzivnim istraživanjima potvrđena je i u arheološkom iskopu S-10. Bila je izdužena smjerom istok–zapad, a nalazila se u sjevernom dijelu sonde, uz sjeverni profil. Uočena tamnosiva pjeskovita zapuna nalazila se odmah ispod oranog sloja, na zapadnom dijelu ukopana u predzdravični sloj, a na istočnom u sterilni žuti pijesak. U plitko ukopanom objektu

3 Netom završena arheološka iskopavanja u 2014. godini prezentirana su kao poster na *Danima eksperimentalne arheologije* koji su se u organizaciji Instituta za arheologiju odvijali u Arheološkom muzeju u Zagrebu dana 25. studenoga 2014.

stern part, and into sterile yellow sand in the east. A shallow rectangular structure measuring 4.00 × 6.40 × 0.78 m (Fig. 3), yielded several fragments of indeterminate iron objects and a wedge (cat. no. 53–55; Fig. 7). In addition to abundant La Tène potshards, the most important find from this feature is a series of 36 pyramidal ceramic loom weights (Fig. 3–4). When the densest cluster of weights was removed, next to the northern edge of the structure, it was observed that the walls descend vertically to the base in a regular fashion, directly below the weights a dark greyish feature in the shape of an elongated rectangle was observed. In view of these circumstances, it is conceivable that these are the remains of a wooden beam of a loom.

An indication of the period in which the sunken rectangular structure that yielded the loom weights was used is provided by the collected potshards, which belong to ordinary graphited kitchen jars (cat. no. 37–40) and bowls of fine workmanship, presumably of biconical shape, with inverted



Sl. 3 Tlocrt i presjeci objekta SJ 424/425 s keramičkim utezima *in situ* (snimio: I. Valent; crtež: K. Jelinčić Vučković)
Fig. 3 Plan and sections of structure SU 424/425 with ceramic weights in situ *(photo: I. Valent; drawing: K. Jelinčić Vučković)*

Sl. 4 *In situ* keramički utezi u objektu SJ 424/425, detalj (snimila: T. Sekelj Ivančan)
Fig. 4 Ceramic weights in situ *in structure SU 424/425, a detail (photo: T. Sekelj Ivančan)*

pravokutnog oblika tlocrta, čije su dimenzije iznosile 4,00 × 6,40 × 0,78 m (sl. 3), pronađeno je nekoliko ulomaka željeznih predmeta nedefinirane namjene i jedan klin (kat. br. 53–55; sl. 7). Uz mnoštvo prikupljenih keramičkih ulomaka iz razdoblja latena, najznačajniji nalaz u ovoj tvorevini jest niz od 36 velikih piramidalnih keramičkih utega za tkalački stan (sl. 3–4). Na mjestu gdje je bila najveća koncentracija utega, uz sjeverni rub objekta, nakon njihova uklanjanja, uočeno je kako se stijenke ukopa objekta okomito, pravilno spuštaju prema dnu. Neposredno ispod utega uočena je tvorevina intezivno sive boje relativno pravilnog izduljenog četvrtastog oblika te je s obzirom na okolnosti pronalaska moguće pomišljati na ostatke neke drvene grede tkalačkog stana.

Na vrijeme funkcioniranja pravokutno ukopanog objekta u kojem su pronađeni utezi tkalačkog stana upućuju prikupljeni keramički ulomci običnih kuhinjskih grafitiranih lonaca (kat. br. 37–40) i zdjela finije izrade, vjerojatno bikoničnog oblika, čiji su zaobljeni i/ili zadebljani rubovi izvijeni prema van. Vanjska stijenka nekih zdjela bila je glačana čime se dobivao efekt sjaja posude, ali prikupljeni su i ulomci jednostavnih zdjela (kat. br. 46–47). I dok su obični lonci ukrašeni nizom okomitih gustih žljebova, a zdjele ponekim vodoravnim žlijebom, nekoliko keramičkih ulomaka upućuje i na kompleksnije motive. Riječ je o nizovima paralelnih sitnih otiska/uboda u kombinaciji s motivom koncentričnih kružnica složenih u kompoziciji/kombinaciji po četiri (kat. br. 49–50). Ukrašavanje posuda motivima žigosanih koncentričnih kružnica osnovni je način ukrašavanja rano- i srednjolatenskih keramičkih posuda (i Tauriska i Skordiska; Dizdar 2013: 352–362), te ovi ulomci zajedno s izraženim oblicima rubova kod običnih kuhinjskih lonaca (kat. br. 37, 39) upozoravaju na vrijeme njihove izrade i uporabe na ovom lokalitetu u nekom razdoblju između druge polovine 3. i druge polovine 2. st. pr. Kr. (odnosno tijekom čitavog Lt C).[4]

Repertoar kvalitetnog, na brzovrtećem kolu izrađenog posuđa iz objekta s tkalačkim stanom smještenog na Sušinama poklapa se s dosadašnjim rezultatima i spoznajama dobivenim arheološkim istraživanjima provedenima na obližnjem položaju Volarski breg. Osim što su slični površinski nalazi bili poznati još iz rekognosciranja ovog područja provedenog krajem prošlog stoljeća, iskopavanja obavljena 2008. godine u kojima je istraženo nekoliko jama te provedena ^{14}C analiza ugljena (Sekelj Ivančan 2010: 35),[5] a naročito istraživanja provedena od strane Gradskog muzeja u Koprivnici iz 2010., dala su bliske analogije za sve oblike posuđa iz našeg objekta sa Sušina. Tom je prilikom istraženo 26 objekata od kojih su tri prepoznata kao zemunice, jedna s manjom pomoćnom peći kružnog oblika u sjevernom di-

4 Zahvaljujem kolegi dr. sc. Marku Dizdaru na preciznijem vremenskom datiranju keramičkih ulomaka u okviru preliminarne analize odabranih komada posuđa za potrebe ove objave koja u fokusu ima tkalački stan i tkanje u mlađem željeznom dobu. Na lokalitetu Sušine istraženo je više latenskih objekata čija će detaljna i cjelovita obrada i analiza tek uslijediti.

5 Analiza je provedena u Kielu u Leibniz Labor für Altersbestimmung und Isotopenforschung Christian-Albrechts-Universität, Njemačka. Detaljni podaci KIA 36426: Radiocarbon Age BP 2128±30; One Sigma Range: cal BC 201–107 (68,3%); Two Sigma Range: cal BC 349–314 (8,6%); 208–52 (86,8%).

rounded and/or thickened rims. The exterior wall on some bowls was polished, which gave the bowls a glossy surface, however, other rims belonged to simple bowls (cat. br. 46–47). While ordinary jars are decorated with a series of dense vertical grooves, and bowls featured an occasional horizontal groove, several potshards point also to more complex motifs. These consist of a series of parallel tiny impressions/stabs in combination with concentric circles arranged in a composition/combination of four circles (cat. no. 49–50). Decoration of pots with stamped concentric circles is a basic type of decorating early- and middle La Tène ceramic pots (of both the Taurisci and Scordisci; Dizdar 2013: 352–362), so these shards, in addition to prominent rim forms on simple kitchen pots (cat. no. 37, 39) suggest that they were produced and used at this site in a period between the second half of the 3rd cent. and the second half of the 2nd cent. BC (that is, during the entire Lt C).[4]

The repertory of good-quality wheel-made pottery from the structure with the loom at Sušine matches the results and the understanding obtained so far by the archaeological research carried out at the neighbouring site of Volarski breg. In addition to the fact that similar surface finds had been known from the surveys of the area carried out at the end of the last century, the 2008 excavations, which yielded several pits, and the ^{14}C analysis of charcoal (Sekelj Ivančan 2010: 35),[5] and particularly the 2010 research conducted by the Koprivnica Municipal Museum, provided close analogies for all the pottery forms from our structure at Sušine. On that occasion 26 features were revealed – three were interpreted as pit-houses, one of which had a small accessory kiln of round plan in the northern part— which are broadly dated to the period from the 2nd to the 1st cent. BC. On the one hand, this partly corresponds to the previously obtained ^{14}C dates and the potshards decorated with concentric circles and, on the other, with the chance surface find of a Celtic silver coin from this site, which can be attributed with a fair degree of certainty to the 1st century BC (Zvijerac 2010: 20, Fig. 18–19; Čimin 2011: 14–15, cat. no. 150). These data show that both sites in Virje – Volarski breg and Sušine – were occupied during several centuries of the Late Iron Age,[6] and that the collected movable finds have

4 As regards the preliminary analysis of selected potshards, I am grateful to my colleague Dr Marko Dizdar for helping me to more precisely date the ceramic shards for the requirements of this report, which otherwise focuses on the loom and weaving in the Late Iron Age. The excavation at Sušine yielded a number of La Tène structures, whose detailed and comprehensive processing and analysis are yet to follow.

5 The analysis was carried out in Kiel, at the Leibniz Labor für Altersbestimmung und Isotopenforschung Christian-Albrechts-Universität, Germany. Detailed data KIA 36426: Radiocarbon Age BP 2128±30; One Sigma Range: cal BC 201–107 (68,3%); Two Sigma Range: cal BC 349–314 (8,6%); 208–52 (86,8%).

6 Based on oral communication, the literature mentions that the excavation for the foundations of the former "Voćeprodukt" factory in the 1960s led to the discovery of a burial assemblage next to cremated bones of the dead person in a ceramic urn. The finds were collected and delivered to the Archaeological Museum in Zagreb, where they are presently kept (Zvijerac 2010: 20; Čimin 2011: 15). That building lies several hundred metres south of the Volarski breg site, so this position ought to be in-

jelu, koji su široko datirani u vrijeme od 2. do 1. st. pr. Kr. To se s jedne strane djelomično poklapa s ranije dobivenim ^{14}C datumima te nalazima keramičkih ulomaka ukrašenih motivom koncentričnih kružnica, a s druge strane sa slučajnim površinskim nalazom keltskoga srebrnog novca s ovog položaja koji se s većom sigurnošću može opredijeliti u 1. st. pr. Kr. (Zvijerac 2010: 20, sl. 18–19; Čimin 2011: 14–15, kat. br. 150). Ovi podaci pokazuju kako su oba položaja u Virju, i Volarski breg i Sušine, bili zaposjedani tijekom više stoljeća mlađega željeznog doba,[6] te da prikupljeni pokretni nalazi imaju sve karakteristike latenske kulture čija je prisutnost na području Podravine evidentirana i u prijašnjim arheološkim istraživanjima (Marković 1984: 298–300, s ovdje citiranom literaturom; Dizdar 2013).

Bliske analogije linijski poslaganim glinenim utezima kakvi su pronađeni u Virju, a koji se tumače kao ostaci tkalačkog stana,[7] poznate su još od vremena kasnog neolitika s nalazišta Krems u Donjoj Austriji (Grömer 2010a: 115, sl. 51), preko kasnobrončanodobnog nalaza u naselju Gars-Thunau (Grömer 2010a: 136, sl. 66) pa do velikoga tkalačkog stana širine 4 m namijenjenog istodobnom tkanju dviju osoba iz halštatskog razdoblja pronađenog u mjestu Hafnerbach također u Donjoj Austriji (Grömer 2010a: 255, sl. 127). Objekti unutar kojih su pronađene koncentracije utega čiji položaj upućuje da su u istom prostoru mogla postojati dva ili više tkalačkih stanova datiraju u halštatsko (Nové Košariská u Slovačkoj; Čambal, Gregor 2005: 36–39, 42–43; Belanova et al. 2007: 419–434; Grömer 2010a: 122, sl. 56), latensko (Mitterretzbach u Donjoj Austriji; Trebsche 2014: 182–185) te ranorimsko doba (Slepotice u Češkoj; Jílek 2014: 288–289, sl. 20). Baveći se tekstilom kroz povijest, istraživači uočavaju razlike u oblikovanju utega od cilindričnih do piramidalnih,[8] te prema poznatim i objavljenim primjerima stanova iz Do-

Sl. 5 Uteg kat. br. 7 (PN 193), druga strana (snimila: T. Karavidović)

Fig. 5 Weight cat. no. 7 (PN 193), another side (photo: T. Karavidović)

all the features of the La Tène culture, whose presence in the Podravina region was documented also by the previous archaeological research (Marković 1984: 298–300, with here quoted bibliography; Dizdar 2013).

Close analogies for the sequence of clay weights such as those found in Virje, which are interpreted as the remains of a loom,[7] are known from as early as the Late Neolithic from Krems in Lower Austria (Grömer 2010a: 115, Abb. 51), through a Late Bronze Age find from the Gars-Thunau settlement (Grömer 2010a: 136, Abb. 66), up to a big, 4-metre wide loom from the Hallstatt period, designed for simultaneous weaving of two persons, from Hafnerbach, also in Lower Austria (Grömer 2010a: 255, Abb. 127). Structures that yielded clusters of weights whose position suggests that the same space may have accommodated two or more looms,

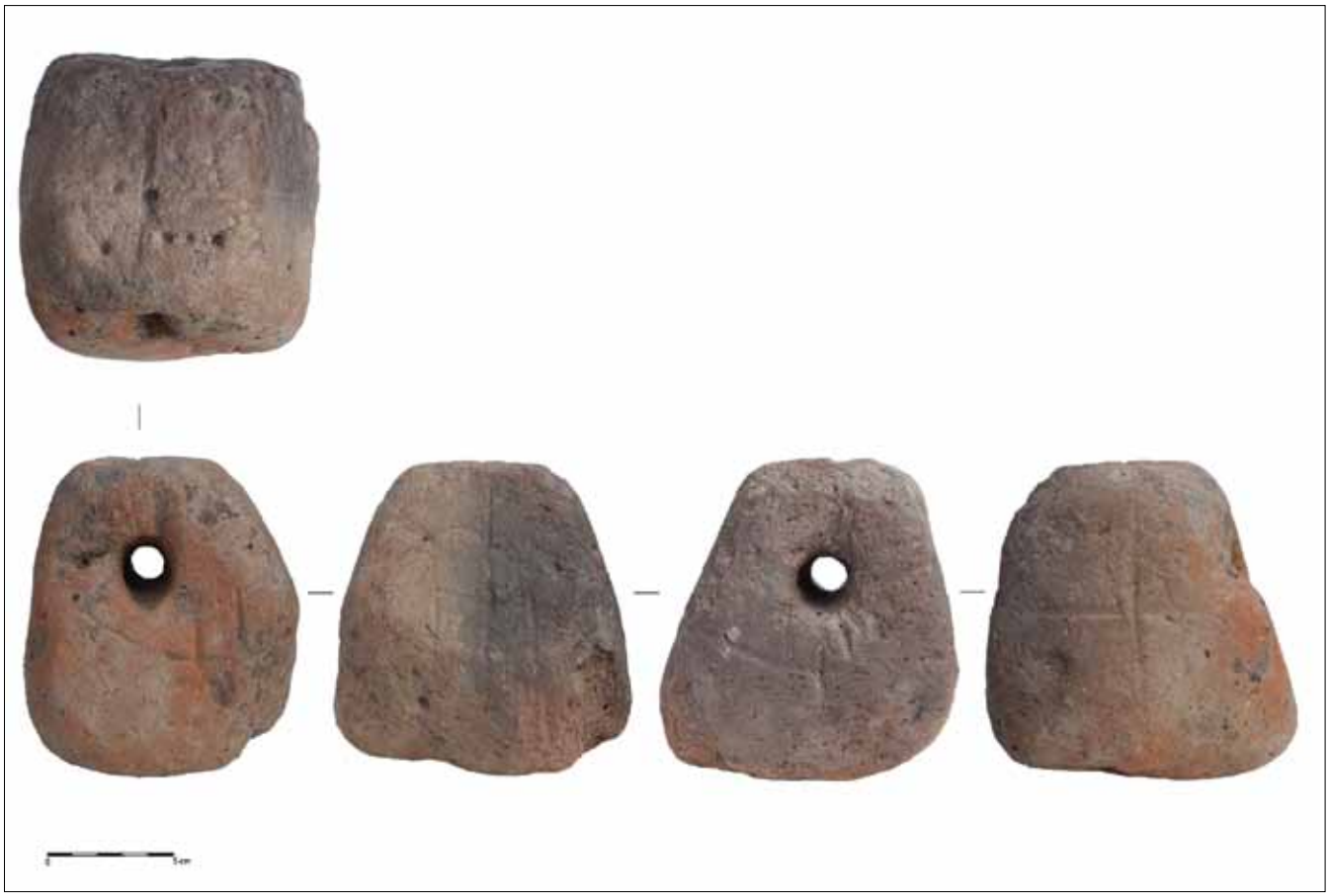
6 Prema preuzetim usmenim podacima, u literaturi se navodi da je 60-ih godina 20. stoljeća pri iskopu temelja nekadašnje tvornice „Voćeprodukt" pronađen inventar grobnog ukopa pored spaljenih kostiju pokojnika u keramičkoj urni, a nalazi su predani i čuvaju se u Arheološkom muzeju u Zagrebu (Zvijerac 2010: 20; Čimin 2011: 15). Ta se zgrada nalazi nekoliko stotina metara južno od položaja Volarski breg i svakako bi ovaj položaj valjalo dodatno u budućnosti provjeriti na terenu kako bi se eventualno ubiciralo groblje onog stanovništva koje je živjelo na uzvišenjima Volarski breg i Sušine.

7 *In situ* nalazi keramičkih utega, pronađeni u (nekom) objektu, koji su interpretirani kao ostaci tkalačkog stana na području Hrvatske rijedak su nalaz. Ovom prilikom valja spomenuti nekoliko njih datiranih u starija razdoblja. To su: skupina utega iz zemunice 10 u Zadubravlju kao i devet utega u zemunici 153 te pet u zemunici 155 iz Galova interpretirani kao ostaci vertikalnoga tkalačkog stana (Minichreiter 2007: 152–153), zatim niz od pet pršljena interpretiranih kao ostatak tkalačkog stana pronađenih na podnici uz rub stambenog objekta koji pripada vučedolskoj kulturi na lokalitetu Vučedol–Vinograd Streim (Durman, Hutinec 2010: 99), kao i nalaz s arheološkog lokaliteta Pogledalo, dijelu naselja uz svetište i groblje Turska kosa, gdje je istražena jedna veća nadzemna kuća s nizom glinenih utega tkalačkog stana iz starijega željeznog doba. Potonji utezi su oblika krnje piramide, a bili su poredani jedan do drugoga u dužini od oko 3 m. Uz njih se pružao jarak dubine oko 80 cm koji je, prema istraživaču L. Čučkoviću, služio da se tkanina na vertikalnom stanu može produžiti (Čučković 2004: 190–194; 2009: 23–24, sl. 17).

8 Utezi piramidalnog oblika javljaju se od brončanog doba, osobito su zastupljeni tijekom halštatskog i latenskog doba (Meduna 1980: 129–130; Ramsl 1998: T. 77, 80: 621–634; T. 122; 1304–1305; Jílek et al. 2015: 318), a poznati su i rimskodobni primjerci (Jilek et al. 2014: 282–285, sl. 13–16; 2015: 67–85; Štolcová, Kolnik 2010: 467–482; Gostenčik 2010: 78, sl. 14.10).

spected in order to see whether this was the site of a cemetery of the population that inhabited the elevations Volarski breg and Sušine.

7 Ceramic weights found *in situ* in structures and interpreted as loom remains are rare in Croatia. Here we ought to mention several finds dated to earlier periods. These are: a group of weights from pit-house 10 at Zadubravlje, as well as nine weights in pit-house 153 and five in pit-house 155 at Galovo, interpreted as the remains of a vertical loom (Minichreiter 2007: 152–153); a series of five spindle-whorls interpreted as the remains of a loom, found on the floor next to the edge of a dwelling belonging to the Vučedol culture at the site Vučedol–Vineyard Streim (Durman, Hutinec 2010: 99), as well as a find from the archaeological site Pogledalo, a part of the settlement next to the sanctuary and cemetery Turska kosa, where an above-ground house was excavated, with a series of clay weights from a loom dated to the Early Iron Age. The latter weights have the shape of a truncated pyramid, and lay arranged next to each other in the length of 3 m. Next to the weights stretched a ditch around 80 cm deep, whose function—in the opinion of the excavation manager, L. Čučković—was to allow the textile on the loom to be extended (Čučković 2004: 190–194; 2009: 23–24, Fig. 17).



Sl. 6 Uteg kat. br. 8 (PN 194) (snimila: T. Karavidović)
Fig. 6 Weight cat. no. 8 (PN 194) (photo: T. Karavidović)

Sl. 7 PN 183 – ulomci željeznog predmeta iz objekta (snimio: M. Golubić)
Fig. 7 PN 183 – fragments of an iron object from the structure (photo: M. Golubić)

nje Austrije i Slovačke zaključuju kako njihovo oblikovanje utječe na izgled i veličinu tkalačkog stana kao i svojstva tkanine koja se mogla proizvesti, s jedne strane onih u kasnom neolitiku, a s druge onih iz željeznog doba (Grömer 2010a: 118, sl. 54; Belanová Štolcová, Grömer 2010: 17, sl. 3.10, 3.11).

Na osnovi primjera poznatih iz literature te analiza i zaključaka koji se iznose, upravo su novopronađeni glineni utezi iz Virja u fokusu ovog izlaganja. Svi su izrađeni od glinene mase s primjesama zrnaca tinjca, a razlike u njihovu oblikovanju i težini te njihov položaj unutar istražene cjeline kao i tragovi uporabe na pojedinima od njih, pružili su izvor podataka za sagledavanje mogućeg izgleda pronađenoga tkalačkog stana kao i izgleda tkanine za čiju su proizvodnju služili.

A. KERAMIČKI UTEZI

Kako su keramički utezi pokazivali razlike u osnovnom oblikovanju, dimenzijama ali, što je možda i važnije, u svojoj težini i širini (Katalog, sl. 8), svi cjelovito ili djelomično očuvani utezi koji su pružili dovoljno elemenata za razvrstavanje, podijeljeni su u tri osnovne skupine (Tip I–III) (sl. 9).[9] Pojedini utezi nisu bili u cijelosti očuvani te je ukupna težina tih utega procijenjena na osnovi volumena sačuvanih dijelova, a sve u cilju dobivanja što više informacija o karakteru proizvodnje tekstila na temelju ovog *in situ* nalaza tkalačkog stana iz vremena latena.

Tip I

Prvi tip utega pokazivao je oblik krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom u gornjoj, užoj polovici. Tipični predstavnik ovog tipa jest uteg kat. br. **18**, a u ovu se skupinu može opredijeliti još 11 utega (kat. br. 1, 6, 8, 11–12, 14, 16–17, 20, 24, 33), ukupno 12 komada. Utezi ove skupine bili su visine od 10,1 do 13 cm, širine od 8,5 do 10,7 cm. Na osnovi ovdje opredijeljenih cjelovito očuvanih utega vidljivo je kako se njihova težina kreće u rasponu od 1004,1 do 1324,4 g.[10]

Tip II

Drugi tip također je oblika krnje četverostrane piramide, približno jednakih stranica, ali jače naglašenih uglova s kružnom perforacijom u gornjoj, užoj polovici. Tipični predstavnik ovog tipa jest uteg kat. br. **28**, a ovdje se može uvrstiti još 9 utega (kat. br. 3–4, 7, 19, 25–27, 29, 31), ukupno 10 komada. Utezi ove skupine bili su najbolje očuvani, a njihova visina varirala je od 11,3 do 14,2 cm, širina od 8,6 do 10,4

9 Pri razvrstavanju triju skupina utega iz Virja u daljnjem se tekstu koristi termin *tip* pri čemu se izraz odnosi na međusobno različito oblikovane nalaze utega unutar promatrane arheološke cjeline i za potrebe ovog rada, a radi lakšeg praćenja zamijećenih razlikovnih elemenata.

10 Većina cjelovitih utega tipa I teži između 1004,1 i 1186,3 g (kat. br. 1, 6, 11, 14, 16, 24). Slične ukupne težine je i djelomično očuvan uteg kat. br. 17 koji prema procjeni teži oko 1000 g. Izuzetak čini cjeloviti uteg kat. br. 12 koji teži 1324,4 g te djelomično očuvani utezi kat. br. 20 i kat. br. 8 koji prema procjeni teže oko 1450 g. Utezi kat. br. 12 i 20 oblikom, dimenzijama i težinom odstupaju od ostalih utega tipa I (robusniji su, veći i teži).

date from the Hallstatt period (Nové Košariská in Slovakia; Čambal, Gregor 2005: 36–39, 42–43; Belanova et al. 2007: 419–434; Grömer 2010a: 122, Abb. 56), La Tène (Mitterretzbach in Lower Austria; Trebsche 2014: 182–185) and Early Roman period (Slepotice in Bohemia; Jílek 2014: 288–289, Fig. 20). By studying textile through history, researchers have observed differences in the shapes of weights from cylindrical to pyramidal,[8] concluding, based on the known and published looms from Lower Austria and Slovakia, that their shape influences the appearance and dimensions of the looms and cloth that could have been produced, on one side those in the Late Neolithic, and on the other, those from the Iron Age (Grömer 2010a: 118, Abb. 54; Belanová Štolcová, Grömer 2010: 17, Fig. 3.10, 3.11).

Based on the examples from the literature and the analyses and conclusions that have been put forward, it is precisely the newly discovered clay weights from Virje that are in the focus of this paper. All are made of a clay mass with inclusions of mica grains. Differences in their shape and weight, their position within the excavated context, as well as the usewear traces on some of them, provided a source of information for considering a possible appearance of the discovered loom, as well as of the fabric for whose production they served.

A. CERAMIC WEIGHTS

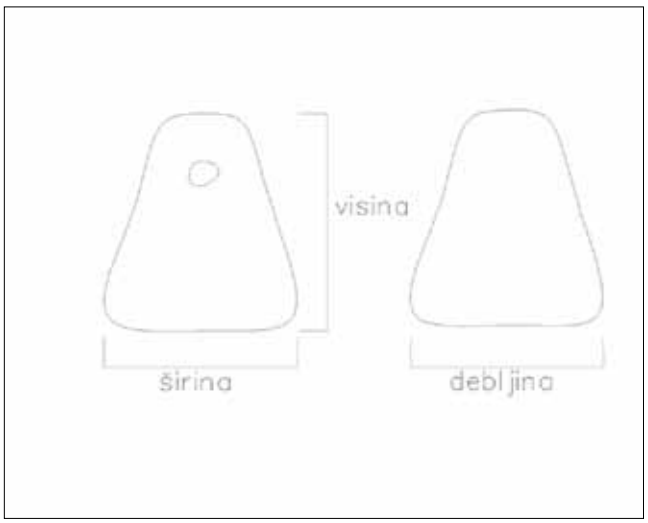
Since the ceramic weights differ in their basic shape, dimensions, as well as—perhaps even more importantly—in their weight and width (Catalogue, Fig. 8), all complete or partially preserved weights with sufficient distinctive elements, were divided into three basic groups (Type I–III) (Fig. 9).[9] Several weights were not fully preserved and their total mass was calculated on the basis of the volume of their preserved parts, in order to obtain as much information on the character of textile production based on this *in situ* find of a loom from the La Tène period.

Type I

Weights of type I have the shape of a truncated foursided pyramid of approximately equal sides and slightly rounded corners, with a circular perforation in the upper, narrower half. Weight cat. no. **18** is a typical representative of this type, to which we may attribute further 11 weights (cat. no. 1, 6, 8, 11–12, 14, 16–17, 20, 24, 33), or 12 in total. Weights of this type were between 10.1 and 13 cm high by 8.5 to 10.7 cm wide. Based on the complete weights attributed to this group it is clear that their weight ranges between

8 Pyramidal weights, which had been known since the Bronze Age, became particularly common during the Hallstatt and La Tène periods (Meduna 1980: 129–130; Ramsl 1998: T. 77, 80: 621–634; T. 122; 1304–1305; Jílek et al. 2015: 318), but also Roman-period specimens are known (Jilek et al. 2014: 282–285, Fig. 13–16; 2015: 67–85; Štolcová, Kolnik 2010: 467–482; Gostenčik 2010: 78, Fig. 14.10).

9 In the rest of the text, in our distinction of the three groups of weights from Virje we use the term *type*, in which the term refers to different shapes of weights in the observed archaeological context and for the requirements of this paper, to facilitate the following of the observed distinctive elements.



Sl. 8 Grafički prikaz značenja pojmova pri određivanju dimenzija utega (izradila: T. Karavidović)

Fig. 8 Depiction of the meaning of terms for determining the dimensions of the weights (made by: T. Karavidović)

cm. Raspon težine cjelovito očuvanih utega ove skupine je od 1044,5 do 1456,2 g.[11]

Tip III

Treći tip jajolika je oblika, približno jednakih stranica i jače zaobljenih uglova s kružnom perforacijom u gornjoj, užoj polovici. Tipični predstavnik ovog tipa jest uteg kat. br. **23**, a ovdje se može uvrstiti još 6 utega (kat. br. 2, 10, 13, 15, 21–22), ukupno 7 komada. Iz ove skupine utega ne postoji niti jedan cjelovito očuvani primjerak.[12] Prema procjeni, tipični predstavnik tipa III, uteg kat. br. 23 kao i utezi kat. br. 15 i 22 teže između 950 i 1000 g. Visina utega ove skupine varira između 11,8 i 13,6 cm, a širina od 6,9 do 9,5 cm.

Težina pojedinog utega igra značajnu ulogu u procesu tkanja, stoga valja naglasiti kako tipični predstavnici utega tipa I teže između 1004,1 i 1186,3 g, utega tipa II između 1044,5 i 1138,2 g, dok su tipični predstavnici tipa III nešto lakši te prema procjeni teže između 950 i 1000 g.[13] Utezi kat. br. 25 (tip II) i 8 (tip I) oblikom potpuno odgovaraju karakteristikama pripadajućih tipova, no razlikuju se težinom i širinom. Uteg kat. br. 25 teži 1456,2 g, a uteg kat. br. 8 prema procjeni teži oko 1450 g. Ta dva utega nose jedinstvenu

11 Uteg kat. br. 25 iznimno teži 1456, 2 g, dok ostali cjeloviti utezi tipa II teže između 1044,5 i 1138,2 g. Taj uteg, jedini unutar tipa II, na gornjoj plohi nosi urezanu oznaku u vidu znaka X. Djelomično očuvani utezi ovoga tipa (kat. br. 3, 19, 27, 29, 31) prema procjeni teže između 1000 i 1200 g.

12 Nekoliko djelomično očuvanih utega oblikom, dimenzijama i težinom (robusniji su, veći i teži) odstupa od tipičnih značajki tipa III. Ti utezi su: uteg kat. br. 21 koji prema procjeni teži između 1150 i 1200 g, utezi kat. br. 2 i 10 koji teže između 1250 i 1300 g te uteg kat. br. 13 koji teži između 1400 i 1450 g.

13 Nekoliko glinenih utega nije bilo moguće sa sigurnošću opredijeliti u predstavljene tipove jer njihove značajke variraju između tipa I i III. Na osnovi izraženijih obilježja uvršteni su u tip I (kat. br. 12 i 20) te tip III (kat. br. 2, 13, 21, 10) iako od njih odstupaju oblikom, dimenzijama i težinom (robusniji su, veći i teži). Ti utezi teže između 1150 i 1450 g.

1004.1 and 1324.4 g.[10]

Type II

Type II is likewise shaped as a truncated four-sided pyramid of roughly equal sides but with more pronounced corners, with a circular perforation in the upper, narrower half. A typical representative of this type is weight cat. no. **28**. Further 9 weights (cat. no. 3–4, 7, 19, 25–27, 29, 31), a total of 10 specimens, can be attributed to this type. Weights of this group were the best preserved, and their height varied from 11.3 to 14.2 cm and width from 8.6 to 10.4 cm. The mass of the completely preserved weights ranged between 1044.5 and 1456.2 g.[11]

Type III

The third type has an oval shape, with approximately equal sides and more prominently rounded corners, with a circular perforation in the upper, narrower half. As a typical representative we can single out weight cat. no. **23**, and to this type we can attribute 6 other weights (cat. no. 2, 10, 13, 15, 21–22), a total of 7 specimens. This group does not contain a single completely preserved weight.[12] In our assessment, a typical representative of type III, specimen cat. no. 23, like the specimens cat. no. 15 and 22, weigh between 950 and 1000 g. The height of the weights in this group varies between 11.8 and 13.6 cm, while the width ranges from 6.9 to 9.5 cm.

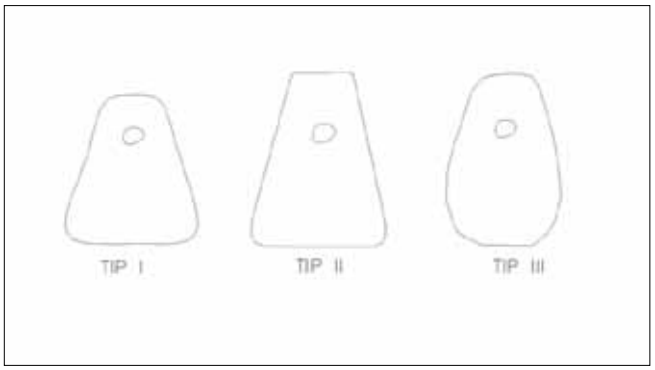
The mass of the weights plays a significant role in the weaving process, and it is therefore important to stress that typical representatives of type I weigh between 1004.1 and 1186.3 g; in type II between 1044.5 and 1138.2 g, while typical representatives of type III are slightly lighter, since their mass is assessed at between 950 and 1000 g.[13] Weights cat. no. 25 (type II) and 8 (type I) have the shape entirely in line with the features of the corresponding types, however, they differ in mass and width. Weight cat. no. 25 has the mass

10 Most complete weights of type I have the mass between 1004.1 and 1186.3 g (cat. no. 1, 6, 11, 14, 16, 24). The total mass of the partially preserved weight cat. no. 17 is similar, assessed at around 1000 g. One exception is the completely preserved weight cat. no. 12, with 1324.4 g, and partially preserved weights cat. no. 20 and cat. no. 8, whose weight is estimated at around 1450 g. Weights cat. no. 12 and 20 differ in shape, dimensions and mass from the remaining weights of type I (they are more robust, bigger and heavier).

11 Weight cat. no. 25, exceptionally, has the mass of 1456.2 g, while the other complete weights of type II weigh between 1044.5 and 1138.2 g. This weight, as the only one in type II, has an incised X-shaped symbol on the upper surface. The mass of the partially preserved weights of this type (cat. no. 3, 19, 27, 29, 31) is assessed at between 1000 and 1200 g.

12 Several partially preserved weights, by their shape, dimensions and mass (they are more robust, bigger and heavier) deviate from the typical features of type III. These are: weight cat. no. 21, whose mass is assessed at between 1150 and 1200 g, weights cat. no. 2 and 10, which weigh between 1250 and 1300 g, and weight cat. no. 13, weighing between 1400 and 1450 g.

13 Several clay weights were impossible to confidently attribute to any presented type, since their features vary between types I and III. Based on their more pronounced features they were attributed to type I (cat. no. 12 and 20) or type III (cat. no. 2, 13, 21, 10) even if they deviate from these types by shape, dimensions and mass (they are more robust, bigger and heavier). These specimens weigh between 1150 and 1450 g.



Sl. 9 Grafički prikaz predloženih tipova (Tip I–III) (izradila: T. Karavidović)
Fig. 9 Depiction of the proposed weight types (Type I–III) (made by: T. Karavidović)

oznaku na gornjoj plohi koja bi mogla upućivati na razliku u težini.[14] Svi su utezi, na kojima je to bilo moguće zaključiti, imali u gornjoj, užoj polovici perforaciju čiji se promjer kretao od 1,1 cm do 2,2 cm, kako kod kojeg primjerka, različito čak i na obje strane pojedinog utega.

Neki primjerci utega (iz prve i druge skupine) imali su jače ili slabije očuvani udubljeni znak na gornjoj plohi, većinom u obliku križa (+) (kat. br. 7–8, 16, 18, 24, 33); kod dva utega znak križa blago je ukošen (kat. br. 4, 6). Na jednom je primjerku prisutan i jače urezani znak iksa (X) (kat. br. 25). Valja izdvojiti uteg kat. br. 8 na kojem je znak križa okružen utisnutim krugovima. Taj uteg ima jedinstvene plitko urezane oznake i na bočnim stranama (sl. 6).

Donja ploha utega kod nekih je pokazivala blago utisnute, jedva vidljive dvije linije koje se sijeku u obliku znaka X (kat. br. 3) ili se dvije udubljene linije pružaju paralelno (kat. br. 27) odnosno pod blagim kutom (kat. br. 28), dok se kod jednog primjerka blago udubljena linija pružala duž čitavog dna utega (kat. br. 18). Ova se pojava pojavljuje većinom kod utega iz druge skupine (3 primjerka), odnosno iz prve (1 primjerak), čije je dno u većini slučajeva kvadratična oblika i vjerojatno je tek slučajna pojava nastala pri izradi samih utega za tkalački stan.

Najznačajniji tragovi koji su uočeni gotovo na svim utezima, neovisno o tipu, okomite su ili blago ukošene jedna ili dvije udubljene linije, uočene iznad perforacije na jednoj (kat. br. 6, 9, 12, 14–15, 17, 20, 24, 26, 33) ili obje stranice utega kroz koje prolazi perforacija (kat. br. 1, 7–8). Osim njih vidljive su i vodoravne linije koje se protežu oko sredine utega ili u visini perforacije, a uočavaju se, osim na stranicama gdje se nalazi perforacija, i na bočnim stranicama utega (kat. br. 3, 6, 7, 15, 17, 22–23, 27–28). Ponekad ih pod pravim kutom sijeku na njih položene okomite linije (kat. br. 1, 16). Te se linije tumače kao tragovi niti na osnovi kojih je učinjen pokušaj rekonstrukcije načina vezivanja utega.

14 Nekoliko utega zbog iznimno loše očuvanosti nije bilo moguće opredijeliti niti u jedan od predloženih tipova (kat. br. 5, 9, 30, 32, 34–36).

of 1456.2 g, while the mass of weight cat. no 8 is assessed at around 1450 g. These two weights bear a unique mark on the upper surface, which might indicate a difference in the mass.[14] In all the cases in which this observation could be made, all the weights had a perforation in the upper, narrower half, whose diameter ranged between 1.1 and 2.2 cm, depending on the weight, which sometimes differed even on the opposite sides of the same weight.

Several weights (from the first and second groups) had a more or less well preserved depressed mark on the upper surface, mostly in the shape of a cross (+) (cat. no. 7–8, 16, 18, 24, 33); on two weights this mark is slightly slanted (cat. no. 4, 6). One specimen features also a more pronouncedly incised symbol X (cat. no. 25). We ought to single out weight cat. no. 8, which features a cross symbol surrounded by impressed circles. This weight has unique shallow incised marks on the lateral sides, too (Fig. 6).

The bottom surface of some weights features two slightly impressed, barely visible lines intersecting in the shape of an X (cat. no. 3), or two depressed lines extend in parallel (cat. no. 27) or at a slight angle (cat. no. 28), while on one weight a slightly impressed line stretches the length of the bottom (cat. no. 18). This phenomenon appears mostly on weights of the second group (3 specimens) or the first group (1 specimen), whose base is in most cases square, and this is probably simply a chance occurrence created during the making of the loom weights.

The most distinctive marks observed on almost all the weights, regardless of the type, are vertical or slightly slanted single or double impressed lines, which appear above the perforation on one (cat. no. 6, 9, 12, 14–15, 17, 20, 24, 26, 33) or both sides of the weight through which the perforation runs (cat. no. 1, 7–8). Besides these, there are also horizontal lines extending around the middle of the weight or at level with the perforation, which can be seen—besides on the sides with the perforation—also on the lateral sides of the weights (cat. no. 3, 6, 7, 15, 17, 22–23, 27–28). At times, they are intersected by perpendicular lines (cat. no. 1, 16). These lines are interpreted as traces of threads, which served as the basis for the attempt to reconstruct the way the weights were tied.

B. A POSSIBLE RECONSTRUCTION OF THE LOOM

Weights on an optimally setup loom are attached at the same level, one adjacent to the other.[15] Systematic experiments with weights of various sizes and masses have shown that the basic functional parameters in the study of weights

14 Due to their exceptionally poor state of preservation, several weights were impossible to attribute to any of the proposed types (cat. no. 5, 9, 30, 32, 34–36).

15 If the weights are positioned at different levels, this may cause the upper weights, when moved, to damage the warp threads; also, threads may entangle together. In that case, the moving of the weights may cause irregular motion of the threads, which has adverse effects on their order, in other words, weaving may become irregular.

B. PRIJEDLOG REKONSTRUKCIJE POSTAVA TKALAČKOG STANA

Kod optimalno postavljenoga tkalačkog stana utezi se vezuju na jednakoj visini, neposredno jedan do drugoga.[15] Sustavno provedeni eksperimenti s utezima različitih dimenzija i težina pokazali su da su osnovni funkcionalni parametri pri promatranju utega njihova širina i težina (Mårtensson et al. 2009: 373–398). Različiti tipovi niti osnove (vertikalno postavljene niti), ovisno o debljini, načinu i razini pripreme sirovine, kvaliteti i drugim parametrima, zahtijevaju određeni stupanj napetosti kako bi tkanje bilo pravilno izvedeno.[16] Uz to, distribucija napetosti niti osnove treba biti ravnomjerna. Nepravilna distribucija i razina napetosti pojedinih niti uvjetuje nepravilnosti u tkanju, stoga finalni proizvod, tkanina, neće biti jednolično izvedena, tj. homogena. Uteg određene težine može napinjati određeni broj niti koje zahtijevaju specifičnu razinu napetosti. Prema rezultatima provedenih eksperimenata, moguće je izračunati koliki broj niti određeni uteg može napinjati.[17]

Eksperimenti su također pokazali da težina i širina utega uvjetuje izradu specifičnog tipa tkanine te da je na osnovi debljine niti moguće pretpostaviti gustoću tkanja i time dobiti uvid u mogući izgled tkanine (Andersson Strand 2010: 211). Široki i teški utezi, poput ovdje proučavanih, bili bi najpogodniji za izradu grublje tkanine s debljim nitima. Deblje niti uobičajeno potražuju veću napetost što rezultira manjim brojem niti osnove po centimetru. Prevelik broj niti po utegu otežava osnivanje, ostavlja prostor pogrešci, a postoji velika mogućnost da niti neće biti ravnomjerno raspoređene što negativno utječe na krajnji izgled tkanine. Tako su za tanje niti koje potražuju manju razinu napetosti pogodniji lakši utezi, a ovisno o debljini niti varira i izgled tkanine (gusto ili rijetko tkanje). Stoga je odabir utega, u kombinaciji s nitima koje nose i napinju, izrazito bitan za laku i optimalnu izvedbu tkanja. Zaključno se može konstatirati da su mogućnosti spajanja morfološki različitih utega u jedinstven postav tkalačkog stana ograničene.

U tom se kontekstu nameće pitanje mogućnosti međusobnog funkcioniranja utega pronađenih u latenskom objektu istraženom na nalazištu Sušine u jedinstvenom postavu tkalačkog stana i izgleda proizvedene tkanine. Prije no što se upustimo u rekonstrukciju postava tkalačkog stana potrebno je odrediti/procijeniti optimalan broj niti za pojedine primjerke utega te sagledati mogućnosti uparivanja utega s obzirom na njihove glavne funkcionalne parametre.

15 Ako su utezi postavljeni na različite visine, postoji mogućnost da gornji utezi pri pomicanju oštete niti osnove, a može doći i do međusobnog uplitanja niti. Pomicanje utega u tom slučaju može prouzročiti nepravilno kretanje niti što negativno utječe na njihov raspored odnosno može doći do nepravilnosti u tkanju.

16 Pravilno napete niti trebaju izgubiti svoju prirodnu elastičnost, odnosno biti dovoljno napete da se ne pomiču nepravilno pri tkanju, no ne prenapete kako ne bi došlo do njihova pucanja.

17 Primjerice, na uteg težine 1000 g moguće je objesiti 20 niti koje zahtijevaju napetost od 50 g po niti ili pak 100 niti koje zahtijevaju napetost od 10 g. Ako uzmemo u obzir širinu utega, moguće je izračunati broj niti osnove po centimetru. Ukupan broj niti osnove, koje vise na dva utega u paru, potrebno je podijeliti sa širinom utega (pretpostavljeno je da su oba utega jednake širine i težine odnosno da pravilno i jednolično napinju niti).

are width and mass (Mårtensson et al. 2009: 373–398). Different types of the warp (the vertical thread), depending on the thickness, method and level of preparation of the raw material, quality and other parameters, require a certain level of tension in order for the weaving to be properly done.[16] Besides, the tension of the warp threads has to be evenly distributed. Uneven distribution and level of tension of individual threads may cause irregularities in the weaving process, due to which the final product—textile—will not be uniformly done, i.e. homogeneous. A weight of a certain mass may keep a certain number of threads taut, depending on the required degree of tension. Based on the experimental results, it is possible to calculate how many threads a specific weight can keep taut.[17]

Experiments have also shown that the mass and width of the weight conditions the making of a specific type of fabric, and that based on the thickness of the thread one may also presume the weaving density, thus gaining insight into the possible appearance of the textile (Andersson Strand 2010: 211). Wide and heavy weights, like the ones studied here, are most suitable for making coarser fabrics with thicker threads. Thicker threads usually require greater tension, resulting in fewer warp threads per centimetre. Too many threads per weight may render warping more difficult, leaving room for mistakes, plus, it is also very likely that threads would be unevenly distributed, which may have adverse effects on the final appearance of the fabric. For thinner threads, which require a lesser degree of strain, lighter weights are more suitable. The appearance of the fabric varies depending on the thread thickness (dense or thinly woven). Due to this, the choice of the weights, in combination with the threads they are attached to and which they strain, is exceptionally important for a smooth and optimal weaving. To conclude, we may state that options are limited when it comes to combining weights of different morphology into a single loom setup.

In this context, the question is raised regarding the possible joint functioning of the assemblage of weights discovered in the La Tène structure excavated at Sušine as part of a single loom setup, as well as of the appearance of the produced fabric. Before embarking on a reconstruction of the loom setup we ought to determine/assess the optimal number of threads for individual weights and to consider the possibility of pairing weights in line with their key functional parameters.

1. Optimal choice of threads

In keeping with the guidelines deduced based on the mentioned systematic experiments, for the Virje loom we

16 Properly taut threads ought to lose their natural elasticity, that is, they have to be pulled sufficiently taut not to move irregularly during weaving, but not too taut, lest they should snap.

17 For instance, on a weight with a mass of 1000 g it is possible to attach 20 threads requiring the tension of 50 g per thread, or 100 threads requiring the tension of 10 g. If we consider the width of the weight, we can calculate the number of warp threads per centimetre. The total number of warp threads, suspended on two weights in a pair, has to be divided with the width of the weight (presumably both weights have the same width and mass, that is, they probably pull the threads in a regular and uniform fashion).

1. Optimalan odabir niti

U skladu s naputcima izvedenim na osnovi spomenutih sustavnih eksperimenata, za virovski tkalački stan izračunate su varijable mogućih postava s nitima koje zahtijevaju različitu razinu napetosti te je ocijenjeno koje su najvjerojatnije opcije pri odabiru niti za pojedine primjerke utega. Preklapanjem rezultata specifičnih vrijednosti za pojedine utege moguće je utvrditi jesu li ovi utezi mogli stajati u istom postavu, kakve su niti optimalan odabir i zatim postaviti osnovne parametre za izvedbu eksperimenta odnosno odabrati niti koje će se koristiti pri postavljanju osnove. Izračun je izveden na utezima tipičnih značajki unutar definiranih tipova te za utege koji odstupaju od prosječnih vrijednosti unutar pojedinog tipa kako bi se dobio maksimalni raspon mogućih vrijednosti odnosno međusobnog preklapanja/odstupanja: uteg tipičnih vrijednosti tipa I (kat. br. 18), utezi tipičnih vrijednosti tipa II (kat. br. 28 i 7), tipa III (kat. br. 22 i 23), te utezi kat. br. 12 i 25. Dobivene vrijednosti izražene su u tablicama (tab. 1–7).[18]

Iz rezultata prikazanih u tablicama vidljivo je da razmatrana skupina utega može stajati u istom postavu tkalačkog stana. Štoviše, postoji više mogućnosti postavljanja s nitima koje zahtijevaju različitu razinu napetosti, te je moguće pretpostaviti korištenje niti različite debljine, odnosno izradu različitih tipova tkanine. Vrijednosti se za moguće napetosti niti osnove kreću između 30 i 80 g, iako je optimalan odabir za sve utege nit osnove koja zahtijeva napetost 40 ili 50 g.[19] Zajedno postavljeni utezi u optimalnom su slučaju namijenjeni izradi specifične tkanine s četiri do šest debljih niti osnove po centimetru.

2. Uparivanje utega na osnovi glavnih funkcionalnih parametara

Kako bi se dobila tkanina koja ima pravilan i homogen izgled odnosno jednak broj niti osnove po centimetru, prema načelu pravilnog postavljanja tkalačkog stana potrebno je procijeniti te pričvrstiti različit broj niti jednake razine napetosti po utegu. Ako bi jednak broj niti bio pričvršćen na pojedini uteg, one bi mjestimično bile gušće raspoređene i manje napete kod užih i lakših utega odnosno rjeđe raspoređene i napetije kod težih i širih utega. Takav bi postav otežao izradu i utjecao na nepravilan izgled tkanine jer niti vjerojatno ne bi bile prikladno napete, a ni distribucija napetosti ne bi bila jednolična. Stoga, u ovoj kombinaciji

18 Izračun i procjena vjerojatnosti pojedinih opcija učinjena je prema primjeru i naputcima autora spomenutih eksperimenata (Mårtensson et al. 2009: 391–396). Svi izvedeni eksperimenti rađeni su tehnikom običnog tkanja koja je korištena i u eksperimentima prikazanim u ovom radu.

19 Prema rezultatima eksperimentalnog predenja, razlika od 10 g u razini napetosti niti može označavati razliku u debljini ispredene niti. Primjerice, predenje uz pomoć pršljena težine 18 g rezultiralo je nitima debljine 0,4–0,6 mm, koje zahtijevaju razinu napetosti od 25 do 30 g, dok su predenjem na pršljenu težine 44 g dobivene niti promjera 0,8–1 mm, a zahtijevaju napetost od 40 g (Mårtensson et al. 2009: 378). Niti dobivene od iste sirovine koje su dvije osobe isprele uz pomoć istog pršljena razlikovale su se debljinom, no zahtijevale su jednaku razinu napetosti (Andersson Strand 2010: 211–212). Bitno je imati na umu da debljina niti tijekom predenja i iste napete niti postavljene kao osnova na tkalački stan mogu varirati što treba uzeti u obzir pri vizualizaciji mogućeg izgleda tekstila.

have calculated the variables of possible setups with threads requiring different tensile levels. Based on this we have estimated the most likely options for selecting threads for individual weights. By overlapping the results of specific values for individual weights, it is possible to determine whether these weights may have been used in the same setup, to determine what types of threads would be the optimal choice and, after that, to set the basic parameters for experimental testing, that is, for choosing the threads to be used when setting up the warp. The calculation was made for weights of typical features within the defined types, as well as for weights deviating from the average values within individual types in order to obtain the maximum range of possible values, that is, mutual overlaps/deviations: a weight of typical values of type I (cat. no. 18), weights with typical values of type II (cat. no. 28 and 7), type III (cat. no. 22 and 23), and weights cat. no. 12 and 25. The obtained values are presented in the tables (Tab. 1–7).[18]

The results in the tables make it clear that the observed group of weights may be used in the same loom setup. What is more, there are several possibilities of a setup with threads requiring different tensile levels, making it possible to assume that threads of different thickness may have been used, resulting in different types of fabric. Possible tensile values for the warp threads range between 30 and 80 g, although the optimal choice for all weights was a warp thread requiring a tension of 40 or 50 g.[19] In the optimal case, the weights put together were intended for making a specific fabric with four to six thicker warp threads per centimetre.

2. Pairing weights based on the key functional parameters

In order to obtain a regular and homogeneous fabric with an even number of warp threads per centimetre, following the proper method of seting up the loom, it is necessary to assess and attach a different number of threads sharing the same tensile strain per weight. If the same number of threads are attached to a single weight, they would be more densely distributed and less taut in the case of narrower and lighter weights, and more thinly distributed and more taut in heavier and wider weights. Such a setup would encumber the weaving process and cause irregularities in the appearance of the fabric, since threads would

18 The calculation and estimation of values of specific options is based on the model and guidance by the authors of the mentioned experiments (Mårtensson et al. 2009: 391–396). All the experiments were conducted using the simple weaving technique, which was also used in the experiments presented in this paper.

19 The results of experimental spinning suggest that a 10 g difference in the level of tension may mark a difference in the thickness of the spun thread. For instance, spinning using an 18 g spindle-whorl resulted in 0.4–0.6 mm thick threads, requiring a tensile strain of 25 to 30 g, while spinning on a 44 g spindle-whorl resulted in threads 0.8–1 mm thick, requiring a tensile strain of 40 g (Mårtensson et al. 2009: 378). Threads obtained from the same raw material spun by two persons using the same spindle-whorl differed in thickness, however, they still required the same tensile strain (Andersson Strand 2010: 211–212). One ought to keep in mind that the thickness of the thread during spinning and the thickness of the same thread strained as a warp on the loom may vary, which ought to be taken into consideration when visualizing the fabric.

	Uteg kat. br./Weight cat. no. 18; težina/mass: 1038,4 g; širina/width: 10,4 cm								
Potrebna napetost niti osnove/Required tension of warp threads	10 g	20 g	30 g	40 g	50 g	60 g	70 g	80 g	100 g
Broj niti osnove/uteg/Number of warp threads/weight	104	52	34	26	21	17	15	13	10
Broj niti osnove/2x utega/Number of warp threads/2x weights	208	104	68	52	42	34	30	26	20
Broj niti osnove/cm/Number of warp threads/cm	19 ili/or 20	10	6	5	4	3	2 ili/or 3	2	2
Procjena optimalnosti postava/Optimal setup estimate	nije optimalno -prevelik broj niti po utegu/ not optimal - too many threads per weight	nije optimalno -prevelik broj niti po utegu/not optimal - too many threads per weight	moguće - iako velik broj niti po utegu/possible - although a lot of threads per weight	optimalno/optimal	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	nije optimalno -premalen broj niti po cm/not optimal - too few threads per cm	nije optimalno -premalen broj niti po cm/not optimal - too few threads per cm	nije optimalno -premalen broj niti po cm/not optimal - too few threads per cm
Tab. 1									
	Uteg kat. br./Weight cat. no. 28; težina/mass: 1044,5 g; širina/width: 9 cm								
Potrebna napetost niti osnove/Required tension of warp threads	10 g	20 g	30 g	40 g	50 g	60 g	70 g	80 g	100 g
Broj niti osnove/uteg/Number of warp threads/weight	104	52	35	26	21	17	15	13	10
Broj niti osnove/2x utega/Number of warp threads/2x weights	208	104	70	52	42	34	30	26	20
Broj niti osnove/cm/Number of warp threads/cm	23	11	7	6	4 ili/or 5	3 ili/or 4	3	2 ili/or 3	2
Procjena optimalnosti postava/Optimal setup estimate	nije optimalno -prevelik broj niti po utegu/ not optimal - too many threads per weight	nije optimalno -prevelik broj niti po utegu/not optimal - too many threads per weight	moguće - iako velik broj niti po utegu/possible - although a lot of threads per weight	optimalno/optimal	optimalno - iako malen broj niti po cm/optimal - although few threads per cm	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	nije optimalno -premalen broj niti po cm/not optimal - too few threads per cm
Tab. 2									
	Uteg kat. br./Weight cat. no. 7; težina/: 1138,2 g; širina/width: 9,6 cm								
Potrebna napetost niti osnove/Required tension of warp threads	10 g	20 g	30 g	40 g	50 g	60 g	70 g	80 g	100 g
Broj niti osnove/uteg/Number of warp threads/weight	114	57	38	28	23	19	16	14	11
Broj niti osnove/2x utega/Number of warp threads/2x weights	228	114	76	56	46	38	32	28	22
Broj niti osnove/cm/Number of warp threads/cm	23 ili/or 24	11 ili/or 12	7 ili/or 8	5 ili/or 6	4 ili/or 5	4	3	3	2
Procjena optimalnosti postava/Optimal setup estimate	nije optimalno -prevelik broj niti po utegu/ not optimal - too many threads per weight	nije optimalno -prevelik broj niti po utegu/not optimal - too many threads per weight	moguće - iako velik broj niti po utegu/possible - although a lot of threads per weight	optimalno/optimal	optimalno - iako malen broj niti po cm/optimal - although few threads per cm	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	nije optimalno -premalen broj niti po cm/not optimal - too few threads per cm
Tab. 3									

	Uteg kat. br./Weight cat. no. 22; težina/: 960 g (procjena/estimated); širina/width: 8,5 cm (procjena/estimated)								
Potrebna napetost niti osnove/Required tension of warp threads	10 g	20 g	30 g	40 g	50 g	60 g	70 g	80 g	100 g
Broj niti osnove/uteg/Number of warp threads/weight	97	48	32	24	19	16	13	12	9 ili/or 10
Broj niti osnove/2x utega/Number of warp threads/2x weights	194	96	64	48	38	32	26	24	18 ili/or 20
Broj niti osnove/cm/Number of warp threads/cm	23	11	7	6	4 ili/or 5	3 ili/or 4	3	2 ili/or 3	2
Procjena optimalnosti postava/Optimal setup estimate	nije optimalno -prevelik broj niti po utegu/ not optimal - too many threads per weight	nije optimalno -prevelik broj niti po utegu/not optimal - too many threads per weight	moguće - iako velik broj niti po utegu/possible - although a lot of threads per weight	optimalno/optimal	optimalno - iako malen broj niti po cm/optimal - although few threads per cm	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	nije optimalno -premalen broj niti po cm/not optimal - too few threads per cm
Tab. 4									
	Uteg kat. br./Weight cat. no. 23; težina/mass: 1004 g (procjena/estimated); širina/width: 9,0 cm (procjena/estimated)								
Potrebna napetost niti osnove/Required tension of warp threads	10 g	20 g	30 g	40 g	50 g	60 g	70 g	80 g	100 g
Broj niti osnove/uteg/Number of warp threads/weight	100	50	33	25	20	17	14	12 ili/or 13	10
Broj niti osnove/2x utega/Number of warp threads/2x weights	200	100	66 ili/or 67	50	40	34	28	25	20
Broj niti osnove/cm/Number of warp threads/cm	22	11	7	5 ili/or 6	4	3 ili/or 4	3	2 ili/or 3	2
Procjena optimalnosti postava/Optimal setup estimate	nije optimalno -prevelik broj niti po utegu/ not optimal - too many threads per weight	nije optimalno -prevelik broj niti po utegu/not optimal - too many threads per weight	moguće - iako velik broj niti po utegu/not optimal - too many threads per weight	optimalno/optimal	optimalno - iako malen broj niti po cm/optimal - although few threads per cm	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	nije optimalno -premalen broj niti po cm/not optimal - too few threads per cm
Tab. 5									
	Uteg kat. br./Weight cat. no. 12; težina/mass: 1324,4 g; širina/width: 10,4 cm								
Potrebna napetost niti osnove/Required tension of warp threads	10 g	20 g	30 g	40 g	50 g	60 g	70 g	80 g	100 g
Broj niti osnove/uteg/Number of warp threads/weight	132	66	44	33	26	22	18	16	13
Broj niti osnove/2x utega/Number of warp threads/2x weights	264	132	88	66	52	44	36	32	26
Broj niti osnove/cm/Number of warp threads/cm	26	13	8	6	5	4	3 ili/or 4	3	2 ili/or 3
Procjena optimalnosti postava/Optimal setup estimate	nije optimalno -prevelik broj niti po utegu/ not optimal - too many threads per weight	nije optimalno -prevelik broj niti po utegu/not optimal - too many threads per weight	nije optimalno -prevelik broj niti po utegu/not optimal - too many threads per weight	moguće - iako velik broj niti po utegu	optimalno/optimal	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	nije optimalno -premalen broj niti po cm/not optimal - too few threads per cm
Tab. 6									

	Uteg kat. br./Weight cat. no. 25; težina/mass: 1456,2 g; širina/width: 9,7 cm								
Potrebna napetost niti osnove/Required tension of warp threads	10 g	20 g	30 g	40 g	50 g	60 g	70 g	80 g	100 g
Broj niti osnove/uteg/Number of warp threads/weight	145	73	48	36	29	24	20	18	14
Broj niti osnove/2x utega/Number of warp threads/2x weights	290	146	96	72	58	48	40	36	28
Broj niti osnove/cm/Number of warp threads/cm	29	15	9 ili/or 10	7	5 ili/or 6	4 ili/or 5	4	3 ili/or 4	2 ili/or 3
Procjena optimalnosti postava/Optimal setup estimate	nije optimalno -prevelik broj niti po utegu/ not optimal - too many threads per weight	nije optimalno -prevelik broj niti po utegu/not optimal - too many threads per weight	nije optimalno -prevelik broj niti po utegu/not optimal - too many threads per weight	moguće - iako velik broj niti po utegu	optimalno/optimal	optimalno - iako malen broj niti po cm/optimal - although few threads per cm	moguće - iako malen broj niti po cm/possible - although few threads per com	moguće - iako malen broj niti po cm/possible - although few threads per com	nije optimalno -premalen broj niti po cm/not optimal - too few threads per cm
Tab. 7									

Tab. 1–7 Tablični prikaz optimalnog odabira niti za odabrane utege (prema: Mårtensson et al. 2009: 391–396) (izradila: T. Karavidović)
Tab. 1–7 Tables showing the optimal choice of threads for the selected weights (according to: Mårtensson et al. 2009: 391–396) (made by: T. Karavidović)

ciji utega takav postav nije vjerojatan. Kako nije moguće sa sigurnošću pretpostaviti utjecaj utvrđenih odstupanja u morfologiji utega i njihova rasporeda u kombinaciji s nitima koje napinju na izgled tkanine, podatke za ta razmatranja može pružiti eksperimentalno testiranje ovakvog postava tkalačkog stana. Ako su niti dovoljno napete, tj. razlika u potrebnoj napetosti dovoljno mala da ne čini tehnički pravilno tkanje teško izvedivim, finalna tkanina neće biti jednolične gustoće nego će se prirodno nametnuti svojevrsna mustra (gušće i rjeđe raspoređene niti osnove). Ovakva tkanina ipak bi mogla biti homogena. U slučaju pričvršćivanja jednakog broja niti na ove utege, pravilna i homogena tkanina (ravnomjeran broj niti osnove/cm) mogla bi se vjerojatno dobiti kombinacijom utega tipa I, II, III te zasebno specifično teških utega (kat. br. 10, 12–13, 20–21, 8 i 25; tab. 1–7). Isti zaključak stoji i za moguće kombinacije pri uparivanju utega koji nose prednje i stražnje niti osnove. Utezi sličnih dimenzija i težina idealno nose jednak ili podjednak broj niti, stoga je moguće pretpostaviti da su morfološki najsličniji utezi logičan odabir pri uparivanju. U tom slučaju dozvoljena varijacija u težini i širini razmatrane skupine utega iznosi oko 150 g (10–15%) te oko 1 cm širine, unutar procijenjenih mogućnosti niti koje su mogli napinjati (tab. 1–7).[20] Utege je moguće svrstati u četiri težinska razreda (sl. 14). Pojedini teži utezi nižeg razreda i lakši višeg razreda mogu stajati u paru. Međutim, postoji mogućnost da utezi većih morfoloških razlika ipak stoje u paru. U tom slučaju linijski slijed utega igra značajnu ulogu. Ako bi utezi različite težine i širine stajali u paru, bilo bi potrebno na pojedini uteg pričvrstiti različit broj niti kako bi one bile optimalno napete i ravnomjerno raspoređene. Primjerice, ako u prednjem redu u nizu stoje dva slična utega srednje težine i nose određen broj optimalno napetih niti (recimo 40, svaki po 20), njihovi su idealni parovi dva morfološki najsličnija utega koji pojedinačno nose također po 20 niti. Međutim, parovi bi mogli biti i dva utega od kojih je jedan teži i širi (napinje veći broj niti), a drugi lakši i uži (napinje manji broj niti). Stražnja dva utega u tom slučaju nosila bi jednak broj niti kao i prednji utezi. Ovakva kombinacija moguća je samo ako je jednak omjer ukupne težine i širine prednjih u odnosu na stražnje utege, odnosno samo specifične kombinacije utega mogu funkcionirati na ovaj način. Položaj pojedinog utega određenih karakteristika uvjetovan je položajem i karakteristikama grupe utega koja ga okružuje u prednjem i stražnjem redu. Pri postavljanju tkalačkog stana na ovaj način, potrebno je postaviti utege u ispravne međusobne odnose kako bi niti bile ravnomjerno napete, raspoređene i iskorištene u cijelom postavu tkalačkog stana. Položaj pojedinog utega u tom smislu gotovo je nezamjenjiv.

Takvim pristupom stvoren je temelj za prijedlog rekonstrukcije rasporeda utega pronađenih pri dnu istraženog objekta, tj. parova utega na osnovi glavnih funkcionalnih parametara.[21]

20 Pretpostavka se odnosi isključivo na utege obrađene u ovom radu. Morfološki drugačiji utezi, različitog odnosa dimenzija i težine vjerojatno imaju drugačiji postotak zanemarive razlike u težini i širini.

21 Primijećeno je i da su različiti tipovi utega proporcionalno izrađeni, tj. širina u odnosu na težinu različitih tipova utega proporcionalno raste ili se smanjuje stoga je bilo dovoljno uzeti jedan referentan funkcionalni parametar, u ovom slučaju težinu.

probably be inappropriately taut and the distribution of the tension would be uneven. Due to this, in this combination of weights such a setup is not very likely. Considering that it is not possible to securely presume the influence the determined deviations in the shape of weights and their distribution in combination with the threads they strain have on the appearance of the fabric, the data for such considerations may be provided by experimental testing of such a loom setup. If the threads are sufficiently taut, i.e. the difference in the necessary tautness is sufficiently small not to render the technically appropriate weaving hardly possible, the density of the final fabric would not be even, rather, a pattern of sorts would naturally impose itself (warp threads would be more densely and thinly distributed). Fabric of this sort might still be homogeneous. If the same number of threads are attached to these weights, a regular and homogeneous fabric (an even number of warp threads/cm) might probably be obtained by a combination of weights of types I, II, III and, separately, by particularly heavy weights (cat. no. 10, 12–13, 20–21, 8 and 25; Tab. 1–7). The same conclusion is true for possible combinations in pairing weights straining the front and back warp threads. Weights of similar dimensions and masses ideally contain the same or similar number of threads, so we may presume that morphologically most similar weights would be a logical choice for pairing. In that case, the permitted variation in the mass and width of the studied assemblage of weights is around 150 g (10–15%) and around 1 cm of width, within the estimated strengths of the threads they may have strained (Tab. 1–7).[20] The weights may be divided into four classes by their mass (Fig. 14). Certain heavier weights from a lower class and lighter ones from a higher class may be paired. However, it is possible that even the weights exhibiting greater morphological differences may have been paired. In that case, the sequence in which the weights were ordered plays a major role. If weights of different mass and width were paired, this would necessitate the attachment of different number of threads on individual weights in order to achieve optimal tension and balanced distribution of threads. For instance, if two similar weights of similar mass stand in the front row, bearing a certain number of optimally strained threads (say, 40, that is, 20 per weight), their ideal pairs are two morphologically closest weights, bearing 20 threads each. However, their pairs might also be two weights, one of them heavier and wider (straining a larger number of threads), and the other one lighter and narrower (straining a smaller number of threads). The two back weights would in that case bear the same number of threads as the front weights. Such a combination is possible only if the ratio of the total mass and width of the front and the back weights is equal, in other words, only specific combinations of weights may function in this way. The position of an individual weight with certain properties is conditioned by the position and features of the group of weights that surround it in the front and back rows. When setting up a loom in this way, it is necessary to

20 The assumption relates exclusively to weights analysed in this paper. Morphologically different weights, featuring different size-to-mass ratios, probably had a different percentage of negligible differences in mass and width.

3. Prijedlog postava tkalačkog stana

Uz sjeverni rub istraženog objekta utvrđena je koncentracija linijski raspoređenih utega. Riječ je o 24 utega smještena na prostoru dužine oko 150 cm, dok su po dva utega nađena istočno i zapadno od ovog prostora, na udaljenosti od oko 40 cm (sl. 3). S obzirom na prostorni raspored i broj utega unutar objekta moguće je pretpostaviti da se uz sjeverni rub objekta nalazila konstrukcija vertikalnoga tkalačkog stana koji je vjerojatno bio prislonjen ili konstrukcijski vezan uz sjeverni zid objekta.

U sjeveroistočnom uglu objekta stajala su i tri međusobno udaljena utega (kat. br. 4–5, 33), u sjeverozapadnom uglu jest trag glinenog utega (kat. br. 36), dok se uz središnji dio istočnog i zapadnog ruba objekta nalaze po dva utega (kat. br. 1–2, 34–35). Spomenuti su utezi isključeni iz pokušaja rekonstrukcije postava tkalačkog stana jer njihov položaj ne odgovara linijskom rasporedu ostalih utega (28 utega, kat. br. 3, 6–31), odnosno konstrukcijskim normama vertikalnih tkalačkih stanova. Ipak, zanimljiv je prostorno simetričan položaj dvaju parova utega (kat. br. 1 i 2, te 34 i 35) uz istočni i zapadni rub objekta. Moguće je pretpostaviti da se uz bočne rubove objekta nalazila svojevrsna manja konstrukcija na kojoj bi bilo moguće izraditi užu tkaninu (do 10-ak cm), primjerice početnu i/ili rubnu traku/obrub za tkaninu koja će se proizvesti na velikom vertikalnom tkalačkom stanu. Na ovaj način izrađena je početna traka za potrebe eksperimenta opisanog u ovom radu (sl. 19). Ostali utezi mogli su biti dijelom postava tkalačkog stana, no mogli su imati i funkciju rezervnih utega u slučaju oštećenja onih koji su u uporabi. Pomicanjem vertikalne prečke utezi postavljeni u dva paralelna reda međusobno se sudaraju te su dugotrajnom uporabom izloženi konstantnom mehaničkom stresu koji može uzrokovati oštećenja odnosno pucanje utega. Također, proces izrade robusnih glinenih utega poput virovskih jest dugotrajan poglavito zbog vremena potrebnog za pravilno sušenje koje prethodi pečenju (replike virovskih utega izrađene za potrebe ovoga rada sušile su se u prozračnom, suhom prostoru na prosječnoj temperaturi od 20°C oko 20 dana).

Postavljanje tkalačkog stana kompleksan je proces za čiju je pravilnu izvedbu potrebna promišljenost, razumijevanje posljedica svake pojedinačne radnje, odnosno iskustvo i znanje. S obzirom na to da je cijeli proces pravilnog postavljanja osnove za tkanje s utezima različitih mogućnosti dodatno kompleksan, čini se potrebnim postaviti pitanja:

Zašto bi tkalac ili tkalja koristili utege sličnih mogućnosti a različitog oblika u istom postavu?

Iz kojeg razloga su pojedini utezi znatno teži i širi, odnosno svojim karakteristikama odstupaju od ostalih utega?

Zašto određeni utezi nose oznaku na gornjoj plohi, a morfološki se ne razlikuju od ostalih utega istog tipa?

Je li kombinacija različitih utega uvjetovana nekim tehnološkim dijelom procesa potrebnim za proizvodnju određene vrste tkanine ili možemo pomišljati da je kombiniranje oblikovno različitih utega u istom postavu imalo ipak neku drugačiju ulogu?

Jesu li morfološki različiti utezi ili pak utezi s oznakom mogli obilježavati dijelove tkanine koji će biti izvedeni drugačijom tehnikom?

3. A possible reconstruction of the loom

A sequence of weights clustered along the northern edge of the excavated structure. The assemblage consisted of 24 weights arranged in a space around 150 cm long, with two additional pairs of weights found at the distance of around 40 cm east and west from this space (Fig. 3). In view of the spatial layout and number of weights within the structure we may presume that a vertical loom was probably reclined against, or structurally incorporated into the northern wall of the structure.

There were three weights lying at a certain distance from each other in the north-eastern corner of the structure (cat. no. 4–5, 33); there is a trace of a clay weight in the north-western corner (cat. no. 36), and there are two weights in both the eastern and western corners of the structure (cat. no. 1–2, 34–35). The mentioned weights were excluded from our attempt at a reconstruction of the loom setup because their position does not fit in the linear sequence of the remaining weights (28 weights, cat. no. 3, 6–31), that is, the structural principles of vertical looms. Nevertheless, the symmetrical spatial position of the two pairs of weights (cat. no. 1 and 2, and 34 and 35) along the eastern and western walls of the structure is worthy of interest. We are entitled to presume that there was a minor setup of sorts along the lateral edges of the structure, on which a narrow fabric (up to 10 cm or so) could be made, for instance, the starting border and/or border stripe/selvedge for the textile that would be made on the vertical loom. The starting border for the experiment described in this paper was also made in this way (Fig. 19). The remaining weights may have formed part of the loom setup, however, they may equally have played the role of replacement weights in case the ones in use were damaged. When the heddle rod is moved the weights placed in two parallel rows collide with each other. Through long and continuous use the weights are exposed to a constant mechanical stress, which may eventually damage or break the weights. Also, the process of making robust clay weights like those from Virje is a long one, primarily on account of the time necessary for proper drying, which precedes firing (replicas of the Virje weights made for the purpose of this paper had been drying in an airy and dry space on an average temperature of 20°C around 20 days).

Installing a loom is a complex process requiring forethought, an understanding of the consequences of each individual action, as well as a degree of experience and knowledge. Considering that the entire process of properly war-

21 It has also been observed that different types of weights were made proportionally, i.e. width to mass ratio of different types of weights increases or decreases proportionally and, due to this, it was sufficient to take a single referential functional parameter, in this case, the mass.

gom bojom, uzorkom (npr. flotirajuća potka), tehnikom ili različitim nitima, primjerice različito uvijenim nitima?

Za odabir morfološki različitih utega u istom postavu zasigurno je postojao konkretan razlog i ta se situacija ne može smatrati slučajnošću niti posljedicom dostupnih materijala. Naime, potrebna je izvjesna razina znanja kako bi se izradili utezi koji bez obzira na razliku u obliku, dimenzijama i težini mogu međusobno dobro funkcionirati. Također, da bi se proizvela određena vrsta tkanine potrebno je znati izraditi odgovarajuće utege. Kako bi različiti utezi funkcionirali u istom postavu, izrazito je bitna pravilna prostorna organizacija, tj. raspored linijski postavljenih utega u kojem su sve niti osnove pravilno iskorištene i ravnomjerno raspoređene. Stoga se čini da je proces izrade i uporabe utega s nalazišta Sušine bio vrlo promišljen.

Rekonstrukcija položaja linijski postavljenih utega izvedena je na osnovi istraživanjem utvrđenoga prostornog rasporeda utega (sl. 10). U predloženoj rekonstrukciji zamijećene su određene pravilnosti, čak i simetrija u razmještaju utega.

Označavanje utega za tkalački stan poznata je pojava koja se u literaturi višestruko tumači. Moguće je da je riječ o oznakama vlasništva ili pak izrađivača, težinskim oznakama, oznakama za mustru i slično (Belanová Štolcová, Grömer 2010: 16; Gleba 2008: 137). Virovski utezi s oznakom križa (+) na gornjoj plohi oblikom, dimenzijama i težinom ne razlikuju se značajno od ostalih utega istog tipa. Time načelno možemo isključiti pretpostavku da se radi o težinskim oznakama na većini utega. Ipak, ranije spomenuti utezi kat. br. 8 i 25 nose jedinstvene oznake na gornjoj plohi te su teži i širi od ostalih utega istog tipa.[22]

Utezi s oznakama postavljeni su centralno simetrično u odnosu na točku osi koju čine središnji utezi (sl. 11, 13). Tako se jednak niz ponavlja od sredine prema lijevom rubu u stražnjem redu odnosno prema desnom rubu u prednjem redu. Raspored utega određenog tipa unutar istog prostora također je simetričan, dok utezi izvan toga područja nisu postavljeni simetrično (sl. 12–13). Pravilan i simetričan raspored utega upućuje da su utezi s oznakom kao i pojedini oblikovno različiti utezi mogli označavati dio tkanine koji će

22 Oznake križa ili znaka X na gornjoj površini utega relativno su česte, a poznati su primjerci i s oznakom kukastog križa (svastike) kakav je pronađen na slovenskom lokalitetu Pri Muri pri Lendavi (Šavel, Sankovič 2011: 204, kat. br. 273). No, postoje primjerci utega s kompleksnijim ukrasima i/ili znakovima, primjerice uteg koji na gornjoj površini ima urezani križ i utisnuti krug, na dvije stranice urezani križ, a na dnu tri duboko utisnute jamice s lokaliteta Hotinja vas pri Mariboru (starije željezno doba; Gerbec 2015: 76–77, kat. br. 169), više pravilno raspoređenih kružnih otisaka na dvije stranice utega s lokaliteta Orehova vas (Grahek 2015: 220, kat. br. 540). Velik broj utega s različitim oznakama pronađen je na nalazištima iz starijega željeznog doba – Nové Košariská u Slovačkoj (Čambal 2015: T. XVI–XXIV), Kotare-Baza pri Murski Soboti (Kerman 2011: 37–39, T. 26: 14), a njima su po oblicima utega i oznakama na njima veoma bliski primjerci pronađeni na slovenskom stariježeljeznodobnom lokalitetu Poštela u Štajerskoj (Teržan 1990: T. 2: 21; T. 6: 30; T. 9: 7, 8; T. 20: 1; T. 23: 21, 25; T. 25: 13; T. 26: 8; T. 27: 5, 7) ali i s austrijskog Magdalensberga (Gostenčik 2009: 40–41, sl. 8: 7; sl. 9; 2010, sl. 14.10: 7; sl. 9d). Ranolatenski utezi s nalazišta Mitterretzbach u Donjoj Austriji na gornjoj plohi također imaju jednu ili više udubljenih točaka (Trebsche 2014: 182–185). O ukrasima na utezima i mogućoj simbolici tih oznaka vidi Teržan 1996: 507–513.

ping the loom is rendered even more complex by weights with different possibilities, it seems important to raise the following questions:

Why would a weaver use weights of similar properties but different shapes in the same setup?

Why are certain weights much heavier and wider, in other words, why do their features deviate from other weights?

Why do certain weights bear a mark on the top surface, while at the same time they are morphologically not dissimilar from other weights of this type?

Are combinations of different weights conditioned by a technological element of the process necessary for the production of a specific type of fabric, or, on the other hand, we might think that combining morphologically different weights in the same setup played a different role?

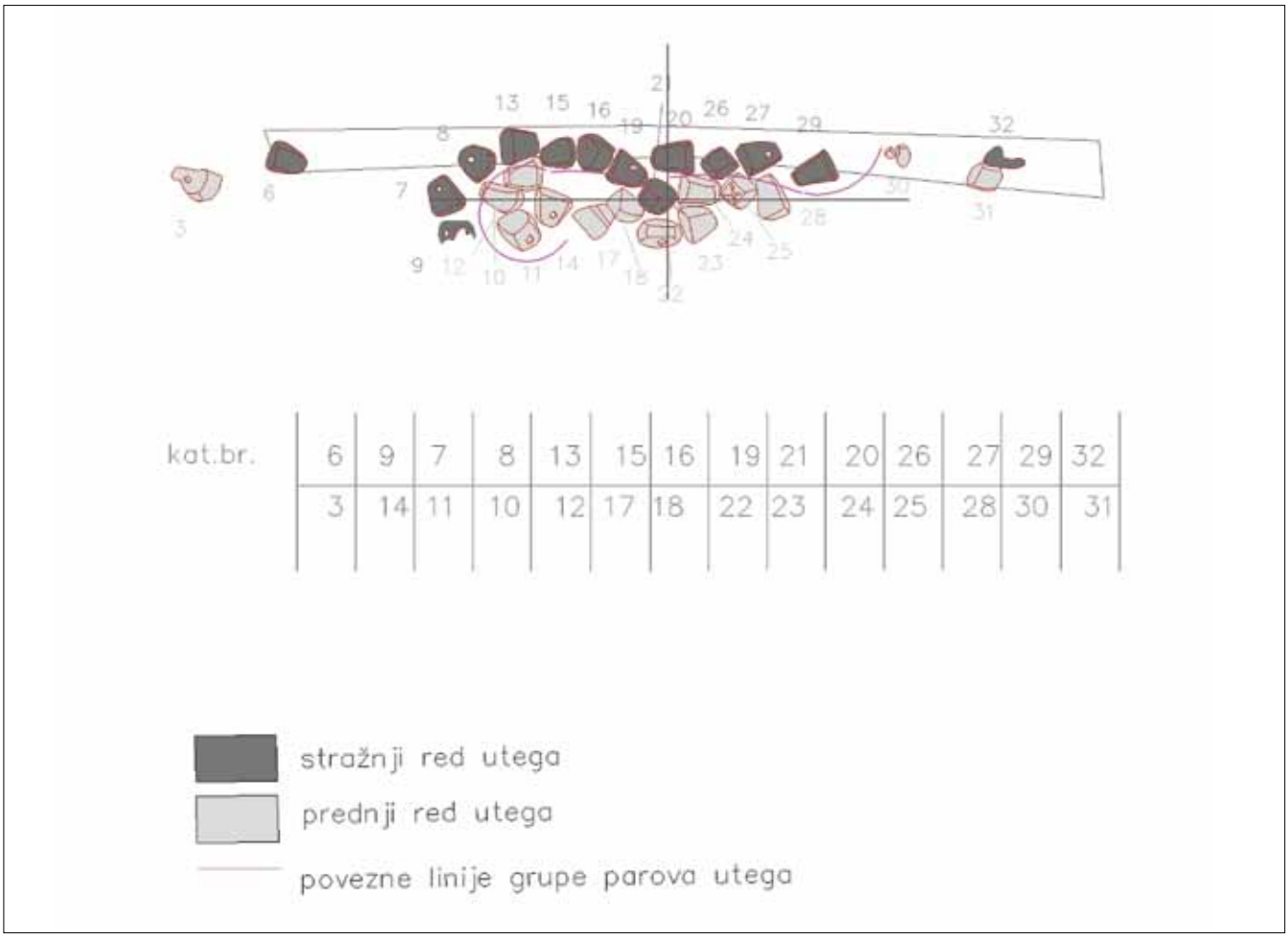
Is it possible that morphologically different weights or weights with a mark may have marked the parts that would be done in a different colour, pattern (e.g. floating warp), technique or different threads, for instance, differently twisted threads?

There was certainly a specific reason for selecting morphologically different weights within the same setup, and this situation cannot be considered a chance one, nor a consequence of available materials. For this, one requires a certain level of knowledge to produce weights that would function together well regardless of differences in the shape, dimensions and mass. Also, in order to produce a specific type of fabric it is necessary to know how to make corresponding weights. For different weights to function in the same setup it is exceptionally important to create a proper spatial layout, i.e. linear sequence of weights in which all the warp threads are properly used and evenly distributed. On account of this, it appears that the process of making and using weights at Sušine was a well-thought-out one.

The reconstruction of the position of the linear sequence of weights was done on the basis of the determined spatial layout of the weights (Fig. 10). The proposed reconstruction makes note of certain observed regularities including, for instance, symmetry in the distribution of the weights.

The practice of marking loom weights is a well-known phenomenon with multiple interpretations in the literature. It is possible that these were property marks or maker's marks; mass or pattern marks and so on (Belanová Štolcová, Grömer 2010: 16; Gleba 2008: 137). The weights from Virje marked with (+) on the top surface do not differ significantly by their shape, dimensions and mass from other weights of the same type. Due to this we can exclude the assumption that on most weights these were marks for mass. Nevertheless, the previously mentioned weights cat. no. 8 and 25 bear unique marks on the upper surface, and they are heavier and wider that the remaining weights of the same type.[22]

22 Cross or X-marks on the upper surface of weights are relatively common, and we know of specimens marked with a swastika, for instance at the Slovenian site Pri Muri pri Lendavi (Šavel, Sankovič 2011: 204, cat. no. 273). However, there are also specimens with more complex ornaments and/or symbols, for instance a weight with an incised cross and impressed circle on the upper surface, with an incised cross on two



Sl. 10 Raspored utega utvrđen istraživanjem s izdvojenim redovima utega (rekonstrukcija prednjeg i stražnjeg reda i oznaka mogućih parova utega) (izradila: T. Karavidović)

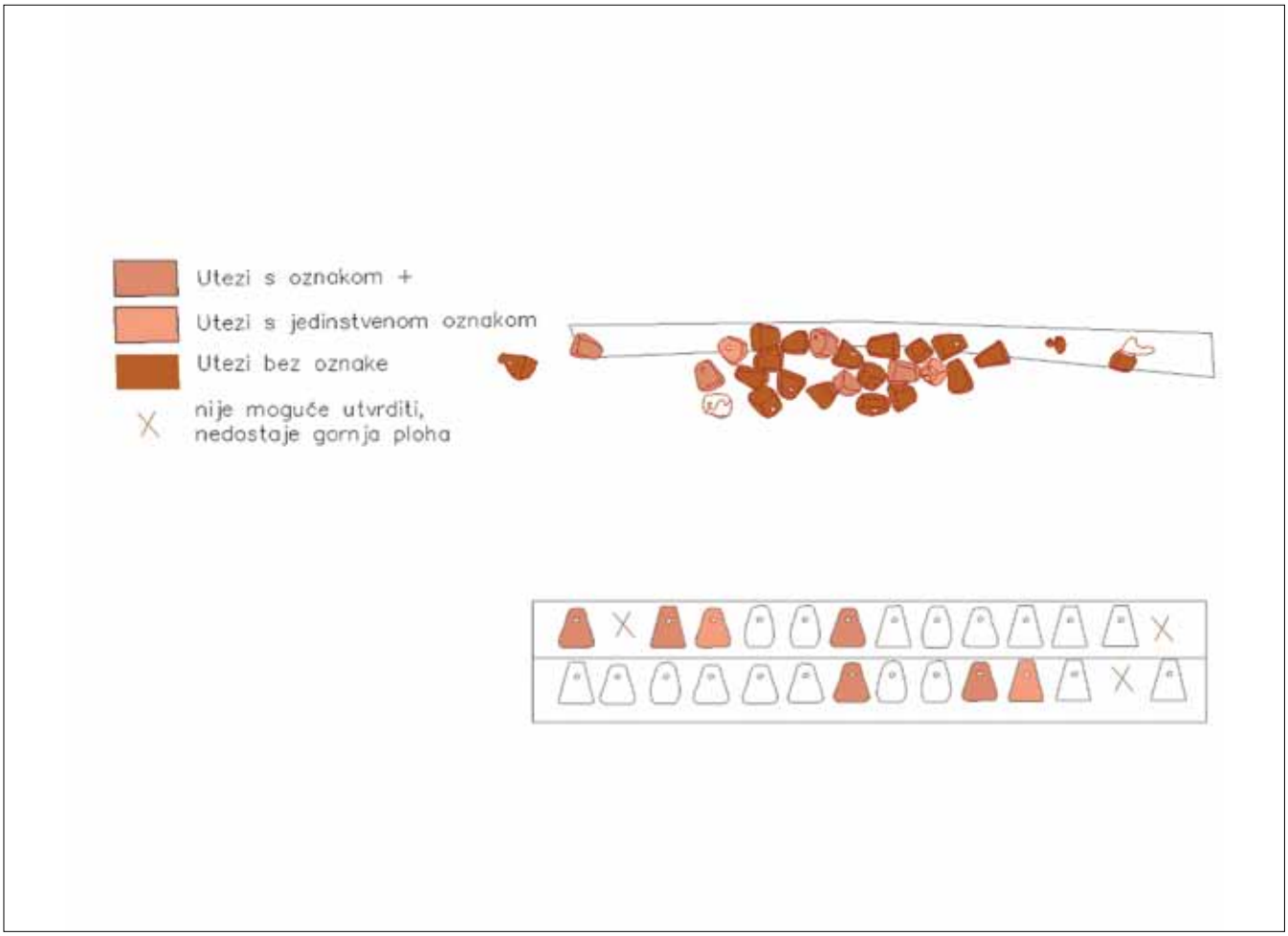
Fig. 10 Distribution of weights determined by tests with separate rows of weights (reconstruction of the front and back row and marks of possible pairs of weights) (made by: T. Karavidović)

primjerice biti izveden drugom bojom, uzorkom, tehnikom itd. Dva utega s jedinstvenom oznakom kat. br. 8 (tip I) i 25 (tip II) svojim položajem čine dio toga pravilnog niza (sl. 11), no njihova pozicija ujedno je uvjetovana i težinom (sl. 15). Dodatno, oni se nalaze na istom mjestu unutar reda utega i međusobno su centralno simetrično postavljeni. Moguće je pretpostaviti da su spomenuta dva utega pri izradi označeni jedinstvenom oznakom kako bi se izdvojili od oblikom sličnih utega s obzirom na razliku u težini (teže oko 1450 g, dok ostali morfološki slični utezi tipa I i II teže između 1000 i 1200 g), no ujedno su mogli imati ulogu kao i ostali označeni utezi. Njihov položaj u ovom postavu uvjetovan je dvama parametrima, težinom i oznakom mjesta.

Prostorni raspored utega različitih razreda težine također pokazuje određene pravilnosti. Na prvi pogled utezi različitih razreda težine nisu sasvim simetrično ni pravilno postavljeni, odnosno pojedini parovi utega značajno se razlikuju u težini (kat. br. 20 i 24, 25 i 26) (sl. 14). Tako se četiri para lakših utega nalaze u sredini postava, sa strana se nalaze četiri para utega različitih težinskih razreda te dva para srednje teških utega uz rubove. Opterećenje je različito na

Weights with marks are placed centrally simmetrical with respect to the point made up of the middle weights (Fig. 11, 13). Thus the same sequence is repeated from the middle to the left edge in the back row, that is, to the right edge in the front row. The distribution of weights of the same type within the same space is also symmetrical, while the weights outside that space are not symmetrical (Fig. 12–13). The regular and symmetrical layout of the weights suggests that the weights with a mark, as well as individual

sides and with three deeply impressed small pits on the base, from the site Hotinja vas near Maribor (Early Iron Age; Gerbec 2015: 76–77, cat. no. 169); with several evenly distributed circular impressions on two sides of the weight from Orehova vas (Grahek 2015: 220, cat. no. 540). A large number of weights with various marks were found at Early Iron Age sites - Nové Košariská in Slovakia (Čambal 2015: Pl. XVI–XXIV), Kotare-Baza near Murska Sobota (Kerman 2011: 37–39, Pl. 26: 14), closely similar to which, by the shapes of the weights and marks on them, are the specimens found at the Early Iron Age site Poštela in Styria in Slovenia (Teržan 1990: T. 2: 21; T. 6: 30; T. 9: 7, 8; T. 20: 1; T. 23: 21, 25; T. 25: 13; T. 26: 8; T. 27: 5, 7), but also from Magdalensberg in Austria (Gostenčik 2009: 40–41, Abb. 8: 7; Abb. 9; 2010, Fig. 14.10: 7; Fig. 9d). The Early La Tène weights from Mitterretzbach in Lower Austria also have one or several impressed dots on the upper surface (Trebsche 2014: 182–185). For decorations on weights and possible symbolism of these marks see Teržan 1996: 507–513.

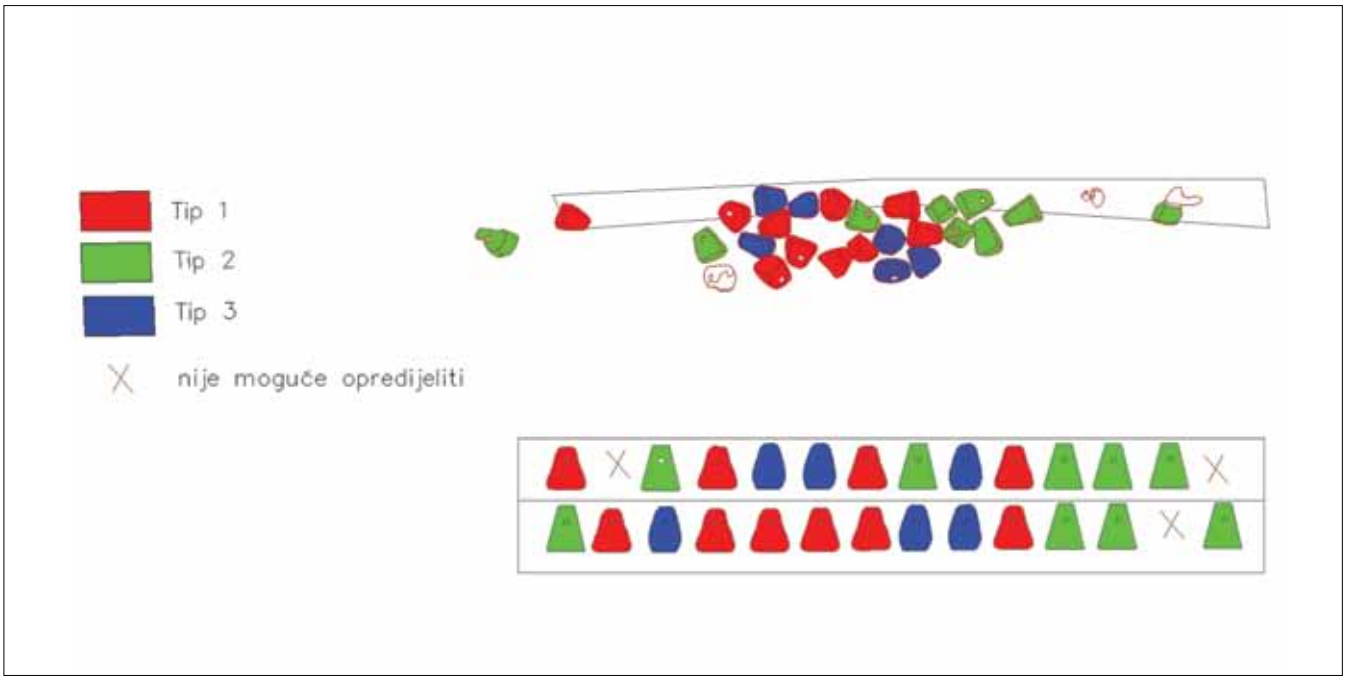


Sl. 11 Raspored utega utvrđen istraživanjem i rekonstrukcija položaja utega s oznakama (izradila: T. Karavidović)
Fig. 11 Distribution of weights determined by the research and a reconstruction of the position of marked weights (made by: T. Karavidović)

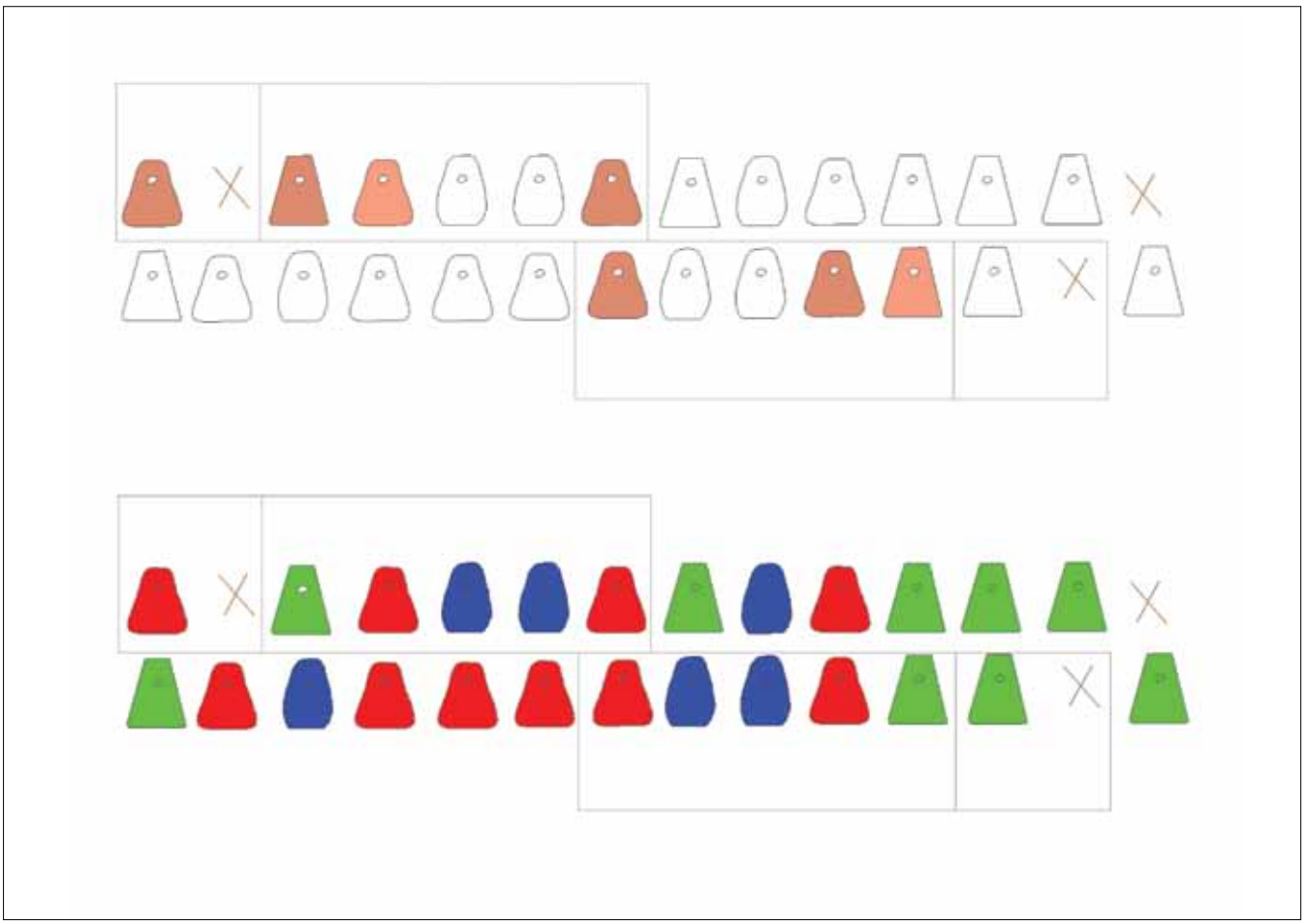
pojedinim, užim dijelovima tkanine. Međutim, grupe parova utega ipak su pravilno i simetrično (centralno i osno) prostorno raspoređene u oba reda kako bi se dobila jednolična razina opterećenja u odnosu na ukupnu dužinu reda utega odnosno širinu tkanine (sl. 15). Pri tome utezi nisu svugdje upareni prema načelu 1 : 1 nego je pravilna raspodjela težine u odnosu na širinu postignuta u nizu od četiri para utega. Naznaka grupiranja po četiri utega vidljiva je i u prostornom položaju utega utvrđenom istraživanjem (sl. 10). Pravilan i simetričan raspored težine imao je ulogu u tehnološkom dijelu procesa izrade tkanine na vertikalnom tkalačkom stanu. Naime, pravilna i simetrična raspodjela težine utega u odnosu na ukupnu dužinu reda utega odnosno širinu tkanine koja se proizvodi osigurava ravnomjernu razinu opterećenja na tkaninu u cjelini kao i na horizontalnu prečku s koje vise niti osnove odnosno na konstrukciju tkalačkog stana. Ovako postavljena skupina utega stoji u ravnoteži i održava ravninu tkanine. Neuravnotežena raspodjela težine, primjerice mjestimična koncentracija težih utega, uzrokovala bi veće opterećenje na pojedinim dijelovima što bi moglo rezultirati potezanjem dijelova tkanine a utjecalo bi i na cjelokupnu statiku tkalačkog stana. Uravnotežen raspored te-

morphologically different weights may have marked a part of the fabric that would, for instance, be made with another colour, pattern, technique etc. Two weights with a unique mark cat. no. 8 (type I) and 25 (type II) by virtue of their position form part of that regular sequence (Fig. 11), however, their position is at the same time conditioned also by their mass (Fig. 15). Additionally, they are positioned at the same place within the sequence of weights and stand centrally simmetric to each other. We may presume that when these two weights were made they were marked with a unique symbol to differentiate them from other weights of similar shape, in view of their different mass (they weigh around 1450 g, while other morphologically similar weights of types I and II weigh between 1000 and 1200 g), although at the same time they may have played the same role as other marked weights. Their position in this setup is conditioned by two parameters, their mass and the symbol marking their place.

Spatial distribution of weights of different mass classes also shows certain regularities. At the first glance, the weights of different mass classes are not entirely symmetrically or regularly positioned, that is, certain pairs of weights



Sl. 12 Raspored utega utvrđen istraživanjem i rekonstrukcija položaja utega pojedinog tipa (izradila: T. Karavidović)
Fig. 12 Distribution of weights determined by the research and a reconstruction of the position of weights of distinct types (made by: T. Karavidović)

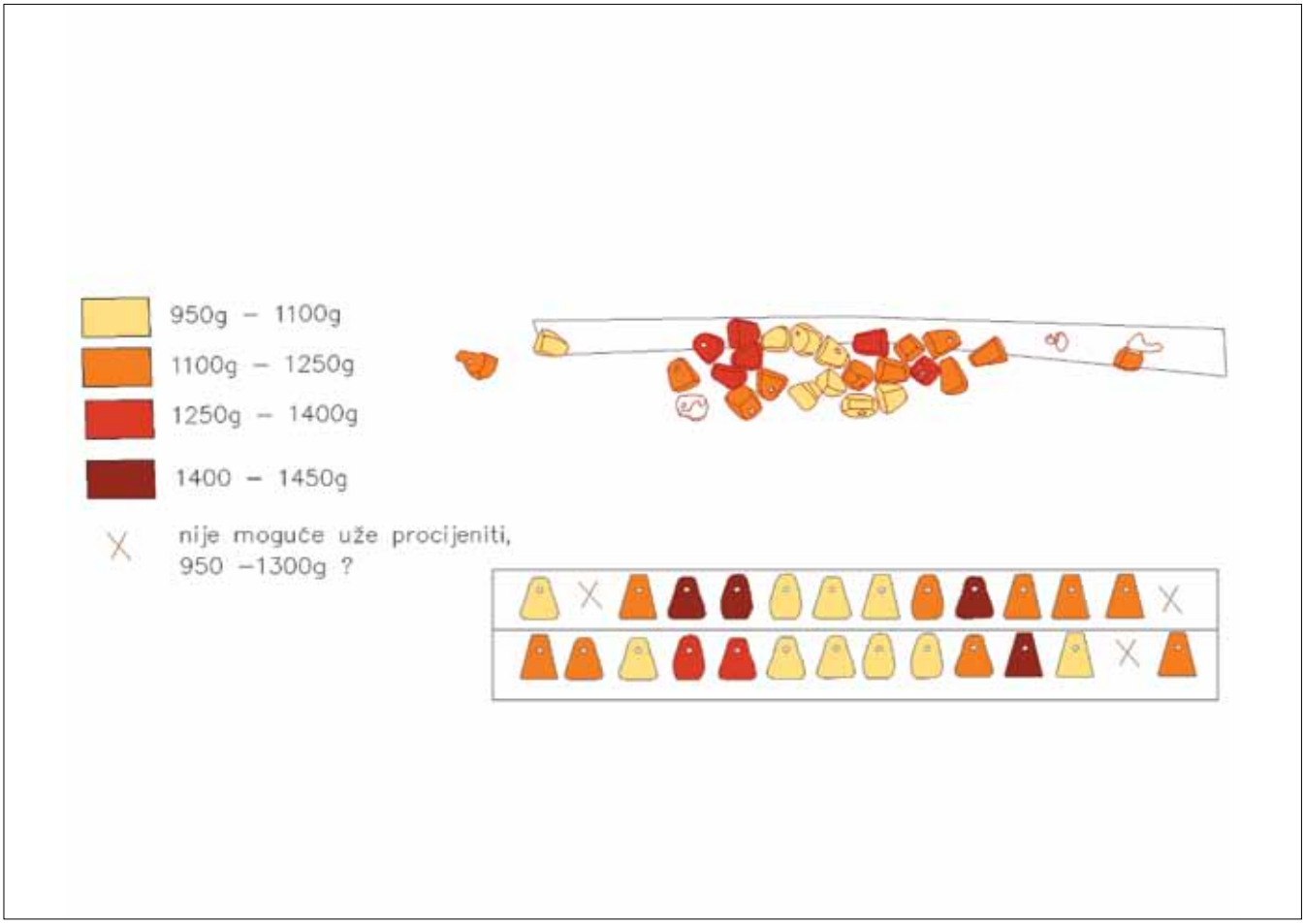


Sl. 13 Rekonstrukcija položaja utega s naznačenim pravilnim nizom utega s oznakama i tipova utega (izradila: T. Karavidović)
Fig. 13 Reconstruction of the position of weights with a marked regular sequence of marked weights and weight types (made by: T. Karavidović)

žine mogao se dobiti i drugačijim prostornim rasporedom utega, primjerice naizmjeničnim postavljanjem težih i lakših utega unutar reda. Iz pretpostavljenog rasporeda utega vidljiv je način postizanja jednolične razine opterećenja u odnosu na ukupnu dužinu reda utega odnosno širinu tkanine, ali i specifičan način uparivanja utega. Uzrok specifične prostorne organizacije odnosno načina uparivanja utega u pretpostavljenoj rekonstrukciji položaja utega mogao je biti nedostupnost prikladnijih utega, specifični tehnološki zahtjev organizacije jednolične razine opterećenja, ali i/ili predodređen položaj pojedinih utega (utezi s oznakom).

Na osnovi iznesenog moguće je zaključiti da je međusobno kombiniranje utega koji se razlikuju oblikom, dimenzijama i težinom imalo ujedno i jedinstvenu, nužnu i praktičnu svrhu olakšavanja procesa postavljanja tkalačkog stana koji je uvjetovan s više parametara. S obzirom na to da gotovo svaki uteg, prema pretpostavci, ima specifičnu svrhu i položaj unutar postava, proces izrade utega također je morao biti promišljen. Utezi su ciljano proizvođeni, odnosno i u tom je dijelu procesa postojala svijest o tome na koji će način tkalački stan biti postavljen. Trebalo je točno znati koliko i kakve je utege potrebno izraditi da bi oni funkcionirali pri izradi određene vrste tkanine.

show significant differences in their masses (cat. no. 20 and 24; 25 and 26) (Fig. 14). For instance, four pairs of lighter weights are positioned in the middle of the setup, there are four pairs of weights of different mass classes on the flanks, and two pairs of weights of medium mass along the edges. The loads are different on certain, narrower parts of the fabric. However, groups of weight pairs are nevertheless regularly and symmetrically (centrally and axially) spatially distributed in both rows in order to achieve an even level of load in relation to the total length of the sequence of weights, that is, the width of the fabric (Fig. 15). In this, the weights are not always paired based on the 1 : 1 principle, but the regular distribution of mass relative to width is achieved in a sequence of four pairs of weights. The grouping of weights in fours can be detected in their in situ spatial distribution (Fig. 10). The regular and symmetrical distribution of mass played a role in the technological part of the process of making fabric on a vertical loom. The even and symmetrical distribution of the weight mass relative to the total length of the sequence of weights, that is, the width of the fabric being produced, ensures a balanced level of strain on the fabric as a whole, as well as on the horizontal beam from which the warp threads are suspended, that is, on the loom structure. An assemblage of weights positioned in this



Sl. 14 Raspored utega utvrđen istraživanjem i rekonstrukcija položaja utega s naznačenim težinama (izradila: T. Karavidović)
Fig. 14 Distribution of weights determined by the research and a reconstruction of the position of weights with marked masses (made by: T. Karavidović)

C. EKSPERIMENTALNO TESTIRANJE PREDLOŽENOG POSTAVA TKALAČKOG STANA

Na osnovi izloženog, eksperimentalno su izvedena dva načina privezivanja niti osnove na utege (eksperiment 1) i dvije varijante tkanja (eksperiment 2). Cilj je saznati može li predložena rekonstrukcija položaja utega funkcionirati te na koji je način potrebno postaviti niti osnove kako bi se dobila homogena tkanina s ravnomjerno raspoređenim nitima odnosno s jednakim brojem niti osnove po centimetru.

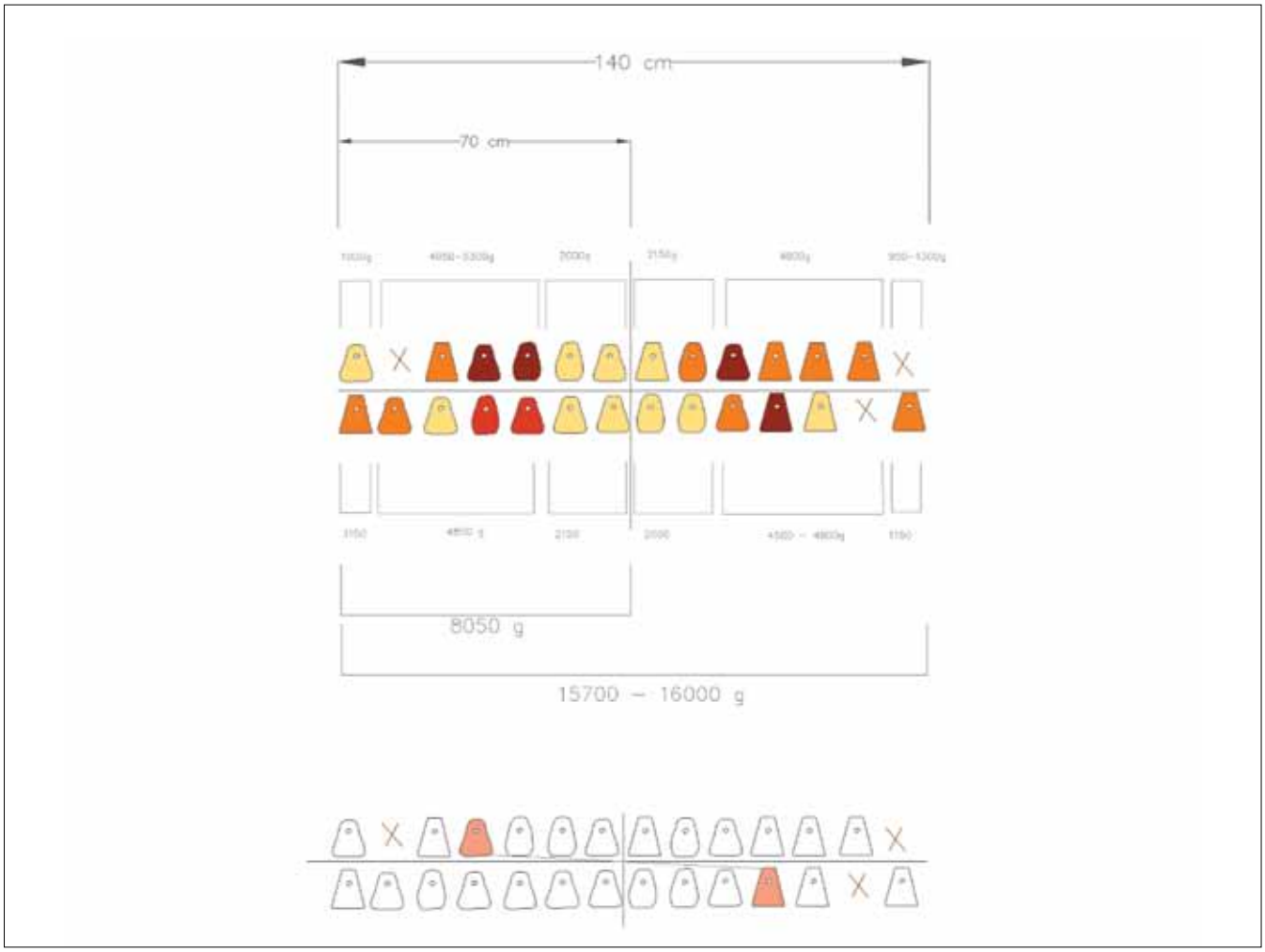
1. eksperiment – način vezivanja niti osnove na utege

Vezivanje niti osnove na utege moguće je izvesti na dva načina: neposredno – provlačenjem svih niti osnove kroz perforaciju na utegu, ili posredno – u vidu svojevrsne omče ili graničnika na koji se vežu niti osnove. Obje su varijante eksperimentalno isprobane.

1.1. Provlačenje niti osnove kroz perforaciju

U prvom primjeru niti vune različite razine napetosti/debljine (30 g – 0,6 mm, 50 g – 1–1,5 mm, 80 g – 1,5–2 mm) way is in equilibrium and maintains the level of the fabric in balance. Unbalanced distribution of weight, for instance, occasional clusters of heavier weights, would cause greater load at certain parts, which might stretch out certain parts of the fabric and also influence the overall statics of the loom. Balanced distribution of weight might also be achieved by a different spatial distribution of weights, for instance, by alternating placement of heavier and lighter weights in the sequence. A look at the presumed arrangement of weights reveals the way to achieve an equal level of strain relative to the total length of the sequence of weights, that is, the width of the fabric, as well as the specific way in which the weights were paired. The specific spatial organization, that is, the method of pairing weights in the presumed reconstruction of their position may have been caused by the unavailability of more suitable weights, by specific technological requirements for organizing a uniform level of strain, but also/or the predestined position of certain weights (those bearing a mark).

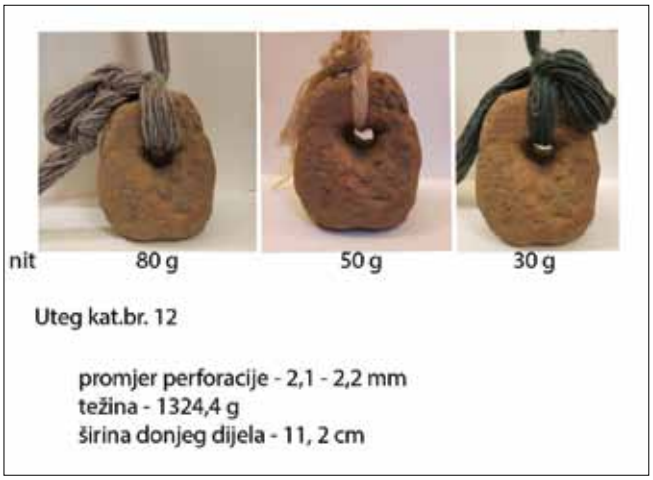
Based on all of this it is possible to conclude that these combinations of weights differing in shape, dimensions and mass at the same time had a unique, necessary and practical purpose to facilitate the process of setting up a loom,



Sl. 15 Rekonstrukcija položaja utega s naznačenim težinama, utega s jedinstvenim oznakama i prikaz pravilnosti u njihovu rasporedu (izradila: T. Karavidović)

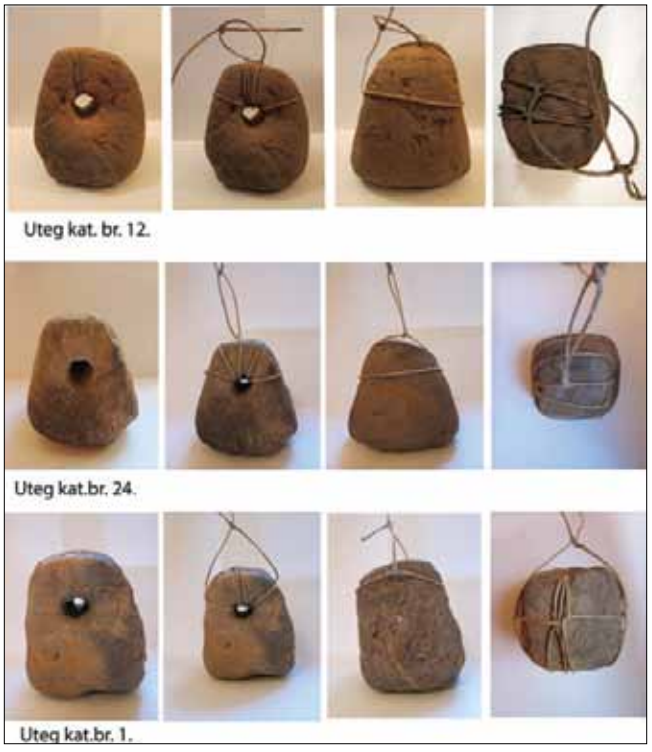
Fig. 15 Reconstruction of the position of the weights with marked masses, weights with unique marks and a representation of regularities in the spatial layout (made by: T. Karavidović)

vezivane su izravno na uteg. Vezivanje je bilo otežano i dugotrajno zbog odnosa promjera perforacije utega i debljine snopa niti. Na pojedinim utezima (kat. br. 4, 6–7, 26, 28–29) nije bilo moguće provući snop s odgovarajućim brojem niti (pravilno napete) kroz perforaciju. Na utezima na kojima je to bilo moguće, niti se nisu uplitale, rasplitale ni pomicale pri tkanju (sl. 16).



Sl. 16 Vezivanje niti različite potrebne napetosti izravno na uteg (izradila i snimila: T. Karavidović)

Fig. 16 Attachment of threads requiring different level of tautness directly to weights (made and photographed by: T. Karavidović)



Sl. 17 Vezivanje niti osnove posredno preko omče, prikaz mogućih varijanti omče na osnovi tragova niti na utezima (izradila i snimila: T. Karavidović)

Fig. 17 Attaching warp threads indirectly with a loop, a representation of the possible variants of the loops based on the thread-wear traces on weights (made and photographed by: T. Karavidović)

which was conditioned by several parameters. In view of the fact that almost every weight, so it is presumed, had a specific purpose and position within the setup, the process of making weights also had to be thought out beforehand. Weights were produced intentionally, in other words, also in this part of the process there was an idea about the way in which the loom would be set up. It was essential to know precisely how many and what kind of weights were required for them to function in the production of a specific kind of fabric.

C. EXPERIMENTAL TESTING OF THE PROPOSED LOOM SETUP

Based on what has been mentioned, we carried out two experiments. In the first one we tested two methods of attaching warp threads to weights (experiment 1) while the other focused on two variants of weaving (experiment 2). The objective was to learn whether the proposed reconstruction of the position of the weights was feasible and in what way the warp threads had to be placed to achieve a homogeneous fabric with evenly distributed threads, that is, with the same number of warp threads per centimetre.

Experiment 1 – a method of attaching warp threads to weights

Warp threads may be attached to weights in two ways: directly – by threading all the warp threads through the perforation in the weight, or indirectly – by a loop of sorts, on which warp threads are attached. Both variants were tested experimentally.

1.1. Threading warp threads through the perforation

In the first test, wool threads of various level of tautness/thickness (30 g – 0.6 mm, 50 g – 1–1.5 mm, 80 g – 1.5–2 mm) were directly attached to the weight. The attachment was hampered and prolonged due to the ratio of the diameter of the perforation on the weight and the thickness of the thread bundle. On some of the weights (cat. no. 4, 6–7, 26, 28–29) it was impossible to thread the bundle with the corresponding number of threads (properly taut) through the perforation. On the weights where this was possible, the threads neither entangled, unweaved nor moved during weaving (Fig. 16).

1.2. Threading warp threads with a loop

In the second test the threads were attached indirectly, to a loop made of hemp threads (1.5 mm thick). The attachment was simpler and faster. They neither moved during weaving, nor they entangled or unwove. The experiments tested several ways in which the loop might be fastened based on the traces observed on some weights (Fig. 17). Most often these consist of one or two impressed lines visible above the perforation on either side of the weight, sometimes also on the lateral sides at level with the middle of the perforation. Direct attachment of a bundle of threads to the weight probably would not leave such conspicuous

1.2. Provlačenje niti osnove pomoću omče

U drugom primjeru niti su vezivane posredno, na omču načinjenu od niti konoplje (debljine 1,5 mm). Vezivanje je bilo jednostavnije i brže. Pri tkanju se niti nisu pomicale, uplitale niti rasplitale. Eksperimentalno je isprobano nekoliko varijanti vezivanja omče na osnovi tragova uočenih na pojedinim utezima (sl. 17). Najčešće je riječ o jednoj ili dvije udubljene linije vidljive iznad perforacije s obje strane utega, ponekad i na bočnim stranama u visini sredine perforacije. Privezivanje snopa niti izravno na uteg vjerojatno ne bi ostavilo tako izražene zasebne udubljene linije, a opcija da se na uteg privezuje jedna ili dvije niti nije vjerojatna s obzirom na težinu i širinu utega. Tkanje proizvedeno s tako malo niti po utegu bilo bi izrazito rijetko (dvije niti osnove na prosječnih 10 cm širine po utegu).

Zaključak eksperimenta 1: Iz rezultata eksperimenata kao i proučavanja tragova niti na pojedinim utezima moguće je pretpostaviti da su niti osnove vezivane na utege posredno preko svojevrsne omče. Ovakav način vezivanja bilo je moguće izvesti na svim utezima, a pokazao se znatno jednostavniji i brži.

2. eksperiment – varijante osnivanja

U eksperimentima tkanja za osnovu je korištena industrijski proizvedena vuna, bez sintetičkih primjesa. Riječ je o jednonitnoj vuni koja potražuje razinu napetosti od 50 g, kakva je, prema rezultatima prikazanim u tablicama 1–7, optimalna opcija za ovu skupinu utega. Nit je debljine 1–1,5 mm u napetom stanju. Nit slične debljine mogla bi biti proizvedena koristeći pršljen težine iznad 44 g (Mårtensson et al. 2009: 378). Uobičajeno je mišljenje da su veći i teži pršljenovi služili za izradu debljih niti od vune ili lana (Grömer 2005b: 116; Belanová Štolcová, Grömer 2010: 13). Zanimljivo se čini napomenuti da je tijekom istraživanja, nakon uklanjanja humusnog sloja u S-10, pronađena polovica keramičkog pršljena (kat. br. 37). Njegova ukupna procijenjena težina (oko 53,8 g) pokazuje da je mogao biti korišten za izradu niti spomenute debljine od vune ili niti lana.

Tkanina je izvedena tehnikom običnog tkanja (engl. *tabby*) koja se smatra osnovnom, najjednostavnijom tehnikom. Korištena je tijekom neolitika, brončanog i željeznog doba, a prema poznatim nalazima tekstila s područja istočne i zapadne Europe, čini se najučestalijom tehnikom upravo u razdoblju mlađega željeznog doba (Bender Jørgensen 2005: 134, sl. 1–2; Belanová Štolcová, Grömer 2010: 16; Bender Jørgensen, Grömer 2012: 100, sl. 7).[23]

Za potrebe eksperimenta izrađene su replike utega. Utezi su postavljeni u linijski raspored prema prijedlogu rekonstrukcije. Utezi kat. br. 9, 32 i 30, za koje na osnovi sačuvanog volumena nije bilo moguće procijeniti težinu uže od 950 do 1300 g, izrađeni su u težini koja bi odgovarala kako bi se postigao simetričan raspored težine grupa utega (sl. 18).

23 Postoji više varijanti običnog tkanja. Ravnomjerno izvedeno tkanje znači da je broj niti osnove (vertikalnih niti) i potke (horizontalnih niti) na 1 cm² približno jednak. Broj niti osnove i potke može varirati. Ako je broj niti osnove veći od broja niti potke, tada su na licu tkanine vidljive niti osnove (engl. *warp-faced*), u suprotnom vidljive su niti potke (engl. *weft-faced*). Tkanina može biti otvorena, odnosno rijetko tkana ili zatvorena, odnosno gusto tkana.

separate impressed lines. Also, the possibility that one or two threads were attached to the weight is not likely considering the mass and width of the weight. A fabric produced with so few threads per weight would be extremely open (two warp threads per average width of 10 cm per weight).

Conclusion of experiment 1: The results of the experiments and the study of the thread wear marks on some weights allows the assumption that warp threads were attached to weights indirectly through a loop of sorts. Such a way of attachment was possible on all the weights, and it proved far simpler and faster.

Experiment 2 – warping variants

In the weaving experiments we used industrially produced wool without synthetic inclusions for the warp. This is a single-thread wool requiring a tensile strain of 50 g, which, based on the results shown in tables 1–7, is the optimal solution for this group of weights. The thread is 1–1.5 mm thick when taut. A thread of similar thickness might be produced using a spindle-whorl with a mass greater than 44 g (Mårtensson et al. 2009: 378). It is generally believed that larger and heavier spindle-whorls were used for making thicker threads of wool or linen (Grömer 2005b: 116; Belanová Štolcová, Grömer 2010: 13). It might be interesting to mention that in the course of the excavation, when the topsoil layer in trench 10 had been removed, we found a half of a ceramic spindle-whorl (cat. no. 37). Its total estimated mass (around 53.8 g) suggests that it might have been used for making threads of the mentioned mass from wool or linen threads.

The fabric was woven in tabby weave, which is considered the basic, simplest technique. It was used during the Neolithic and the Bronze and Iron Ages, and based on the known textile finds from Eastern and Western Europe, this was probably the most common technique precisely in the Late Iron Age (Bender Jørgensen 2005: 134, Fig. 1–2; Belanová Štolcová, Grömer 2010: 16; Bender Jørgensen, Grömer 2012: 100, Fig. 7).[23]

Weight replicas were made for the experiment. Weights were placed in a sequence suggested by the reconstruction. Weights cat. no. 9, 32 and 30, whose volume was only partially preserved and consequently their mass was only broadly estimated at between 950 and 1300 g, were made with a mass optimized for a symmetrical distribution of the masses of the weights groups (Fig. 18).

Before the warp threads were placed on the loom, the starting border was made (Fig. 19–20).[24] In order to achieve

23 There are several variants of tabby weave. An even weave means that the number of warp threads (vertical threads) and weft threads (horizontal threads) per cm² is approximately the same. The number of warp and weft threads may vary. If the number of warp threads is bigger that weft threads, the fabric is said to be warp-faced, and in the opposite case, it is weft-faced. Fabrics may be open, that is thinly woven, or closed, i.e. densely woven.

24 The making of the starting border precedes the setting of the warp threads on the loom. This action ensures a more resistant border for the fabric, the warp threads are divided evenly into back and front ones, facilitating the process of setting up the warp.

Sl. 18 Predloženi raspored utega korišten u eksperimentima s naznačenim težinama svih utega i linijskim rasporedom kataloških brojeva utega (izradila: T. Karavidović)

Fig. 18 Proposed distribution of weights used in the experiments with marked masses of all weights and the linear sequence of catalogue numbers of weights (made by: T. Karavidović)

Prije no što su niti osnove postavljene na tkalački stan, izrađena je početna/rubna traka/obrub (sl. 19–20).[24] Kako bi se postiglo da rubovi tkanine ravnomjerno i ravno teku cijelim tkanjem (tkanina ima jednoličnu širinu), dužina početne trake s nitima osnove trebala bi biti jednako duga ili malo kraća u odnosu na dužinu linijski postavljenog reda utega (Mårtensson et al. 2009: 388). Virovskih 28 utega, za koje je pretpostavljeno da su činili isti postav, postavljeni neposredno jedan do drugoga u dva paralelna reda, dužine su između 140 i 150 cm (sl. 21). Ove dimenzije ujedno označavaju i pretpostavljenu širinu tkanine za izradu koje su utezi korišteni. Početna je traka izrađena na vertikalnom tkalačkom stanu (sl. 19) s nitima vune koje potražuju napetost 80 g. Širina početne trake iznosila je 3,5 cm, a dužina 140 cm (sl. 20–21).

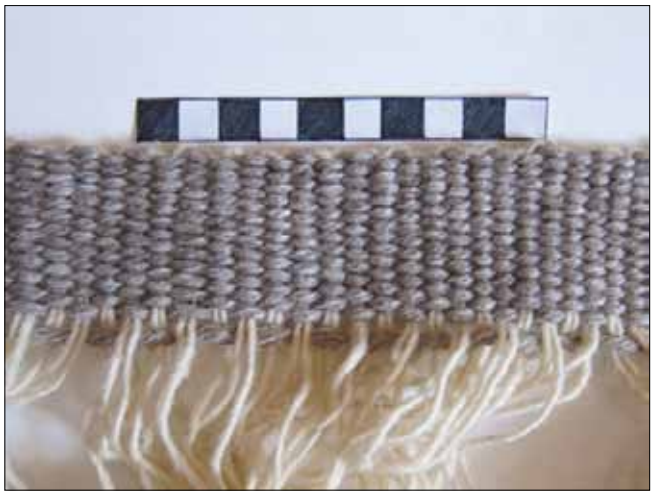
Kada bi svi utezi koji su pronađeni pri dnu latenskog objekta stajali u istom postavu tkalačkog stana, širina tkanine iznosila bi između 170 i 180 cm. Taj je podatak znathat the borders of the fabric run evenly and straight around the fabric (that the fabric have a uniform width), the length of the starting border with warp threads ought to be equally long or slightly shorter relative to the length of the linear sequence of weights (Mårtensson et al. 2009: 388). The 28 weights from Virje, which presumably made up a single setup, when placed immediately one next to the other in two parallel rows have the width between 140 and 150 cm (Fig. 21). These dimensions at the same time mark the presumed width of the fabric for whose production the weights were used. The starting border was made on a vertical loom (Fig. 19) with wool threads requiring a strain of 80 g. The width of the starting border was 3.5 cm, and its length was 140 cm (Fig. 20–21).

If all the weights found at the base of the La Tène structure formed part of the same loom setup, the width of the fabric would be between 170 and 180 cm. This piece of information is important for considering the possible dimensions of the loom. If the maximum width of the textile that could be woven on the loom was 170–180 cm, the construction must have been a bit wider to make room for inserting the weft threads from the sides. The soil immedia-

24 Predradnja postavljanju niti osnove na tkalački stan jest izrada početne/rubne trake/obruba. Ovim postupkom osigurava se čvršći rub tkanine, niti osnove razdvajaju se ravnomjerno na stražnje i prednje te se olakšava proces postavljanja osnove.

Sl. 19 Izrada početne trake (izradila i snimila: T. Karavidović)
Fig. 19 Production of the starting border (made by: T. Karavidović)

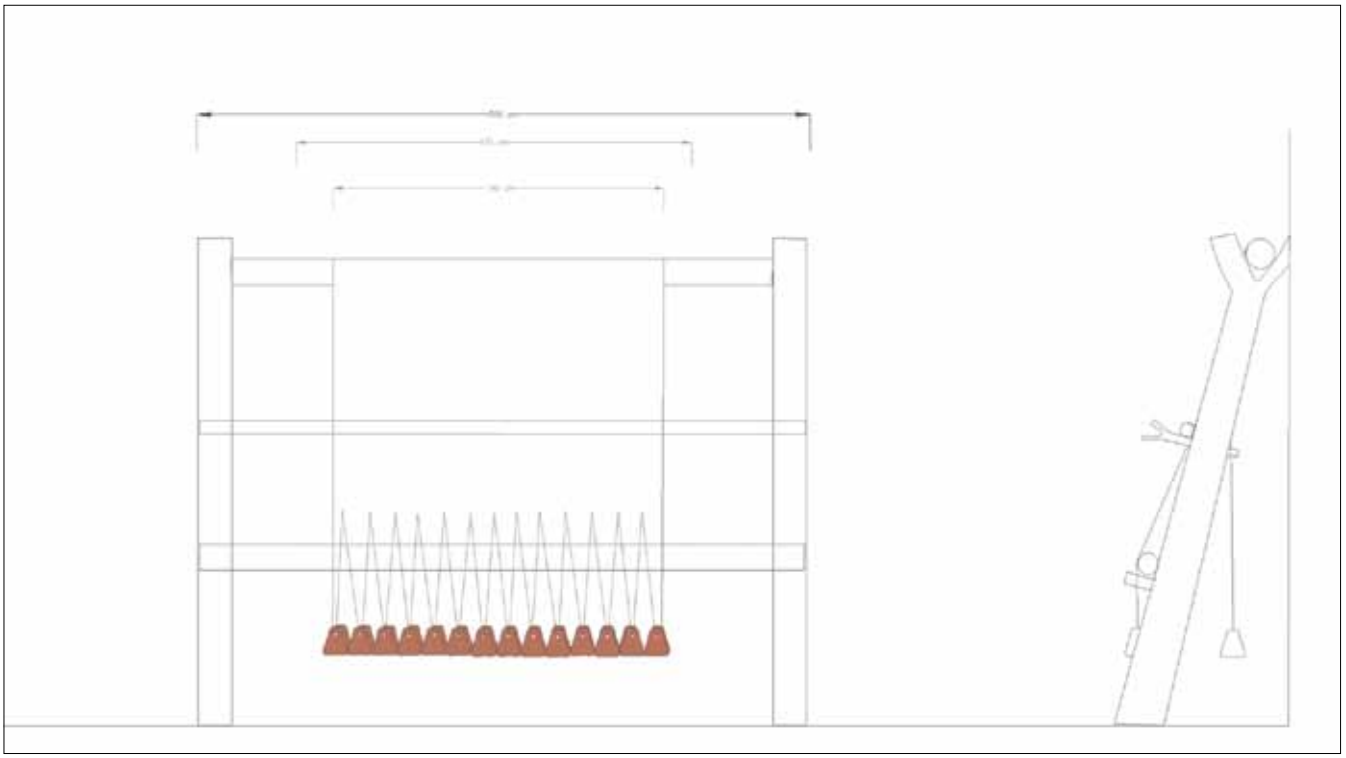
čajan za razmatranje mogućih dimenzija tkalačkog stana. Ako je maksimalna širina tkanine koja se mogla proizvesti na tkalačkom stanu 170–180 cm, konstrukcija je morala biti nešto šira kako bi bilo moguće umetati niti potke s rubnih bočnih strana. Neposredno ispod najveće koncentracije utega dokumentirana je zemlja izrazito sive boje, pravilnijega pravokutnog, izduženog oblika, dimenzija 263 × 20 cm (sl. 3). Moguće je da je širina konstrukcije tkalačkog stana za 80-ak cm šira od širine tkanja te da je otisak pronađen neposredno ispod utega ostatak dijela drvene konstrukcije tkalačkog stana. Širina konstrukcije tkalačkog stana u tom slučaju iznosila bi oko 260 cm. Kako bi se stvorio prirodan zijev između prednjih i stražnjih niti osnove i time olakšalo osnivanje stana i tkanje, poželjno je da konstrukcija vertikalnoga tkalačkog stana stoji pod određenim nagibom. To je moguće postići prislanjanjem ili učvršćivanjem gornjeg dijela stana na ravnu plohu te odmicanjem donjeg dijela dok se ne napravi optimalan nagib. Tkalački stan mogao je biti prislonjen ili konstrukcijski vezan uz sjeverni zid objekta (sl. 22). Činjenica da je sjeverna stijenka ukopa objekta izrazito okomita sasvim je u skladu s tim zahtjevom. Konstrukcija je vjerojatno bila prilično masivna jer je prilikom tkanja tkanine širine 140–150 cm tkalja morala pomicanjem horizontalne prečke pomaknuti oko 16 kg utega, odnosno oko 20 kg za tkaninu širine 170–180 cm.



Sl. 20 Početna traka, detalj (izradila i snimila: T. Karavidović)
Fig. 20 Starting border, a detail (made by: T. Karavidović)

Sl. 21 Niti osnove s početnom trakom i dva reda linijski postavljenih replika utega. Širina početne trake malo je uža od linijski postavljenog reda utega (izradila i snimila: T. Karavidović)
Fig. 21 Warp threads with the starting border and two lines of the linear sequence of weight replicas. The width of the starting border is slightly narrower than the linear sequence of weights (made and photographed by: T. Karavidović)

tely below the densest cluster of weights had a distinctly grey colour, and a rather regular rectangular elongated shape measuring 263 x 20 cm (Fig. 3). It is possible that the width of the loom structure was around 80 cm greater than that of the weave, and that the impression documented immediately below the weights was the remains of a part of the wooden structure of the loom. The width of the loom structure in that case was around 260 cm. In order to make a natural shed between the front and back warp threads, thereby facilitating the initiation of the loom and weaving, the vertical loom would ideally be positioned at a slant. This could be done by reclining or fastening the upper part of the loom to a flat surface and removing the lower part until the optimal angle is achieved. The loom may have been



Sl. 22 Grafički prikaz pretpostavljenog izgleda postavljenoga tkalačkog stana s vidljivim odnosima širine tkanine naspram konstrukcije tkalačkog stana (izradila: T. Karavidović)

Fig. 22 Depiction of the presumed appearance of the loom with a visible ratio of the fabric width to the loom structure (made by: T. Karavidović)

Sl. 23 Tkanje, eksperiment 2.1. (izradila i snimila: T. Karavidović)

Fig. 23 Weaving, experiment 2.1. (made and photographed by: T. Karavidović)

reclined or structurally connected with the northern wall of the structure (Fig. 22). The fact that the northern wall of the trench is distinctly vertical is entirely in keeping with that condition. The structure was probably quite a massive one, since during the weaving of a fabric 140–150 cm wide the weaver, by moving the heddle rod, had to move around 16 kg of weights, or around 20 kg for a fabric 170–180 cm wide.

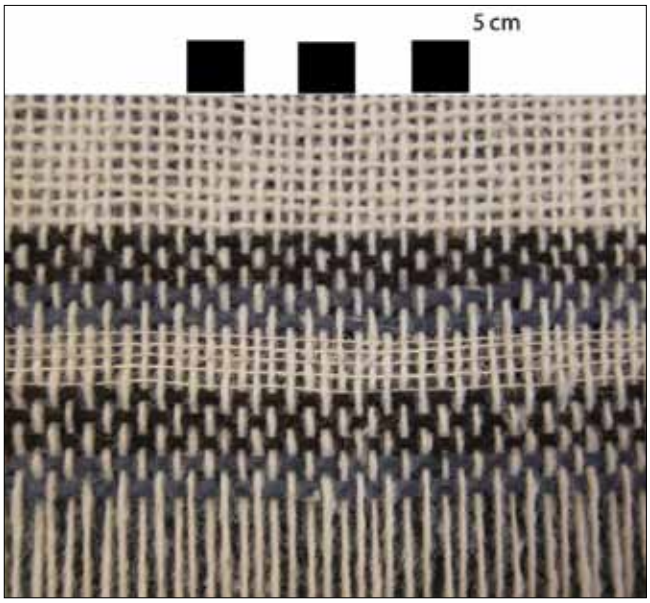
2.1. A different, yet appropriate number of threads per weight

When the warp was placed, different number of threads were attached to individual weights, depending on their mass and width. Weights of the same class strained an approximately equal number of threads. Warp threads were attached to weights indirectly using a loop. The total length of the woven fabric was 15 cm.

The result of experiment 2.1: Distribution of thread tension was uniform along the width of the setup. Threads were evenly distributed, 4–5 warp threads per cm. The edges of the fabric ran straight along the entire length. During the weaving, weft threads of different thickness were used (Fig. 23–24).

2. 2. Equal number of warp threads on all weights

The same warp was used also for the other weaving experiment. The same number of threads were attached to all the weights. The tension of the threads in the middle part of the setup (replicas of lighter weights cat. no. 15–19, 21–23) was uniform, however, significantly lower than on the flanks, where the threads were attached to heavier



Sl. 24 Detalj tkanja, eksperiment 2.1. (izradila i snimila: T. Karavidović)
Fig. 24 Detail of the weaving, experiment 2.1. (made and photographed by: T. Karavidović)

2.1. Različit, ali prikladan broj niti osnove po utegu

Pri postavljanju osnove, na pojedine utege pričvršćen je različit broj niti, ovisno o njihovoj težini i širini. Utezi istog razreda težine nosili su podjednak broj niti. Niti osnove vezivane su na utege posredno preko omče. Istkano je 15 cm tkanja.

Rezultat eksperimenta 2.1: Distribucija napetosti niti cijelom širinom postava bila je jednolična. Niti su bile ravnomjerno raspoređene, 4–5 niti osnove na cm. Rubovi tkanine tekli su ravno cijelom dužinom. Pri tkanju je korišteno nekoliko različitih debljina niti potke (sl. 23–24).

2. 2. Jednak broj niti osnove na svim utezima

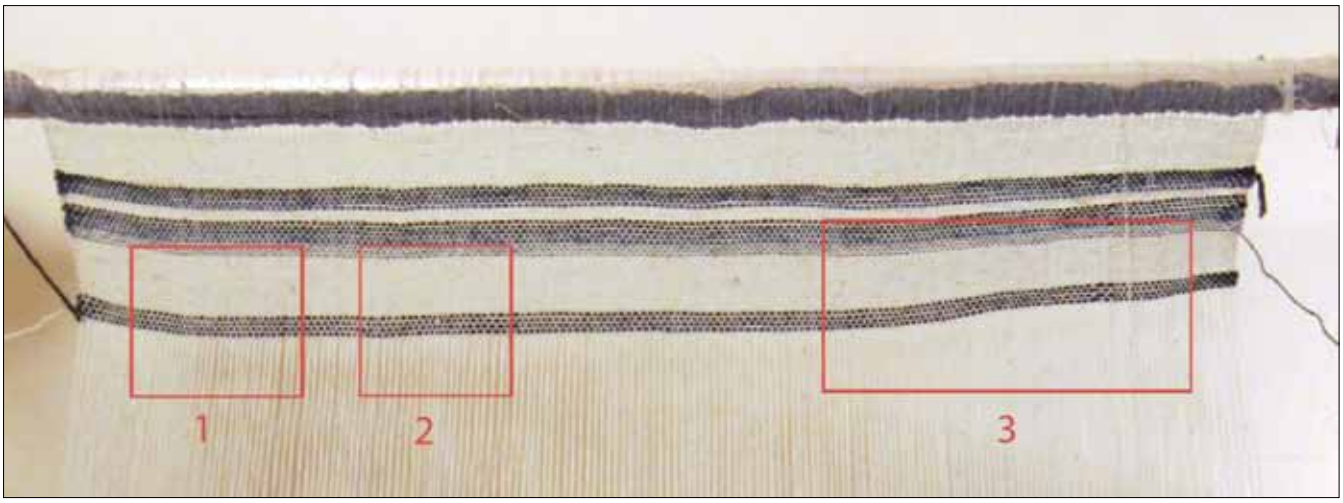
Za drugi eksperiment tkanja korištena je ista osnova. Na sve utege pričvršćen je jednak broj niti. Napetost niti na središnjem dijelu postava (replike lakših utega kat. br. 15–19, 21–23) bila je jednolična no osjetno niža nego na bočnim dijelovima na kojima su niti pričvršćene na teže utege (replike kat. br. 8, 10, 12–13, 20, 25). Napetost na krajnjim bočnim parovima utega također je bila niža (replike kat. br. 3, 6–7, 9, 11, 14). Napetost niti varirala je na dijelovima tkanja na kojima su redom postavljeni utezi različitih razreda težine, ovisno o težini utega na kojem su ovješene niti (na težim utezima niti su bile napetije nego na lakšim). Istkano je 10 cm tkanja.

Rezultat eksperimenta 2.2.: Tkanina se blago suzila, a rubovi tkanine bili su valoviti (sl. 25). Razlog je nedovoljna napetost niti pri rubovima, te se niti provlačenjem i natezanjem potke pomiču. Niti osnove mjestimično su bile gušće i/ili neravnomjerno raspoređene. Ta nepravilnost (sl. 26/1) poglavito se očitovala na dijelu tkanine gdje razlike u težini utega u paru prelaze 150 g (replike kat. br. 20 i 24, 26 i 25). Jače nepravilnosti (sl. 26/1, 2 i 3) očitovale su se i na područjima na kojima su u nizu utezi s velikim razlikama u težini weights (replicas cat. no. 8, 10, 12–13, 20, 25). The tension on the extreme lateral pairs of weights was likewise lower (replicas cat. no. 3, 6–7, 9, 11, 14). The tension of the threads varied in the parts of the fabric on which weights of different mass classes were positioned, which depended on the mass of the weight to which the threads were attached (threads on the heavier weights were more taut than on the lighter weights). The total length of the woven fabric was 10 cm.

The result of experiment 2.2.: The fabric slightly narrowed, and its edges became undulated (Fig. 25). The reason for this is the insufficient tautness at the edges, so the threading and pulling of the warp moved the threads. Warp threads were at places denser and/or unequally distributed. This irregularity (Fig. 26/1) primarily manifested itself in the part of the fabric where the differences in the mass of the weight pairs exceeded 150 g (replicas cat. no. 20 and 24; 26 and 25). Greater irregularities (Fig. 26/1, 2 and 3) manifested themselves also in the areas in which weights with greater differences in mass stood in a sequence (replicas cat. no. 7, 8, 11, 10 and 20, 26, 24, 25, 28, 30). The most regular segment of the fabric was in the middle, where the weight pairs had a very similar mass, between 950 and 1100 g (replicas cat. no. 15, 16, 17, 18, 19, 21, 22, 23).

Sl. 25 Tkanje, eksperiment 2.2. (izradila i snimila: T. Karavidović)
Fig. 25 Weaving, experiment 2.2. (made and photographed by: T. Karavidović)

Conclusion of experiment 2: Based on the conducted experiments we may conclude that the proposed reconstruction of the setup of the 28 weights may have produced a homogeneous fabric with evenly distributed warp threads by attaching a different yet appropriate number of threads per weight, depending on the mass and width of in-



Sl. 26 Tkanje, eksperiment 2.2. Označeni su dijelovi tkanja na kojima su se nepravilnosti najviše očitovale (izradila i snimila: T. Karavidović)
Fig. 26 Weaving, experiment 2.2. Marked are the parts of the weaving in which irregularities came most to the fore (made and photographed by: T. Karavidović)

(replike kat. br. 7, 8, 11, 10 i 20, 26, 24, 25, 28, 30). Najpravilnije tkanje zadržalo se na središnjem dijelu tkanine na kojem se nalaze upareni utezi vrlo slične težine između 950 i 1100 g (replike kat. br. 15, 16, 17, 18, 19, 21, 22, 23).

Zaključak eksperimenta 2: Iz provedenih eksperimenata moguće je zaključiti da je predložena rekonstrukcija postava 28 utega mogla proizvesti homogenu tkaninu s ravnomjerno raspoređenim nitima osnove na način da se po utegu pričvrsti različit ali prikladan broj niti ovisno o težini i širini pojedinog utega (eksperiment 2.1; sl. 23–24, 27).

Sl. 27 Usporedni rezultati tkanja, detalj (izradila i snimila: T. Karavidović)
Fig. 27 Comparative results of the weaving, a detail (made and photographed by: T. Karavidović)

dividual weights (experiment 2.1; Fig. 23–24, 27). In that case, a uniform distribution and regular level of tension of the warp threads was achieved, in other words, the produced fabric had the same number of warp threads per cm, the fabric is regular, homogeneous and uniform. In this, groups of weights function as pairs, and it is clear that in pairing weights one can combine also those whose mass differs for more than 150 g, provided that the total mass and width of the group of weights of the front and back rows are roughly equal. The regular distribution of the total level of tension relative to the total length of the sequence of weights, that is, the width of the fabric, was achieved by the symmetrical layout of the weight mass. A group of four pairs of lighter weights stood in the centre of the setup, while a bit greater, symmetrically distributed load was achieved in groups of four pairs of weights on the lateral parts of the fabric (Fig. 18).

D. CONCLUDING OBSERVATIONS

Based on the previous understanding about the La Tène textile production it is assumed that textile production became massive and standardized. Such a conclusion is based on the fact that the tools associated with this production (spindle-whorl) acquired a standardized shape, and the preserved remains of fabrics exhibit certain uniformity (Grömer 2010b: 185; 2014: 9). Unlike spindle-whorls from the Hallstatt period, which exhibited a variety of shapes and were often decorated, the La Tène specimens are usually standardized and sometimes, the same role is fulfilled by perforated potsherds. Unlike the Hallstatt period, which is characterized by an exceptionally wide range of diverse sorts of fabrics, the well-known textile of the La Tène period was mostly made in tabby weave, often has a standardized quality and number of warp threads per centimetre. A certain regional, as well as local uniformity in the production of textile is noticeable. Finds of pieces of fabric from the same sites often feature a very similar, almost identical workmanship (Bender Jørgensen 2005: 135). The workmanship of the analysed textile, if of a diminished range, is nevertheless of

U tom slučaju postignuta je jednolična distribucija napetosti te pravilna razina napetosti niti osnove, odnosno proizvedena tkanina ima jednak broj niti osnove na cm, tkanje je pravilno, homogeno i jednolično. Pri tome, grupe utega funkcioniraju kao parovi te je vidljivo da je moguće međusobno uparivati i utege čija se težina razlikuje za više od 150 g ako je ukupna težina i širina grupe utega prednjeg i stražnjeg reda podjednaka. Pravilna distribucija ukupne razine opterećenja u odnosu na ukupnu dužinu reda utega odnosno širinu tkanine postignuta je simetričnim rasporedom težine utega. Grupa od četiri para lakših utega stajala je na sredini postava, dok je nešto veće, simetrično raspoređeno opterećenje postignuto u grupama od po četiri para utega na bočnim dijelovima tkanja (sl. 18).

D. ZAKLJUČNA RAZMATRANJA

Na osnovi dosadašnjih spoznaja o proizvodnji tekstila u razdoblju latena pretpostavlja se da dolazi do masovne, standardizirane proizvodnje tkanina. Takav zaključak temelji se na činjenici da su alatke vezane uz proizvodnju (pršljen) standardnog oblika, a sačuvani ulomci tekstila čine se uniformnim (Grömer 2010b: 185; 2014: 9). Naime, pršljenovi za predenje iz halštatskog doba često su raznolikog oblika, nerijetko i ukrašeni, dok su latenodobni obično standardiziranog oblika, a ponekad se u istu svrhu koriste i perforirani ulomci keramičkih posuda. Za razliku od halštatskog razdoblja u kojem je vidljiv iznimno šarolik repertoar različitih vrsta tkanja, poznati latenodobni tekstil izrađen je većinom u tehnici običnog tkanja, često je standardizirane kvalitete i broja niti osnove po centimetru. Primijećena je i određena regionalna kao i lokalna uniformnost u izradi tkanina. Nalazi dijelova tkanine s istih lokaliteta najčešće su vrlo slične, gotovo jednake izrade (Bender Jørgensen 2005: 135). Analizirani tekstil, iako smanjenog repertoara, ipak je kvalitetne izrade, a mogao je biti i bogato dekoriran (Bender Jørgensen, Grömer 2012: sl. 7). Tekstilni nalazi iz rudnika soli Dürrenberg u Austriji (Stöllner 2005: 168), kao i ostaci tekstila očuvanog na metalnim predmetima iz latenodobnih grobova na području Slovačke i Češke (Limburský et al. 2015: 222–223, Obr. 29; Belanová 2007: 43–44; Grömer 2016: 202, 220, 403–404, sl. 120)[25] upućuju na to da su tkanine bile bojene, a raznoliki su uzorci izvedeni tehnikom flotirajuće niti (engl. *flying thread tehnique*) ili vezenja te stvaranjem uzorka spajanjem različito uvijenih niti (S- ili Z-uvoj) na istoj tkanini.

Objekt u kojem se nalazi tkalački stan moguće je interpretirati kao radni prostor namijenjen isključivo za tkanje (engl. *weaving hut*). Proces izrade tkanine, od obrade sirovine do finalnog proizvoda, izrazito je dugotrajan i zahtijeva veći prostor, stoga nije neobično da su postojali zasebni prostori ili objekti u kojima su se obavljali pojedinačni segmenti procesa. Nalazi keramičkih utega za tkalački stan općenito su rjeđi u latensko u odnosu na halštatsko doba, a good quality, and it was also sometimes richly decorated (Bender Jørgensen, Grömer 2012: Fig. 7). Textile finds from Dürrenberg salt mine in Austria (Stöllner 2005: 168), as well as the remains of textile preserved on metal objects from La Tène graves in Slovakia and the Czech Republic (Limburský et al. 2015: 222–223, Obr. 29; Belanová 2007: 43–44; Grömer 2016: 202, 220, 403–404, Fig. 120)[25] suggest that textiles were dyed, and that diverse patterns were executed using the flying thread technique or embroidery and by combining differently twisted threads (S- or Z-twist) on the same fabric.

A structure accommodating a loom may be interpreted as a working space dedicated exclusively to weaving: a weaving hut. The textile making process, from the processing of the raw material to the final product, is an extremely long one, which requires a large space. Due to this, it is not unusual that there were separate spaces or structures dedicated to work on individual segments of the process. Finds of ceramic loom weights are generally more rare in the La Tène period relative to the Hallstatt period, which might be due to the present state of research, but also due to the introduction of a new way of making fabric, such as the vertical loom on two horizontal beams (Stöllner 2005: 173; Belanová Štolcová, Grömer 2010: 16). Nevertheless, in the broader region (Lower Austria, Slovakia, Bohemia, Western Hungary) there are known examples of individual finds of ceramic weights in La Tène contexts,[26] as well as of clusters of weights inside structures. An Early La Tène structure with in situ ceramic weights was found at Gőr in western Hungary (Marton 2001: 297–302, T. 1–3, Fig. 1–3; Horváth, Marton 1998: 252, Fig. 12–13, 19)[27] and at Mitterretzbach in Lower Austria (Trebsche 2014: 182–185),[28] while examples from the Late La Tène include structures from the sites of Litovska Mara II and Devin Castle in Slovakia and from Křinec in Bohemia (Belanova et al. 2005: 106, 108, Fig. 2).[29] A testimony to the weaving activity in the Scordiscan La Tène settlement at Gomolava

25 Bitnim se čini naglasiti da tekstilne ostatke očuvane na metalnim predmetima iz grobova često nije moguće kontekstualno definirati kao dijelove odjevnih predmeta nego su mogli imati drugu (možda sekundarnu) uporabu. Funkcionalnu uporabu imaju ostaci tekstila pronađeni unutar šupljih brončanih narukvica (Müllauer 2011: 586–604; Belanová 2007: 43–44), a tekstil je mogao biti korišten za umatanje predmeta/priloga u grobovima (Grömer 2016: 404).

25 It seems important to stress that textile remains preserved on metal objects from burials are not always possible to define contextually as parts of clothing items, but they might have rather had another (possibly secondary) usage. The remains of textile discovered inside hollow bronze bracelets (Müllauer 2011: 586–604; Belanová 2007: 43–44) had a functional use, and the textile may have been used for wrapping objects/goods in burials (Grömer 2016: 404).

26 The 2010 excavations at the neighbouring site Volarski breg yielded a complete pyramidal weight, attributed to the Late Bronze Age in the first publication (Čimin 2011: 13, 49).

27 The structure was dated to the transition from the Hallstatt to the La Tène period. A cluster of 20 pyramidal weights (divided into three types by mass: 1.25, 1.5 and 1.75 kg) was found within the structure (pit 1-6c). A linear sequence of weights ran 80 cm long, while the presumed width of the loom was around 1 m. Three (or four) holes for support beams of the loom, 10 cm in diameter, were found within the structure,

28 More than 100 weights were found *in situ* inside the structure, probably for two looms. Certain weights bear marks in the shape of one or several impressed dots on the upper surface.

29 Here we ought to mention two structures excavated at Tápiószele in Central Hungary, which yielded pyramidal weights – 4 found south-west of the hearth and 14 grouped along the northern wall of house II, and several weights along the northern edge and a cluster of 13 weights in the north-eastern corner of house III, dating from Lt D. The author, omitting the loom altogether, associates their function with the hearths inside the structures, interpreting them as holders/postaments for pots (Hellebrandt 1999: 42–50, 118, Fig. 19–20, Pl. XVI: 15–17).

uzrok čemu može biti trenutačno stanje istraživanja, ali i uvođenje novog načina izrade tkanine poput vertikalnoga tkalačkog stana na dvije horizontalne prečke (Stöllner 2005: 173; Belanová Štolcová, Grömer 2010: 16). Ipak, na području šire regije (Donja Austrija, Slovačka, Češka, zapadna Mađarska) poznati su primjeri pojedinačnih nalaza keramičkih utega u latenodobnom kontekstu,[26] ali i koncentracije utega unutar objekata. Ranolatenski objekt s keramičkim utezima *in situ* pronađen je na nalazištu Gőr u zapadnoj Mađarskoj (Marton 2001: 297–302, T. 1–3, sl. 1–3; Horváth, Marton 1998: 252, sl. 12–13, 19)[27] te na lokalitetu Mitterretzbach u Donjoj Austriji (Trebsche 2014: 182–185),[28] dok u doba kasnog latena datiraju objekti s lokaliteta Liptovska Mara II i dvorca Devin u Slovačkoj, te Křinec u Češkoj (Belanova et al. 2005: 106, 108, sl. 2).[29] O tkalačkoj aktivnosti u kasnolatenskom naselju Skordiska na lokalitetu Gomolava svjedoči niz od 15 utega pronađenih pri dnu djelomično istraženog objekta za koji se pretpostavlja da je funkcionirao kao tkalačka radionica (Jovanović 2009: 118).

Konstrukcija virovskog tkalačkog stana unutar objekta vjerojatno je stajala prislonjena ili konstrukcijski vezana uz sjeverni rub objekta (sl. 22). Prema broju utega pronađenih pri dnu objekta te dužini traga drvene grede pretpostavljeno je da je širina konstrukcije mogla okvirno iznositi oko 260 cm. Maksimalna širina tkanine koja se mogla proizvesti na tkalačkom stanu, kada bi svih 36 utega stajalo postavljeno u dva paralelna reda, iznosila bi 170–180 cm. Širina tkanine koja se mogla proizvesti sa 28 linijski raspoređenih utega pronađenih uz sjeverni rub objekta (kat. br. 3, 6–31) iznosila bi 140–150 cm. Zajedno postavljeni, utezi su idealno namijenjeni izradi tkanine s debljim nitima osnove (4–6 niti na cm). Na osnovi prostornog rasporeda utega utvrđenog istraživanjem, predložena je rekonstrukcija položaja utega za koje je pretpostavljeno da su činili jedinstven postav tkalačkog stana. Riječ je o 28 linijski raspoređenih utega pronađenih uz sjeverni rub objekta. Ostali utezi isključeni su iz pokušaja rekonstrukcije s obzirom na to da njihov položaj, utvrđen istraživanjem, ne odgovara konstrukcijskim normama vertikalnih tkalačkih stanova. Predloženi raspored utega upućivao je na postojanje pravilnosti i simetrije u položaju utega s oznakama, oblikovno različitih utega (tip I, II, III) te

26 Na susjednom položaju Volarski breg tijekom iskopavanja 2010. godine pronađen je cjelovit piramidalan uteg, pri objavi opredijeljen kasnom brončanom dobu (Čimin 2011: 13, 49).

27 Objekt je datiran u prijelaz halštatskog u latensko doba. Unutar objekta (jama 1-6c) pronađena je koncentracija od 20 utega piramidalna oblika (podijeljenih u tri tipa prema težini; 1,25, 1,5 i 1,75 kg). Red linijski postavljenih utega dužine je 80 cm, a pretpostavljena širina tkalačkog stana oko 1 m. Unutar objekta pronađene su tri (ili četiri) rupe promjera 10 cm za horizontalne nosive grede tkalačkog stana.

28 Unutar objekta pronađeno je preko 100 utega *in situ*, vjerojatno za dva tkalačka stana. Pojedini utezi na gornjoj plohi imaju oznake u vidu jedne ili više udubljenih točaka.

29 Ovdje valja spomenuti i dva objekta istražena na lokalitetu Tápiószele iz središnje Mađarske u kojima su pronađeni piramidalni utezi – 4 jugozapadno od ognjišta i 14 grupiranih uz sjeverni zid kuće II, odnosno nekoliko utega uz sjeverni rub i 13 grupiranih utega u sjeveroistočnom uglu kuće III iz vremena Lt D, čiju funkciju autorica, ne spominjući tkalački stan, veže uz ognjišta u objektima interpretirajući ih kao držače/postamente za posude (Hellebrandt 1999: 42–50, 118, sl. 19–20, T. XVI: 15–17).

is found in a sequence of 15 weights discovered near the base of a partially excavated structure, presumably used as a weaving workshop (Jovanović 2009: 118).

The construction of the loom from Virje, located in the interior of the structure, was probably reclined against or structurally connected with the northern wall of the structure (Fig. 22). Judging by the number of the weights found near the base of the structure and the length of the track of the wooden beam it was presumed that the width of the construction might have been around 260 cm. The maximum width of the fabric that could be produced on the loom if all 36 weights stood in two parallel rows would be between 170 and 180 cm. The width of the textile that could be produced with 28 linearly arranged weights found along the northern edge of the structure (cat. no. 3, 6–31) is 140–150 cm. Placed together, the weights are ideally suited for producing fabrics with thicker warp threads (4–6 threads per cm). Based on the spatial layout of weights, documented by the excavation, we have put forward a reconstruction of the position of the weights presumed to have formed a single loom setup. It consists of 28 weights, arranged in a linear sequence along the northern edge of the structure. The remaining weights were omitted from this attempt at a reconstruction since their position, documented by the excavation, does not match the structural norms of vertical looms. The proposed arrangement of the weights suggested there were regularity and symmetry in the position of the weights with marks, morphologically different weights (types I, II, III) and weights of different mass and width. It was presumed that weights with marks, as well as some morphologically different weights marked parts of the fabric to be executed with another colour, pattern, technique etc. The function of the unique mark on the upper surface of weights cat. no. 8 and 25 may have been multiple, e.g. it may have marked the place and mass greater than that of the remaining morphologically similar weights (Fig. 6). The distribution of weights of different mass classes showed a possible way to achieve a regular level and distribution of load relative to the total width of the produced fabric, that is, the vertical loom structure. The specific way to achieve a balanced distribution of mass is conditioned by a technological aspect of the production of fabric of a certain width, but probably also by a predestined position of certain weights (marked weights). It was assumed that morphologically different weights were deliberately produced with the aim to produce a specific type of fabric, and their dissimilarity was aimed at facilitating the complex procedure of setting up the loom. The shape of the weight pointed at its mass, which was important for choosing the position of the weight and for attaching the appropriate number of threads. Symmetrical series of morphologically different weights in the same space, as well as of marked weights suggest that the shape of the weights may have played a role of marking the parts of the fabric to be executed in e.g. different colour, pattern, technique etc. In favour of this speaks also the fact that typical representatives of type I and II weights had the same mass span (from 1000 to

utega različite težine i širine. Pretpostavljeno je da su utezi s oznakama kao i pojedini oblikovno različiti utezi označavali dijelove tkanine koji su mogli biti izvedeni drugom bojom, uzorkom, tehnikom itd. Funkcija jedinstvene oznake na gornjoj plohi kod utega kat. br. 8 i 25 mogla je biti višestruka, primjerice oznaka mjesta i težine veće od ostalih morfološki sličnih utega (sl. 6). Raspored utega različitih razreda težine pokazao je mogući način postizanja pravilne razine i distribucije opterećenja u odnosu na ukupnu širinu tkanine koja se proizvodi, odnosno na konstrukciju vertikalnoga tkalačkog stana. Specifičan način postizanja uravnotežene raspodjele težine uzrokovan je tehnološkim aspektom proizvodnje tkanine određene širine, no vjerojatno i predodređenim položajem pojedinih utega (utezi s oznakama). Pretpostavljeno je da su oblikovno različiti utezi proizvedeni ciljano u svrhu proizvodnje specifičnog tipa tkanine, a njihova različitost imala je funkciju pojednostavljenja kompleksnog procesa postavljanja tkalačkog stana. Oblik utega upućivao je na njegovu težinu bitnu pri odabiru položaja pojedinog utega kao i pričvršćivanja prikladnog broja niti. Simetrični nizovi oblikovno različitih utega na jednakom prostoru kao i utega s oznakama upućuju da je oblik utega ujedno mogao imati i funkciju označavanja dijelova tkanine koji će biti izvedeni primjerice drugom bojom, mustrom, tehnikom itd. Tomu u prilog ide i činjenica da su tipični predstavnici utega tipa I i II jednakog raspona u težini (od 1000 do 1150–1200 g). Dodatno, potrebno je izdvojiti uteg kat. br. 8 koji nosi jedinstvene plitko urezane, različite oznake i na bočnim stranama. S obzirom na pretpostavke iznesene u vezi s funkcijom oznaka na gornjoj plohi označenih utega, pravilnosti i simetriju u položaju utega s obzirom na njihove oblikovne i funkcionalne karakteristike odnosno naizgled predodređen prostorni raspored, te pretpostavku da su svi utezi zajedno postavljeni namijenjeni u optimalnom slučaju izradi specifičnog tipa tkanine čini se logičnim pretpostaviti da spomenute oznake nisu odraz slučajnosti. Njihova uloga, u kontekstu iznesenih pretpostavki, mogla bi biti u vezi s načinom postavljanja tkalačkog stana s obzirom na zahtjeve izrade specifičnog tipa tkanine odnosno odnositi se na prostorni raspored utega i/ili karakteristike tkanine koja se proizvodi.

Eksperimentalno su izvedena dva načina postavljanja niti osnove na utege koji su linijski postavljeni u dva reda prema predloženoj rekonstrukciji položaja te je predložen optimalan način postavljanja tkalačkog stana kako bi se dobila homogena tkanina s pravilno raspoređenim nitima osnove. Na pojedine utege bilo je potrebno ovjesiti različit ali prikladan broj niti kako bi se postigla pravilna napetost niti kao i jednolična distribucija napetosti. Tkanina proizvedena na ovaj način ima homogenu strukturu s pravilno i jednolično raspoređenim nitima osnove. Niti osnove vjerojatno su bile pričvršćivane na utege posredno, preko svojevrsne omče na što upućuju tragovi uočeni na pojedinim utezima kao i eksperimentalno testiranje ovakvog načina pričvršćivanja.

Kontekst pronalaska kao i zaključci izneseni u ovom radu upućuju da su virovski utezi izrađeni s namjerom proizvodnje određenog tipa tkanine/tkanina. Ovakvi podaci mogu stajati u korelaciji s trendom utvrđenim za razdoblje latena,

1150–1200 g). Additionally, we ought to single out weight cat. no. 8, which bears unique shallow incised marks also on the lateral sides. Taking into consideration the assumptions pertaining to the function of the marks on the upper surface of marked weights, the regularities and symmetry in the position of weights relative to their morphological and functional features, that is, their apparently preordained spatial layout, as well as the assumption that all the weights positioned together were in the optimal case intended for the production of a specific type of fabric, it seems logical to assume that the mentioned marks were not a coincidence. Their role, in the context of these assumptions, might have to do with the way the loom was set up in view of the requirements of producing a specific type of fabric, that is, it might relate to the spatial layout of the weights and/or features of the textile being produced.

Two methods were experimentally tested of attaching warp threads on weights arranged in a linear sequence in two rows, based on the proposed reconstruction of their position, and we put forward an optimal method to set up the loom in order to produce a homogeneous fabric with evenly distributed warp threads. It was necessary to attach a different but appropriate number of threads to some weights in order to achieve a regular tension of the threads, as well as to distribute the tension uniformly. A fabric produced in this way has a homogeneous structure with evenly and uniformly distributed warp threads. Warp threads were probably attached to weights indirectly, over a loop of sorts, which is suggested by the traces observed on some weights, as well as by experimental testing of this kind of attachments.

The context of discovery and the conclusions presented in this paper indicate that the Virje weights were made with the aim to produce a specific type of fabric(s). Such information may stand in correlation with a trend documented for the La Tène period, i.e. a standardized production of textiles of the same type.

E. CATALOGUE

1. Completely preserved clay weight of grey-brown colour on one side and red on the other, in the shape of a truncated four-sided pyramid of approximately identical sides and slightly rounded corners with a round perforation – type I (t.o.: SF 187)[30]
   Dimensions: height: 11.9 cm
   width: upper part: 5.8 cm
   lower part: 9.4 cm
   thickness: upper part: 6.3 cm
   lower part: 10 cm
   diameter of perforation: 1.6 cm one side; 1.9 cm other side
   mass: 1186.3 g
   Marks: top: /; base: /; side: above the perforation, slightly

30 Drawings of ceramic weights were made by Suzana Čule. Abbreviations: t.o. = fieldwork mark; SF = special find; SU = stratigraphic unit.

standardizirane proizvodnje tkanina istog tipa.

E. KATALOG

1. Cjelovito očuvan glineni uteg sivo-smeđe s jedne i crvene boje s druge strane, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom – tip I (t.o.: PN 187)[30]
   Dimenzije: visina: 11,9 cm
   širina: gornjeg dijela: 5,8 cm
   donjeg dijela: 9,4 cm
   debljina: gornjeg dijela: 6,3 cm
   donjeg dijela: 10 cm
   promjer perforacije: 1,6 cm jedna strana; 1,9 cm druga strana
   težina: 1186,3 g
   Oznake: vrh: /; dno: /; stranica: iznad perforacije blago izmaknuto u lijevo trag paralelne udubljene linije na obje strane. Na jednoj od strana ispod perforacije nalazi se trag vodoravne linije koja se siječe s okomitom linijom.
2. Polovica očuvanoga glinenog utega crvene boje, jajolika oblika, približno jednakih stranica i jače zaobljenih uglova s kružnom perforacijom – tip III (t.o.: PN 188)
   Dimenzije: visina: 12,2 cm
   širina: gornjeg dijela: 5,4 cm
   donjeg dijela: 7,8 cm
   debljina: gornjeg dijela (očuvana): 2,8 cm
   donjeg dijela (očuvana): 5,1 cm
   promjer perforacije: 1,8–2,2 cm jedna strana
   težina (očuvana): 638,5 g
   Oznake: vrh: /; dno: /; stranica: /.
3. Djelomično očuvan glineni uteg crvene boje, oblika krnje četverostrane piramide, približno jednakih stranica i jače naglašenih uglova s kružnom perforacijom – tip II (t.o.: PN 189)
   Dimenzije: visina: 13,2 cm
   širina: gornjeg dijela (očuvana): 2,1 cm
   donjeg dijela: 9,6 cm
   debljina: gornjeg dijela (očuvana): 2,1 cm
   donjeg dijela: 10,6 cm
   promjer perforacije: 1,9 cm jedna strana; 1,6 cm druga strana
   težina (očuvana): 900,5 g
   Oznake: vrh: /; dno: udubljeni trag djelomično vidljivog znaka X; stranica: na bočnoj stranici slabo vidljiva vodoravna linija u visini perforacije.
4. Cjelovito očuvan glineni uteg oker boje, oblika krnje četverostrane piramide približno jednakih stranica s jače naglašenim uglovima i kružnom perforacijom – tip II (t.o.: PN 190)
   Dimenzije: visina: 11,3 cm
   širina: gornjeg dijela: 4,7 cm
   donjeg dijela: 10,7 cm
   debljina: gornjeg dijela: 5,9 cm
   donjeg dijela: 10,3 cm
   promjer perforacije: 1,2 cm jedna strana;

30 Crteže keramičkih utega izradila je Suzana Čule. Kratice: t.o. = terenska oznaka; PN = posebni nalaz; SJ = stratigrafska jedinica.

removed to the left a trace of a parallel grooved line on either side. On one of the sides below the perforation there is a trace of a horizontal line intersecting with a vertical line.

2. Half of a preserved clay weight of red colour, oval shape, of approximately identical sides and strongly rounded corners with a round perforation – type III (t.o.: SF 188)
   Dimensions: height: 12.2 cm
   width: upper part: 5.4 cm
   lower part: 7.8 cm
   thickness: upper part (preserved): 2.8 cm
   lower part (preserved): 5.1 cm
   diameter of perforation: 1.8–2.2 cm one side
   mass (preserved): 638.5 g
   Marks: top: /; base: /; side: /.
3. Partially preserved clay weight of red colour, in the shape of a truncated four-sided pyramid, of approximately identical sides and strongly pronounced corners with a round perforation – type II (t.o.: SF 189)
   Dimensions: height: 13.2 cm
   width: upper part (preserved): 2.1 cm
   lower part: 9.6 cm
   thickness: upper part (preserved): 2.1 cm
   lower part: 10.6 cm
   diameter of perforation: 1.9 cm one side; 1.6 cm other side
   mass (preserved): 900.5 g
   Marks: top: /; base: depressed trace of a partly visible symbol X; side: on a lateral side a poorly visible horizontal line at level with the perforation.
4. Completely preserved clay weight of ochre colour, in the shape of a truncated four-sided pyramid of approximately identical sides with strongly pronounced corners and a round perforation – type II (t.o.: SF 190)
   Dimensions: height: 11.3 cm
   width: upper part: 4.7 cm
   lower part: 10.7 cm
   thickness: upper part: 5.9 cm
   lower part: 10.3 cm
   diameter of perforation: 1.2 cm one side; 1.3 cm other side
   mass: 1075.8 g
   Marks: top: incised symbol + whose horizontal line points slightly upwards; base: /; side: /.
5. Fragments of clay weight of ochre-red colour (2 pieces), morphologically indeterminate – type ? (t.o.: SF 191)
   Dimensions: height: / cm
   width: upper part: /
   lower part: /
   thickness: upper part: /
   lower part: /
   diameter of perforation: /
   mass (preserved): 280.9 g
   Marks: top: /; base: /; side: /.
6. Completely preserved clay weight, one half of ochre-red colour, the other of dark grey-ochre colour, in the shape of a truncated four-sided pyramid of approximately identical sides and slightly rounded corners with a round per-

1,3 cm druga strana
težina: 1075,8 g

Oznake: vrh: urezani znak + čija je vodoravna linija blago uzdignuta prema gore; dno: /; stranica: /.

5. Ulomci glinenog utega oker-crvene boje (2 komada) morfološki nedefinirani – tip ? (t.o.: PN 191)
   Dimenzije: visina: / cm
   širina: gornjeg dijela: /
   donjeg dijela: /
   debljina: gornjeg dijela: /
   donjeg dijela: /
   promjer perforacije: /
   težina (očuvana): 280,9 g
   Oznake: vrh: /; dno: /; stranica: /.
6. Cjelovito očuvan glineni uteg, u jednoj polovici oker-crvene boje, u drugoj tamnosivo-oker boje, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom – tip I (t.o.: PN 192)
   Dimenzije: visina: 12 cm
   širina: gornjeg dijela: 5,2 cm
   donjeg dijela: 8,5 cm
   debljina: gornjeg dijela: 4,7 cm
   donjeg dijela: 9,4 cm
   promjer perforacije: 1,2 cm jedna strana; 1,1 cm druga strana
   težina: 1004,1 g
   Oznake: vrh: urezani znak + kojem je vodoravna linija blago ukošena prema gore; dno: /; stranica: iznad perforacije blago izmaknuto u desno i u lijevo po jedna blago ukošena okomita linija te jedna vodoravna plitka linija od perforacije prema bočnim stranicama.
7. Cjelovito očuvan glineni uteg u jednoj polovici tamnosivo-crne, u drugoj crvene boje, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom – tip II (t.o.: PN 193)
   Dimenzije: visina: 12,1 cm
   širina: gornjeg dijela: 5,8 cm
   donjeg dijela: 9,6 cm
   debljina: gornjeg dijela: 5,5 cm
   donjeg dijela: 8,4 cm
   promjer perforacije: 1,3 cm jedna strana; 1,8 cm druga strana
   težina: 1138,2 g
   Oznake: vrh: urezani znak +; dno: /; stranica: iznad perforacije blago izmaknuto u lijevo trag dviju paralelnih udubljenih linija na jednoj strani i okomito na perforaciju jedna linija na obje strane koje se spajaju s urezanim znakom + na vrhu. U visini sredine perforacije prema bočnim stranicama udubljene vodoravne linije s obje strane utega (sl. 5).
8. Cjelovito očuvan glineni uteg u jednoj polovici crvene, u drugoj tamnosivo-crne boje, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom – tip I (t.o.: PN 194)
   Dimenzije: visina: 11,8 cm
   širina: gornjeg dijela: 5,8 cm
   donjeg dijela: 10,4 cm

foration – type I (t.o.: SF 192)
Dimensions: height: 12 cm
width: upper part: 5.2 cm
lower part: 8.5 cm
thickness: upper part: 4.7 cm
lower part: 9.4 cm
diameter of perforation: 1.2 cm one side; 1.1 cm other side
mass: 1004.1 g

Marks: top: incised symbol + whose horizontal line is slightly slanted upwards; base: /; side: above the perforation, slightly removed to the right and to the left on either side there is a slightly slanted vertical line, and a horizontal shallow line running from the perforation to the lateral sides.

7. Completely preserved clay weight, one half is darke grey-black, the other is red, in the shape of a truncated four-sided pyramid of approximately equal sides and slightly rounded corners, with a round perforation – type II (t.o.: SF 193)
   Dimensions: height: 12.1 cm
   width: upper part: 5.8 cm
   lower part: 9.6 cm
   thickness: upper part: 5.5 cm
   lower part: 8.4 cm
   diameter of perforation: 1.3 cm one side; 1.8 cm other side
   mass: 1138.2 g
   Marks: top: incised symbol +; base: /; side: above the perforation, slightly removed to the left, a trace of two parallel depressed lines on one side and, perpendicular to the perforation, one line on either side, which connect with the incised symbol + on the top. At level with the middle of the perforation towards the lateral sides there are depressed horizontal lines on either side of the weight (Fig. 5).
8. Completely preserved clay weight, one half is red, the other is dark grey-black, in the shape of a truncated four-sided pyramid of approximately equal sides and slightly rounded corners, with a round perforation – type I (t.o.: SF 194)
   Dimensions: height: 11.8 cm
   width: upper part: 5.8 cm
   lower part: 10.4 cm
   thickness: upper part: 6.1 cm
   lower part: 11.1 cm
   diameter of perforation: 1.7 cm one side; 2.1 cm other side
   mass: 1291.9 g
   Marks: top: incised symbol + surrounded by depressed circles; base: /; side: above the perforation slightly removed to the right, a trace of two parallel depressed vertical lines on both sides, and two depressed horizontal lines at level with the perforation on one side. Below the perforation, a slightly depressed thin line that extends horizontally to the neighbouring lateral side of the weight. There are visible places where vertical and horizontal depressed lines intersect on the lateral sides (Fig. 6).

debljina: gornjeg dijela: 6,1 cm
donjeg dijela: 11,1 cm
promjer perforacije: 1,7 cm jedna strana; 2,1 cm druga strana
težina: 1291,9 g

Oznake: vrh: urezani znak + okružen utisnutim krugovima; dno: /; stranica: iznad perforacije blago izmaknuto u desno trag dviju paralelnih udubljenih okomitih linija na obje strane, te dvije udubljene vodoravne linije u ravnini perforacije na jednoj strani. Ispod perforacije blago udubljena tanka linija koja vodoravno prelazi na susjednu bočnu stranu utega. Vidljiva su mjesta križanja okomitih i vodoravnih udubljenih linija na bočnim stranicama (sl. 6).

9. Gornji dio glinenog utega crvene boje, razmrvljen i sastavljen od više komada – tip ? (t.o.: PN 195)
Dimenzije: visina (očuvana): 10,3 cm
širina: gornjeg dijela (očuvana): 3,6 cm
donjeg dijela: /
debljina: gornjeg dijela (očuvana): 3,3 cm
donjeg dijela: /
promjer perforacije: 1,6–1,8 cm jedna strana
težina (očuvana): 504,8 g
Oznake: vrh: /; dno: /; stranica: iznad perforacije blago izmaknuto u desno trag dijela udubljene linije na jednoj strani (? na mjestu gdje je uteg puknuo).
10. Polovica očuvanoga glinenog utega oker boje, sastavljena od dva ulomka jajolika oblika približno jednakih stranica i jače zaobljenih uglova s kružnom perforacijom – tip III (t.o.: PN 196)
Dimenzije: visina: 13,6 cm
širina: gornjeg dijela (očuvana): 4,1 cm
donjeg dijela (očuvana): 4,3 cm
debljina: gornjeg dijela: 4,4 cm
donjeg dijela (očuvana): 5,4 cm
promjer perforacije: 1,8 cm jedna strana (?)
težina (očuvana): 456,7 g
Oznake: vrh: /; dno: /; stranica: /.
11. Gotovo cjelovito očuvan glineni uteg oker-crvene boje, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom u gornjoj, užoj polovici – tip I (t.o.: PN 197)
Dimenzije: visina: 10,9 cm
širina: gornjeg dijela: 6,3 cm
donjeg dijela: 9 cm
debljina: gornjeg dijela: 4,9 cm
donjeg dijela: 10,1 cm
promjer perforacije: 1,7 cm
težina (očuvana): 1050,4 g
Oznake: vrh: /; dno: /; stranica: /.
12. Cjelovito očuvan glineni uteg većinom oker-crvene boje s djelomično tamnije oker-sivim dijelovima u krajnjem donjem dijelu, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom – tip I (t.o.: PN 198)
Dimenzije: visina: 11,8 cm
širina: gornjeg dijela: 6,3 cm
donjeg dijela: 10,4 cm
debljina: gornjeg dijela: 5,3 cm

9. Upper part of a red clay weight, crumbled and composed of several pieces – type ? (t.o.: SF 195)
Dimensions: height (preserved): 10.3 cm
width (preserved): upper part: 3.6 cm
lower part: /
thickness: upper part (preserved): 3.3 cm
lower part: /
diameter of perforation: 1.6–1.8 cm one side
mass (preserved): 504.8 g
Marks: top: /; base: /; side: above the perforation, slightly removed to the right, a trace of a part of a depressed line on one side (? at the point of breakage).
10. Half of a preserved clay weight of ochre colour, consisting of two fragments of oval shape, of approximately equal sides and strongly rounded corners, with a round perforation – type III (t.o.: SF 196)
Dimensions: height: 13.6 cm
width: upper part (preserved): 4.1 cm
lower part (preserved): 4.3 cm
thickness: upper part: 4.4 cm
lower part (preserved): 5.4 cm
diameter of perforation: 1.8 cm one side (?)
mass (preserved): 456.7 g
Marks: top: /; base: /; side: /.
11. Almost completely preserved clay weight of ochre-red colour, in the shape of a truncated four-sided pyramid of approximately equal sides and slightly rounded corners, with a round perforation in the upper, narrower half – type I (t.o.: SF 197)
Dimensions: height: 10.9 cm
width: upper part: 6.3 cm
lower part: 9 cm
thickness: upper part: 4.9 cm
lower part: 10.1 cm
diameter of perforation: 1.7 cm
mass (preserved): 1050.4 g
Marks: top: /; base: /; side: /.
12. Completely preserved clay weight of mostly ochre-red colour with occasional darker ochre-grey parts in the extreme lower portion, in the shape of a truncated four-sided pyramid of approximately equal sides and slightly rounded corners, with a round perforation – type I (t.o.: SF 198)
Dimensions: height: 11.8 cm
width: upper part: 6.3 cm
lower part: 10.4 cm
thickness: upper part: 5.3 cm
lower part: 11.2 cm
diameter of perforation: 2.1 cm one side; 2.2 cm other side
mass: 1324.4 g
Marks: top: /; base: /; side: above the perforation, slightly removed to the left, a trace of two distinctly depressed parallel lines on one side.
13. Half of a preserved clay weight of red colour, oval shape, of approximately equal sides and strongly rounded corners – type III (t.o.: SF 199)
Dimensions: height: 12.3 cm

donjeg dijela: 11,2 cm
promjer perforacije: 2,1 cm jedna strana; 2,2 cm druga strana
težina: 1324,4 g

Oznake: vrh: /; dno: /; stranica: iznad perforacije izmaknuto u lijevo trag dviju jače udubljenih paralelnih linija na jednoj strani.

13. Polovica očuvanoga glinenog utega crvene boje, jajolika oblika, približno jednakih stranica i jače zaobljenih uglova – tip III (t.o.: PN 199)

Dimenzije: visina: 12,3 cm
širina: gornjeg dijela: /
donjeg dijela: /
debljina: gornjeg dijela: 5,3 cm
donjeg dijela: 10,4 cm
promjer perforacije: /
težina (očuvana): 742,5 g

Oznake: vrh: /; dno: /; stranica: /.

14. Cjelovito očuvan glineni uteg u jednoj polovici crvene, u drugoj oker-sive boje, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom u gornjoj, užoj polovici – tip I (t.o.: PN 200)

Dimenzije: visina: 10,4 cm
širina: gornjeg dijela: 4,9 cm
donjeg dijela: 10,1 cm
debljina: gornjeg dijela: 5,6 cm
donjeg dijela: 9,8 cm
promjer perforacije: 1,6 cm
težina: 1135,7 g

Oznake: vrh: /; dno: /; stranica: iznad perforacije blago izmaknuto u lijevo trag dviju paralelnih udubljenih linija te blago izmaknuto u desno trag jedne udubljene linije na jednoj strani.

15. Polovica očuvanoga glinenog utega crvene boje u gornjem i oker boje u donjem dijelu, jajolika oblika, približno jednakih stranica i jače zaobljenih uglova, s kružnom perforacijom – tip III (t.o.: PN 201)

Dimenzije: visina: 11,8 cm
širina: gornjeg dijela (očuvana): 3,1 cm
donjeg dijela: 7,8 cm
debljina: gornjeg dijela (očuvanog): 4,3 cm
donjeg dijela: 9,9 cm
promjer perforacije: 2,1 cm
težina (očuvana): 610,4 g

Oznake: vrh: /; dno: /; stranica: iznad perforacije blago izmaknuto u lijevo trag dviju paralelnih udubljenih blago ukošenih okomitih linija te u visini perforacije trag vodoravne linije koja se pruža prema bočnoj stranici na jednoj strani.

16. Gotovo cjelovito očuvan glineni uteg crveno-oker boje, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom – tip I (t.o.: PN 202)

Dimenzije: visina: 11,3 cm
širina: gornjeg dijela: 4,8 cm
donjeg dijela: 10 cm
debljina: gornjeg dijela: 5,7 cm
width: upper part: /
lower part: /
thickness: upper part: 5.3 cm
lower part: 10.4 cm
diameter of perforation: /
mass (preserved): 742.5 g

Marks: top: /; base: /; side: /.

14. Completely preserved clay weight, one half is red and the other is ochre-grey, in the shape of a truncated four-sided pyramid of approximately equal sides and slightly rounded corners, with a round perforation in the upper, narrower half – type I (t.o.: SF 200)

Dimensions: height: 10.4 cm
width: upper part: 4.9 cm
lower part: 10.1 cm
thickness: upper part: 5.6 cm
lower part: 9.8 cm
diameter of perforation: 1.6 cm
mass: 1135.7 g

Marks: top: /; base: /; side: above the perforation, slightly removed to the left, a trace of two parallel depressed lines and, slightly removed to the right, a trace of a depressed line on one side.

15. Half of a preserved clay weight of red colour in the upper half and ochre in the lower part, of oval shape, of approximately equal sides and strongly rounded corners, with a round perforation – type III (t.o.: SF 201)

Dimensions: height: 11.8 cm
width: upper part (preserved): 3.1 cm
lower part: 7.8 cm
thickness: upper part (preserved): 4.3 cm
lower part: 9.9 cm
diameter of perforation: 2.1 cm
mass (preserved): 610.4 g

Marks: top: /; base: /; side: above the perforation, slightly removed to the left, a trace of two parallel depressed, slightly oblique vertical lines and, at level with the perforation, a trace of a horizontal line extending to the lateral side on one side.

16. Almost completely preserved clay weight of red-ochre colour, in the shape of a truncated four-sided pyramid of approximately equal sides and slightly rounded corners, with a round perforation – type I (t.o.: SF 202)

Dimensions: height: 11.3 cm
width: upper part: 4.8 cm
lower part: 10 cm
thickness: upper part: 5.7 cm
lower part: 11 cm
diameter of perforation: 1.4 cm one side; 2.2 cm other side
mass: 1053.8 g

Marks: top: incised symbol +; base: /; side: on one side below the perforation, a vertical, barely visible incised line. On one preserved lateral side, a depressed trace of a horizontal line.

17. Half of a preserved clay weight of dark grey-black colour on the corners, and red in the remaining parts, in the shape of a truncated four-sided pyramid of approxi-

donjeg dijela: 11 cm
promjer perforacije: 1,4 cm jedna strana; 2,2 cm druga strana
težina: 1053,8 g

Oznake: vrh: urezani znak +; dno: /; stranica: na jednoj strani ispod perforacije okomita jedva vidljiva urezana linija. Na jednoj očuvanoj bočnoj stranici udubljeni trag vodoravne linije.

17. Polovica očuvanoga glinenog utega tamnosivo-crne boje na rubovima, te crvene u preostalom dijelu, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom – tip I (t.o.: PN 203)

Dimenzije: visina: 10,1 cm
širina: gornjeg dijela (očuvana): 2,8 cm
donjeg dijela (očuvana): 5,2 cm
debljina: gornjeg dijela: 5 cm
donjeg dijela: 10,1 cm
promjer perforacije: 1,8 cm
težina (očuvana): 494,5 g

Oznake: vrh: /; dno: /; stranica: iznad perforacije blago izmaknuto u lijevo trag udubljene okomite linije na jednoj strani te vodoravno udubljene linije koja se pruža od perforacije prema bočnoj stranici.

18. Cjelovito očuvan glineni uteg, u jednoj polovici crvene, u drugoj tamnosive boje, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom – tip I (t.o.: PN 204)

Dimenzije: visina: 10,9 cm
širina: gornjeg dijela: 5,2 cm
donjeg dijela: 10,4 cm
debljina: gornjeg dijela: 4,3 cm
donjeg dijela: 10,4 cm
promjer perforacije: 1,2 cm jedna strana; 1,4 cm druga strana
težina: 1038,4 g

Oznake: vrh: urezani znak +; dno: jedna blago udubljena linija koja se pruža duž čitavog dna utega; stranica: /.

19. Gotovo cjelovito očuvan glineni uteg oker-crvene boje, oblika krnje četverostrane piramide približno jednakih stranica, s jače naglašenim uglovima i kružnom perforacijom – tip II (t.o.: PN 205)

Dimenzije: visina: 14,2 cm
širina: gornjeg dijela: 3,5 cm
donjeg dijela: 4,5 cm
debljina: gornjeg dijela: 8,3 cm
donjeg dijela: 10,1 cm
promjer perforacije: 1,8
težina: 903,1 g

Oznake: vrh: /; dno: /; stranica: /.

20. Djelomično očuvan (2/3) glineni uteg oker-crvene boje kojem nedostaje dio donjeg dijela, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom – tip I (t.o.: PN 206)

Dimenzije: visina: 13 cm
širina: gornjeg dijela: 6,5 cm
donjeg dijela: 8,3 cm

mately equal sides and slightly rounded corners, with a round perforation – type I (t.o.: SF 203)

Dimensions: height: 10.1 cm
width: upper part (preserved): 2.8 cm
lower part (preserved): 5.2 cm
thickness: upper part: 5 cm
lower part: 10.1 cm
diameter of perforation: 1.8 cm
mass (preserved): 494.5 g

Marks: top: /; base: /; side: above the perforation, slightly removed to the left, a trace of a depressed vertical line on one side, and horizontal depressed line that runs from the perforation to a lateral side.

18. Completely preserved clay weight, in one half of red colour and in the other of dark grey colour, in the shape of a truncated four-sided pyramid of approximately equal sides and slightly rounded corners, with a round perforation – type I (t.o.: SF 204)

Dimensions: height: 10.9 cm
width: upper part: 5.2 cm
lower part: 10.4 cm
thickness: upper part: 4.3 cm
lower part: 10.4 cm
diameter of perforation: 1.2 cm one side; 1.4 cm other side
mass: 1038.4 g

Marks: top: incised symbol +; base: one slightly depressed line running around the base of the weight; side: /.

19. Almost completely preserved clay weight of ochre-red colour, in the shape of a truncated four-sided pyramid of approximately equal sides, with strongly pronounced corners and a round perforation – type II (t.o.: SF 205)

Dimensions: height: 14.2 cm
width: upper part: 3.5 cm
lower part: 4.5 cm
thickness: upper part: 8.3 cm
lower part: 10.1 cm
diameter of perforation: 1.8 cm
mass: 903.1 g

Marks: top: /; base: /; side: /.

20. Partly preserved (2/3) clay weight of ochre-red colour, missing a part of the upper portion, in the shape of a truncated four-sided pyramid of approximately equal sides and slightly rounded corners, with a round perforation – type I (t.o.: SF 206)

Dimensions: height: 13 cm
width: upper part: 6.5 cm
lower part: 8.3 cm
thickness: upper part: 6.8 cm
lower part: 10 cm
diameter of perforation: 1.6 cm one side; 2.1 cm other side
mass: 1098.5 g

Marks: top: /; base: /; side: above the perforation, slightly removed to the left, a trace of two parallel vertical depressed lines on one side.

21. Almost completely preserved clay weight of ochre-red colour, oval shape, of approximately equal sides and

debljina: gornjeg dijela: 6,8 cm
donjeg dijela: 10 cm
promjer perforacije: 1,6 cm jedna strana; 2,1 cm druga strana
težina: 1098,5 g

Oznake: vrh: /; dno: /; stranica: iznad perforacije blago izmaknuto u lijevo trag dviju paralelnih okomitih udubljenih linija na jednoj strani.

21. Gotovo cjelovito očuvan glineni uteg oker-crvene boje, jajolika oblika, približno jednakih stranica i jače zaobljenih uglova, s kružnom perforacijom – tip III (t.o.: PN 207)
Dimenzije: visina: 12,8 cm
širina: gornjeg dijela: 4,4 cm
donjeg dijela: 9,5 cm
debljina: gornjeg dijela: 4,7 cm
donjeg dijela: 11 cm
promjer perforacije: 1,6 cm
težina: 1079,8 g
Oznake: vrh: /; dno: /; stranica: /.

22. Gotovo cjelovito očuvan glineni uteg u gornjoj polovici tamnosive, a u donjoj crvene boje, jajolika oblika približno jednakih stranica i jače zaobljenih uglova s kružnom perforacijom – tip III (t.o.: PN 208)
Dimenzije: visina: 12,9 cm
širina: gornjeg dijela: 4 cm
donjeg dijela: 6,9 cm
debljina: gornjeg dijela: 5,2 cm
donjeg dijela: 6,7 cm
promjer perforacije: 1,6 cm jedna strana; 2,2 cm druga strana
težina (očuvana): 773,6 g
Oznake: vrh: /; dno: /; stranica: od sredine perforacije prema bočnim stranicama vodoravna linija i na jednoj bočnoj strani jedva vidljiva vodoravna linija.

23. Gotovo cjelovito očuvan glineni uteg oker-crvene boje, jajolika oblika, približno jednakih stranica i jače zaobljenih uglova, s kružnom perforacijom – tip III (t.o.: PN 209)
Dimenzije: visina: 12,6 cm
širina: gornjeg dijela: 4,3 cm
donjeg dijela (očuvana): 5,4 cm
debljina: gornjeg dijela: 5,6 cm
donjeg dijela: 9,8 cm
promjer perforacije: 1,8 cm jedna strana; 2,1 cm druga strana
težina (očuvana): 837,2 g
Oznake: vrh: /; dno: /; stranica: od sredine perforacije prema bočnoj stranici vidljiva vodoravna linija.

24. Cjelovito očuvan glineni uteg u donjem dijelu tamnosivo-oker, u gornjem crvene boje, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom – tip I (t.o.: PN 210)
Dimenzije: visina: 10,4 cm
širina: gornjeg dijela: 4,6 cm
donjeg dijela: 9,8 cm
debljina: gornjeg dijela: 4,6 cm
donjeg dijela: 11,1 cm
promjer perforacije: 1,6 cm jedna strana; 1,8 cm druga strana

strongly rounded corners, with a round perforation – type III (t.o.: SF 207)
Dimensions: height: 12.8 cm
width: upper part: 4.4 cm
lower part: 9.5 cm
thickness: upper part: 4.7 cm
lower part: 11 cm
diameter of perforation: 1.6 cm
mass: 1079.8 g
Marks: top: /; base: /; side: /.

22. Almost completely preserved clay weight, dark grey in the upper half and red in the lower half, of oval shape and approximately equal sides and strongly rounded corners, with a round perforation – type III (t.o.: SF 208)
Dimensions: height: 12.9 cm
width: upper part: 4 cm
lower part: 6.9 cm
thickness: upper part: 5.2 cm
lower part: 6.7 cm
diameter of perforation: 1.6 cm one side; 2.2 cm other side
mass (preserved): 773.6 g
Marks: top: /; base: /; side: from the middle of the perforation towards lateral sides, a horizontal line and, on one lateral side, a barely visible horizontal line.

23. Almost completely preserved clay weight of ochre-red colour, oval shape, of approximately equal sides and strongly rounded corners, with a round perforation – type III (t.o.: SF 209)
Dimensions: height: 12.6 cm
width: upper part: 4.3 cm
lower part (preserved): 5.4 cm
thickness: upper part: 5.6 cm
lower part: 9.8 cm
diameter of perforation: 1.8 cm one side; 2.1 the other side
mass (preserved): 837.2 g
Marks: top: /; base: /; side: a horizontal line running from the middle of the perforation towards a lateral side.

24. Completely preserved clay weight, dark grey-ochre in the lower part and red in the upper part, in the shape of a truncated four-sided pyramid of approximately equal sides and slightly rounded corners, with a round perforation – type I (t.o.: SF 210)
Dimensions: height: 10.4 cm
width: upper part: 4.6 cm
lower part: 9.8 cm
thickness: upper part: 4.6 cm
lower part: 11.1 cm
diameter of perforation: 1.6 cm one side; 1.8 cm, the other side
mass: 1059.3 g
Marks: top: depressed symbol +; base: /; side: above the perforation, slightly removed to the left and to the right, a trace of oblique lines on one side.

25. Completely preserved clay weight of dark grey colour towards the base and red in the upper part, in the shape of a truncated four-sided pyramid of approximately equ-

težina: 1059,3 g

Oznake: vrh: udubljeni znak +; dno: /; stranica: iznad perforacije blago izmaknuto u lijevo i blago izmaknuto u desno, trag kosih linija na jednoj strani.

25. Cjelovito očuvan glineni uteg tamnosive boje na dnu, u gornjem dijelu crvene boje, oblika krnje četverostrane piramide približno jednakih stranica s jače naglašenim zaobljenim uglovima i kružnom perforacijom – tip II (t.o.: PN 211)

Dimenzije: visina: 13,7 cm
širina: gornjeg dijela: 5,7 cm
donjeg dijela: 9,7 cm
debljina: gornjeg dijela: 5 cm
donjeg dijela: 10,1 cm
promjer perforacije: 1,5 cm jedna strana; 1,8 cm druga strana
težina: 1456,2 g

Oznake: vrh: urezani znak X; dno: /; stranica: /.

26. Gotovo cjelovito očuvan glineni uteg u gornjem dijelu crvene, u donjem dijelu sive boje, oblika krnje četverostrane piramide približno jednakih stranica, jače izraženih uglova i s kružnom perforacijom – tip II (t.o.: PN 212)

Dimenzije: visina: 12,4 cm
širina: gornjeg dijela: 5,3 cm
donjeg dijela: 10,4 cm
debljina: gornjeg dijela: 4,9 cm
donjeg dijela: 8,9 cm
promjer perforacije: 1,4 cm jedna strana; 1,7 cm druga strana
težina (očuvana): 1109,8 g

Oznake: vrh: /; dno: /; stranica: iznad perforacije blago izmaknuto u lijevo trag dviju paralelnih udubljenih okomitih linija na jednoj strani.

27. Gotovo cjelovito očuvan glineni uteg po dijagonali u gornjem dijelu tamnosivo-crne, a u donjem dijelu crvene boje, oblika krnje četverostrane piramide približno jednakih stranica s jače izraženim uglovima i kružnom perforacijom – tip II (t.o.: PN 213)

Dimenzije: visina: 12 cm
širina: gornjeg dijela (očuvana): 3,7 cm
donjeg dijela: 10 cm
debljina: gornjeg dijela (očuvana): 3,3 cm
donjeg dijela: 10,1 cm
promjer perforacije: 1,6 cm
težina (očuvana): 957 g

Oznake: vrh: /; dno: dvije slabo vidljive paralelne udubljene linije; stranica: na bočnoj stranici slabo vidljiva vodoravna linija u visini perforacije.

28. Cjelovito očuvan glineni uteg u jednoj polovici crvene, u drugoj tamnosive boje, oblika krnje četverostrane piramide približno jednakih stranica, s jače izraženim uglovima i kružnom perforacijom – tip II (t.o.: PN 214)

Dimenzije: visina: 13,4 cm
širina: gornjeg dijela: 4,4 cm
donjeg dijela: 9 cm
debljina: gornjeg dijela: 4,9 cm
donjeg dijela: 9 cm
promjer perforacije: 1,3 cm jedna strana;

al sides with strongly pronounced rounded corners and a round perforation – type II (t.o.: SF 211)

Dimensions: height: 13.7 cm
width: upper part: 5.7 cm
lower part: 9.7 cm
thickness: upper part: 5 cm
lower part: 10.1 cm
diameter of perforation: 1.5 cm one side; 1.8 cm the other side
mass: 1456.2 g

Marks: top: incised symbol X; base: /; side: /.

26. Almost completely preserved clay weight, red in the upper part and grey in the lower part, in the shape of a truncated four-sided pyramid of approximately equal sides, with strongly pronounced corners and a round perforation – type II (t.o.: SF 212)

Dimensions: height: 12.4 cm
width: upper part: 5.3 cm
lower part: 10.4 cm
thickness: upper part: 4.9 cm
lower part: 8.9 cm
diameter of perforation: 1.4 cm one side; 1.7 cm the other side
mass (preserved): 1109.8 g

Marks: top: /; base: /; side: a trace of two parallel depressed vertical lines on one side above the perforation, slightly removed to the left.

27. Almost completely preserved clay weight, of dark grey-black colour diagonally in the upper part and red in the lower part, in the shape of a four-sided truncated pyramid of approximately equal sides with strongly pronounced corners and a round perforation – type II (t.o.: SF 213)

Dimensions: height: 12 cm
width: upper part: 3.7 cm
lower part: 10 cm
thickness: upper part: 3.3 cm
lower part: 10.1 cm
diameter of perforation: 1.6 cm
mass (preserved): 957 g

Marks: top: /; base: two poorly visible parallel depressed lines; side: on a lateral side, a poorly visible horizontal line at level with the perforation.

28. Completely preserved clay weight, red in one half and dark grey in the other, in the shape of a truncated four-sided pyramid of approximately equal sides, with strongly pronounced corners and a round perforation – type II (t.o.: SF 214)

Dimensions: height: 13.4 cm
width: upper part: 4.4 cm
lower part: 9 cm
thickness: upper part: 4.9 cm
lower part: 9 cm
diameter of perforation: 1.3 cm one side; 1.5 cm the other side
mass: 1044.5 g

Marks: top: /; base: trace of partly visible two lines that intersect at an angle; side: at level with the perforation on a lateral side, a trace of a slightly depressed horizontal line.

1,5 cm druga strana
težina: 1044,5 g

Oznake: vrh: /; dno: trag udubljenih djelomično vidljivih dviju linija koje se sijeku pod kutom; stranica: u visini perforacije na bočnoj stranici trag blago udubljene vodoravne linije.

29. Gotovo cjelovito očuvan glineni uteg dijagonalno u gornjem dijelu tamnosive, a u donjem dijelu crvene boje, oblika krnje četverostrane piramide približno jednakih stranica, s jače izraženim uglovima i kružnom perforacijom – tip II (t.o.: PN 215)

Dimenzije: visina: 12,2 cm
širina: gornjeg dijela: 4,3 (?) cm
donjeg dijela: 8,6 cm
debljina: gornjeg dijela: 4,5 cm
donjeg dijela: 9,7 cm
promjer perforacije: 1,6 cm jedna strana; 1,7 cm druga strana
težina (očuvana): 787,3 g

Oznake: vrh: /; dno: /; stranica: /.

30. Ulomci glinenog utega oker-crvene boje (5 komada) morfološki nedefinirani – tip ? (t.o.: PN 216)

Dimenzije: visina: / cm
širina: gornjeg dijela: /
donjeg dijela: /
debljina: gornjeg dijela: /
donjeg dijela: /
promjer perforacije: /
težina (očuvana): 354,9 g

Oznake: vrh: /; dno: /; stranica: /.

31. Donji dio glinenog utega oker-sive boje, vjerojatno u obliku krnje četverostrane piramide, približno jednakih stranica s jače naglašenim uglovima – tip II (t.o.: PN 217)

Dimenzije: visina (očuvana): 7,3 cm
širina: gornjeg dijela: /
donjeg dijela: 9 cm
debljina: gornjeg dijela: /
donjeg dijela: 9 cm
promjer perforacije: /
težina (očuvana): 560,6 g

Oznake: vrh: /; dno: /; stranica: /.

32. Ulomci glinenog utega oker-crvene boje (2 veća i 4 manja komada) morfološki nedefinirani – tip ? (t.o.: PN 218)

Dimenzije: visina: /
širina: gornjeg dijela: /
donjeg dijela: /
debljina: gornjeg dijela: /
donjeg dijela: /
promjer perforacije: /
težina (očuvana): 336,7 g

Oznake: vrh: /; dno: /; stranica: /.

33. Polovica očuvanoga glinenog utega oker-crvene boje, sastavljenog od više komada, oblika krnje četverostrane piramide približno jednakih stranica i blago zaobljenih uglova s kružnom perforacijom – tip I (t.o.: PN 219)

Dimenzije: visina: 10,4 cm
širina: gornjeg dijela: 5,1 cm
donjeg dijela: 7,1 cm

29. Almost completely preserved clay weight, of dark grey colour diagonally in the upper part, and red in the lower part, in the shape of a truncated four-sided pyramid of approximately equal sides, with strongly pronounced corners and a round perforation – type II (t.o.: SF 215)

Dimensions: height: 12.2 cm
width: upper part: 4.3 (?) cm
lower part: 8.6 cm
thickness: upper part: 4.5 cm
lower part: 9.7 cm
diameter of perforation: 1.6 cm one side; 1.7 cm the other side
mass (preserved): 787.3 g

Marks: top: /; base: /; side: /.

30. Fragments of a clay weight of ochre-red colour (5 pieces), morphologically indeterminate – type ? (t.o.: SF 216)

Dimensions: height: / cm
width: upper part: /
lower part: /
thickness: upper part: /
lower part: /
diameter of perforation: /
mass (preserved): 354.9 g

Marks: top: /; base: /; side: /.

31. Lower part of a clay weight of ochre-grey colour, probably in the shape of a truncated four-sided pyramid, of approximately equal sides with strongly pronounced corners – type II (t.o.: SF 217)

Dimensions: height (preserved): 7.3 cm
width: upper part: /
lower part: 9 cm
thickness: upper part: /
lower part: 9 cm
diameter of perforation: /
mass (preserved): 560.6 g

Marks: top: /; base: /; side: /.

32. Fragments of a clay weight of ochre-red colour (2 big and 4 small pieces), morphologically indeterminate – type ? (t.o.: SF 218)

Dimensions: height: /
width: upper part: /
lower part: /
thickness: upper part: /
lower part: /
diameter of perforation: /
mass (preserved): 336.7 g

Marks: top: /; base: /; side: /.

33. Half of a preserved clay weight of ochre-red colour, composed of several fragments, in the shape of a truncated four-sided pyramid of approximately equal sides and slightly rounded corners, with a round perforation – type I (t.o.: SF 219)

Dimensions: height: 10.4 cm
width: upper part: 5.1 cm
lower part: 7.1 cm
thickness: upper part (preserved): 4.3 cm
lower part (preserved): 4.3 cm
diameter of perforation: 1.6 cm one side

debljina: gornjeg dijela (očuvana): 4,3 cm
donjeg dijela (očuvan): 4,3 cm
promjer perforacije: 1,6 cm jedna strana
težina (očuvana): 643,3 g

Oznake: vrh: blago ulegnuće u obliku znaka +; dno: /; stranica: iznad perforacije blago izmaknuto u lijevo trag udubljene okomite, jedva vidljive linije na jednoj strani.

34. Ulomci glinenog utega oker-crvene boje (12 komada) morfološki nedefinirani – tip ? (t.o.: PN 220)
Dimenzije: visina: /
širina: gornjeg dijela: /
donjeg dijela: /
debljina: gornjeg dijela: /
donjeg dijela: /
promjer perforacije: /
težina (očuvana): 498,1 g
Oznake: vrh: /; dno: /; stranica: /.

35. Ulomci glinenog utega oker-crvene boje (15 komada) morfološki nedefinirani – tip ? (t.o.: PN 221)
Dimenzije: visina: /
širina: gornjeg dijela: /
donjeg dijela: /
debljina: gornjeg dijela: /
donjeg dijela: /
promjer perforacije: /
težina (očuvana): 737,1 g
Oznake: vrh: /; dno: /; stranica: /.

36. Trag glinenog utega – tip ? (t.o.: N -)
Dimenzije: visina: /
širina: gornjeg dijela: /
donjeg dijela: /
debljina: gornjeg dijela: /
donjeg dijela: /
promjer perforacije: /
težina (očuvana): /
Oznake: vrh: /; dno: /; stranica: /.

37. Ulomak zadebljanoga zaobljenog ruba grubog jače grafitiranog lonca sa širokim vodoravnim žlijebom na vratu (t.o.: SJ 424; N 595)
Dimenzije: 15,1 × 3,6 × 0,6 cm.[31] Težina: 88,4 g.
Boja: siva.

38. Ulomak ramena i trbuha grubog jače grafitiranog lonca s vodoravnim žlijebom na ramenu i okomitim gustim žljebljenjem na trbuhu (t.o.: SJ 424; N 615)
Dimenzije: 10,8 × 11,7 × 0,6 cm. Težina: 115,2 g.
Boja: siva.

39. Ulomak zadebljanoga zaobljenog ruba i ramena grafitiranog lonca sa širim vodoravnim žlijebom na vratu i okomitim gustim žljebljenjem na trbuhu (t.o.: SJ 424; N 615)
Dimenzije: 3,5 × 3,1 × 0,3 cm. Težina: 8,1 g.
Boja: tamnosivo-smeđa, u presjeku smeđa.

40. Ulomak zadebljanoga zaobljenog ruba i ramena običnoga grubog lonca (t.o.: SJ 424; N 615)
Dimenzije: 8 × 5,6 × 1,1 cm. Težina: 72,5 g.
Boja: crvena, u presjeku siva.

41. Ulomak ruba zdjele fine fakture, glačana keramika. Rub je prema van izvijen i zaobljen te blago zadebljan (t.o.: SJ

31 Širina × visina × debljina stijenke.

mass (preserved): 643.3 g

Marks: top: slight depression in the shape of symbol +; base: /; side: above the perforation, slightly removed to the left, a trace of a depressed vertical, barely visible line on one side.

34. Fragments of a clay weight of ochre-red colour (12 pieces), morphologically indeterminate – type ? (t.o.: SF 220)
Dimensions: height: /
width: upper part: /
lower part: /
thickness: upper part: /
lower part: /
diameter of perforation: /
mass (preserved): 498.1 g
Marks: top: /; base: /; side: /.

35. Fragments of a clay weight of ochre-red colour (15 pieces), morphologically indeterminate – type ? (t.o.: SF 221)
Dimensions: height: /
width: upper part: /
lower part: /
thickness: upper part: /
lower part: /
diameter of perforation: /
mass (preserved): 737.1 g
Marks: top: /; base: /; side: /.

36. Trace of a clay weight – type ? (t.o.: F -)
Dimensions: height: /
width: upper part: /
lower part: /
thickness: upper part: /
lower part: /
diameter of perforation: /
mass (preserved):
Marks: top: /; base: /; side: /.

37. Fragment of a thickened rounded rim of a coarse, strongly graphited jar with a wide horizontal groove on the neck (t.o.: SU 424; F 595)
Dimensions: 15.1 × 3.6 × 0.6 cm.[31] Mass: 88.4 g.
Colour: grey.

38. Fragment of a shoulder and belly of a coarse, strongly graphited jar with a wide horizontal groove on the shoulder and dense vertical grooves on the belly (t.o.: SU 424; F 615)
Dimensions: 10.8 x 11.7 x 0.6 cm. Mass: 115.2 g.
Colour: grey.

39. Fragment of a thickened rounded rim and shoulder of a graphited jar with a wide horizontal groove on the neck and vertical dense grooves on the belly (t.o.: SU 424; F 615)
Dimensions: 3.5 x 3.1 x 0.3 cm. Mass: 8.1 g.
Colour: dark grey-brown, cross-section is brown.

40. Fragment of a thickened rounded rim and shoulder of an ordinary coarse jar (t.o.: SU 424; F 615)
Dimensions: 8 × 5.6 × 1.1 cm. Mass: 72.5 g.
Colour: red; cross-section is brown.

41. Fragment of a bowl of fine fabric, polished ceramics. Rim

31 Width x height x wall thickness.

424; N 615)
Dimenzije: 12,5 × 4,9 × 0,4 cm. Težina: 45,8 g.
Boja: svijetlosmeđe-oker, u presjeku oker.

42. Ulomak ruba i ramena zdjele fine fakture, glačana keramika. Rub je prema van izvijen i zaobljen te zadebljan (t.o.: SJ 424; N 595)
Dimenzije: 5,3 × 5,4 × 0,4 cm. Težina: 27 g.
Boja: smeđa, u presjeku svijetlosmeđa.

43. Ulomak ruba i ramena zdjele fine fakture, glačana keramika. Rub je prema van izvijen i zaobljen (t.o.: SJ 424; N 595)
Dimenzije: 6,3 × 4,9× 0,4 cm. Težina: 33 g.
Boja: tamnosmeđa, u presjeku svijetlosmeđa.

44. Ulomak trbuha zdjele fine fakture s vidljiva dva vodoravna žlijeba (t.o.: SJ 424; N 595)
Dimenzije: 18 × 5,9 × 0,9 cm. Težina: 141,3 g.
Boja: oker, u presjeku siva.

45. Ulomak ravnog dna zdjele fine fakture (t.o.: SJ 424; N 595)
Dimenzije: 9 × 8,2 × 1 cm. Težina: 70,6 g.
Boja: siva.

46. Ulomak običnog zaobljenog ruba posude (zdjele?) fine fakture (t.o.: SJ 424; N 615)
Dimenzije: 4,3 × 2,9 × 0,5 cm. Težina: 10,5 g.
Boja: tamnosivo-smeđa, u presjeku svijetlosmeđa.

47. Ulomak običnog ravno odsječenog ruba posude (zdjele?) fine fakture (t.o.: SJ 424; N 615)
Dimenzije: 5,3 × 3,6 × 0,6 cm. Težina: 17,7 g.
Boja: tamnosmeđa, u presjeku svijetlosmeđa.

48. Ulomak ruba manje posude fine fakture. Rub je prema van izvijen (t.o.: SJ 424; N 615)
Dimenzije: 5,1 × 3,5 × 0,5 cm. Težina: 10,4 g.
Boja: oker-siva.

49. Ulomak vrata (?) posude fine fakture. Vidljiv je ukras dvaju paralelnih nizova sitnih uboda koji se lome pod kutom. Nizovi su omeđeni plitkim žljebovima. Na mjestu loma ukrasa vidljive su četiri utisnute koncentrične kružnice. Vodoravni niz sitnih uboda također je omeđen plitkim žljebovima (t.o.: SJ 001/424; PN 180)
Dimenzije: 8,9 × 9,2 × 0,9 cm. Težina: 32,5 g.
Boja: oker.

50. Ulomak ramena (?) posude fine fakture. Vidljiv je ukras vodoravnog niza sitnih uboda te dijela utisnute koncentrične kružnice na kraju toga niza. Ispod ukrasa nalazi se plitki vodoravni žlijeb (t.o.: SJ 424; N 595)
Dimenzije: 5,3 × 3,5 × 3,7 cm. Težina: 12,4 g.
Boja: crvena.

51. Ulomak ručke posude (t.o.: SJ 424; N 615)
Dimenzije: 4,8 × 3,9 × 0,6 cm. Širina ručke: 2,6 cm. Težina: 17,4 g.
Boja: tamnosmeđa.

52. Ulomak pršljena D-presjeka, grafitirana keramika (t.o.: SJ 001; PN 178)
Dimenzije: 4,4 × 2,4 × 1,5 (najdeblji dio D-presjeka) cm. Promjer perforacije: 1,3 cm. Težina: 26,9 g.
Boja: siva.

53. Željezni predmet nedefinirane namjene, sastoji se od čeis everted, rounded and slightly thickened (t.o.: SU 424; F 615)
Dimensions: 12.5 × 4.9 × 0.4 cm. Mass: 45.8 g.
Colour: light brown-ochre.

42. Fragment of a rim and shoulder of a bowl of fine fabric, polished ceramics. Rim is everted, rounded and thickened (t.o.: SU 424; F 595)
Dimensions: 5.3 × 5.4 × 0.4 cm. Mass: 27 g.
Colour: brown; light brown cross-section.

43. Fragment of a rim and shoulder of a bowl of fine fabric, polished ceramics. Rim is everted and rounded (t.o.: SU 424; F 595)
Dimensions: 6.3 × 4.9 × 0.4 cm. Mass: 33 g.
Colour: dark brown; light brown cross-section.

44. Fragment of a belly of a bowl of fine fabric, with two horizontal grooves (t.o.: SU 424; F 595)
Dimensions: 18 x 5.9 x 0.9 cm. Mass: 141.3 g.
Colour: ochre; grey cross-section.

45. Fragment of a flat base of a bowl of fine fabric (t.o.: SU 424; F 595)
Dimensions: 9 × 8.2 × 1 cm. Mass: 70.6 g.

46. Fragment of an ordinary rounded rim of a pot (bowl?) of fine fabric (t.o.: SU 424; F 615)
Dimensions: 4.3 x 2.9 x 0.5 cm. Mass: 105 g.
Colour: dark grey-brown; light brown cross-section.

47. Fragment of an ordinary, straight-cut rim of a pot (bowl?) of fine fabric (t.o.: SU 424; F 615)
Dimensions: 5.3 x 3.6 x 0.6 cm. Mass: 17.7 g.
Colour: dark brown; light brown cross-section.

48. Fragment of a rim of a small pot of fine fabric. Rim is everted (t.o.: SU 424; F 615)
Dimensions: 5.1 x 3.5 x 0.5 cm. Mass: 10.4 g.
Colour: ochre-grey.

49. Fragment of the neck (?) of a pot of fine fabric. Decorated with two parallel rows of tiny stabs inflected at a certain angle. Rows are bordered by shallow grooves. Four concentric circles are impressed at the inflection of the ornament. A horizontal row of tiny stabs is likewise bordered by shallow grooves (t.o.: SU 001/424; SF 180)
Dimensions: 8.9 x 9.2 x 0.9 cm. Mass: 32.5 g.
Colour: ochre.

50. Fragment of a shoulder (?) of a pot of fine fabric. Preserved decoration consists of a horizontal row of tiny stabs ending with a part of an impressed concentric circle. A shallow horizontal groove runs below this decoration (t.o.: SU 424; F 595)
Dimensions: 5.3 x 3.5 x 3.7 cm. Mass: 12.4 g.
Colour: red.

51. Fragment of a pot handle (t.o.: SU 424; F 615)
Dimensions: 4.8 x 3.9 x 0.6 cm. Handle width: 2.6 cm. Mass: 17.4 g.
Colour: dark brown.

52. Fragment of a spindle-whorl of D-shaped cross-section, graphite ceramics (t.o.: SU 001; SF 178)
Dimensions: 4.4 x 2.4 x 1.5 cm (thickest part of the D-shaped cross-section). Diameter of perforation: 1.3 cm. Mass: 26.9 g.
Colour: grey.

tiri veća (a–d) i pet manjih ulomaka (ukupne težine 3 g) (t.o.: PN 183) (sl. 7)
a) ulomak glavice čavlića. Visina očuvanog dijela 1,4 cm; širina glavice 0,6 cm; promjer 0,2 cm; težina: 0,4 g,
b) ulomak dijela plosnatog predmeta koji se na jednom kraju savija. Na jednom dijelu ima oštro ispupčenje. Dužina: 9,7 cm; širina: 0,6 cm; debljina: 0,2 cm; težina: 4,3 g,
c) ulomak dijela plosnatog predmeta koji se na jednom dijelu savija. Dužina: 10,2 cm; širina: 0,6 cm; debljina: 0,4 cm; težina: 6,6 g,
d) ulomak dijela plosnatog predmeta koji se lomi oko sredine očuvanog dijela. Dužina: 10,5 cm; širina: 0,9 cm; debljina: 0,2 cm, težina: 5,8 g.

54. Željezni predmet (t.o.: PN 181)
Masivni željezni klin četvrtastog presjeka na najširem dijelu koji se stanjuje i poprima kružni oblik na oba kraja. Dužina: 13,1 cm; najveća širina na sredini predmeta: 0,8 cm; na dijelu očuvanog vrha promjer: 0,3 cm; težina: 21,5 g

55. Željezni predmet nedefinirane namjene (t.o.: PN 182)
Dužina: 3,9 cm; širina: 1,5 cm; debljina: 0,4 cm; težina: 6,6 g.

53. Iron object of indeterminate function, consisting of four big (a-d) and five smaller fragments (total mass: 3 g) (t.o.: SF 183) (Fig. 7)
a) fragment of a nail head. Height of the preserved part: 1.4 cm; head width: 0.6 cm; diameter: 0.2 cm; weight: 0.4 g,
b) fragment of a part of a flat object bent at one end, with a sharp bulge at one point. Length: 9.7 cm; width: 0.6 cm; thickness: 0.2 cm; mass: 4.3 g,
c) fragment of a part of a flat object bent at one end. Length: 10.2 cm; width: 0.6 cm; thickness: 0.4 cm; mass: 6.6 g,
d) fragment of a part of a flat object, inflected around the middle of its preserved part. Length: 10.5 cm; width: 0.9 cm; thickness: 0.2 cm; mass: 5.8 g.

54. Iron object (t.o.: SF 181)
Massive iron wedge of rectangular cross-section at the widest part, which tapers and acquires a more circular shape at both ends. Length: 13.1 cm; greatest width at the middle of the object: 0.8 cm; diameter at the preserved top: 0.3 cm; mass: 21.5 g.

55. Iron object of indeterminate function (t.o.: SF 182)
Length: 3.9 cm; width: 1.5 cm; thickness: 0.4 cm; mass: 6.6 g.

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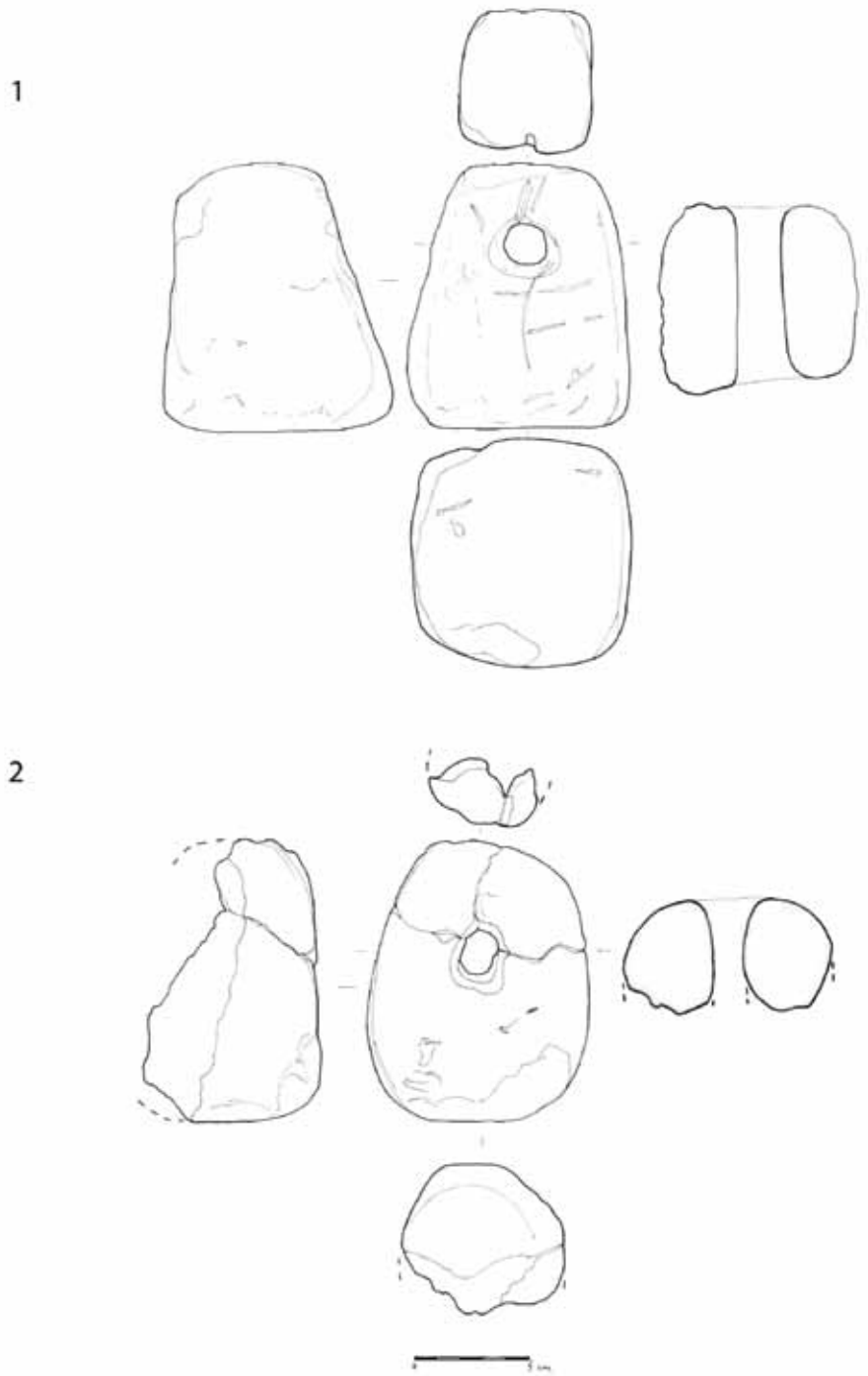
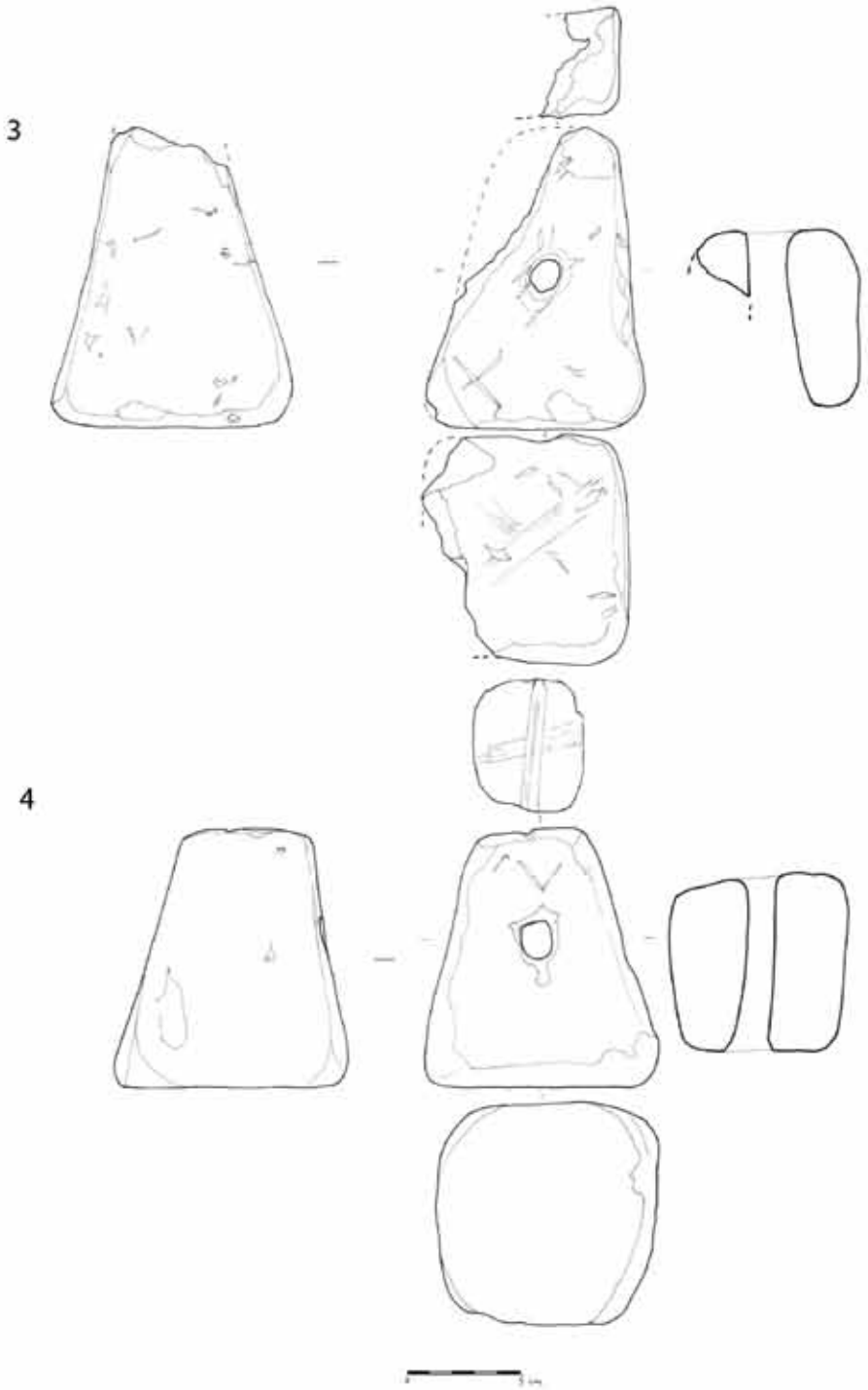


T. 1 Virje–Sušine
Pl. 1 Virje–Sušine

T. 2



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Pl. 2 Virje–Sušine

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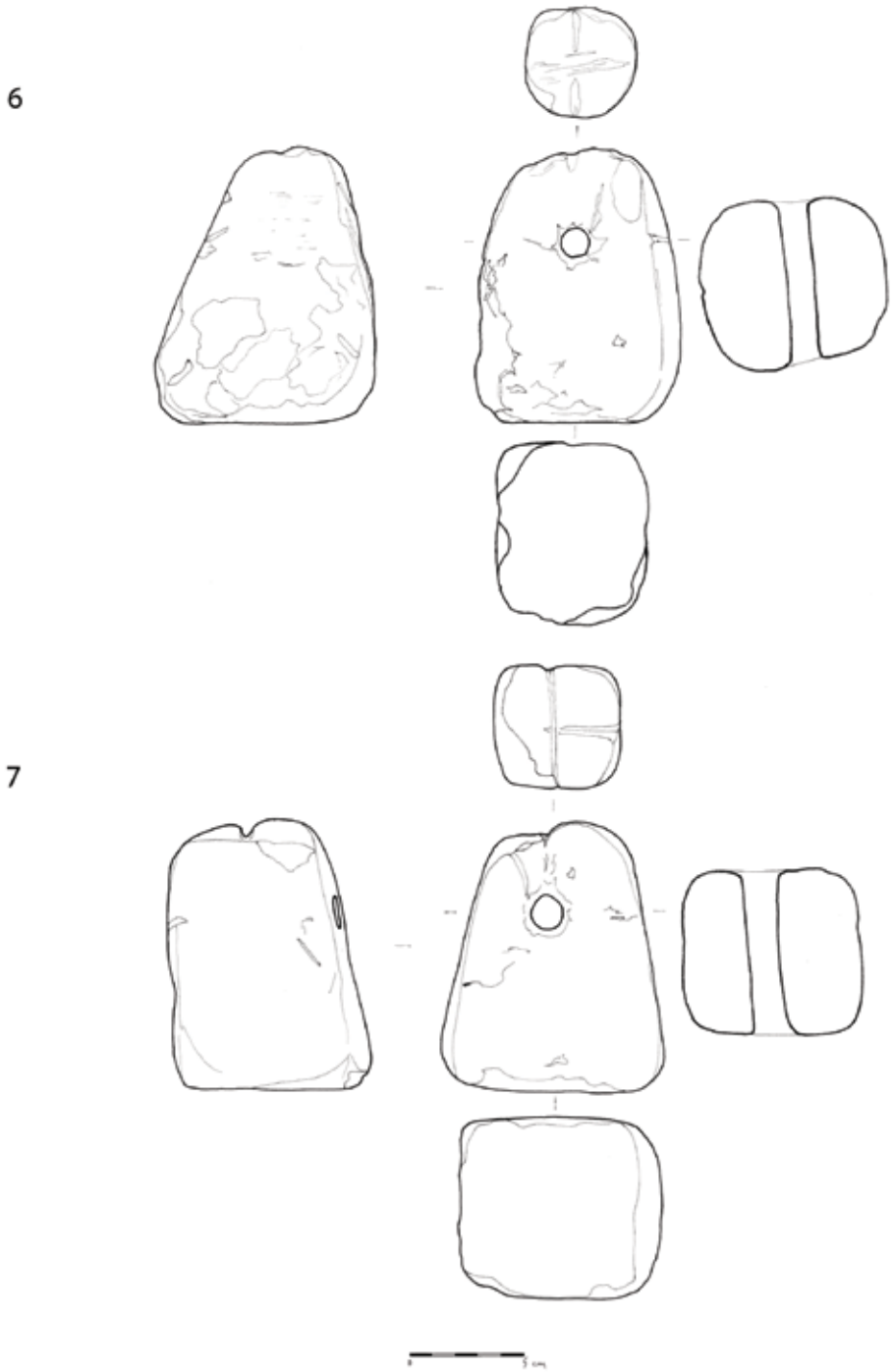

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Pl. 3 Virje–Sušine

T. 4

T. 4 Virje–Sušine
Pl. 4 Virje–Sušine

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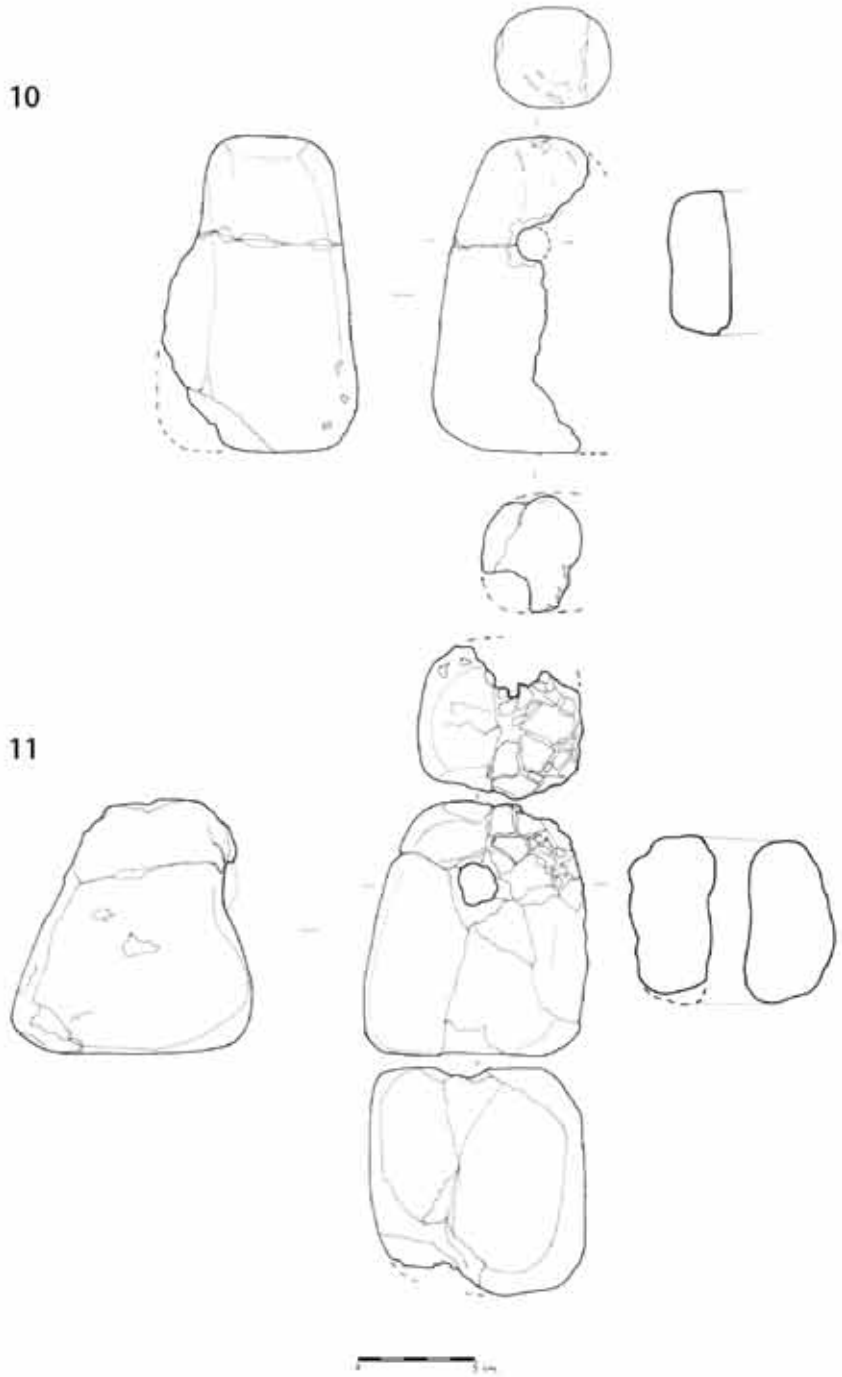

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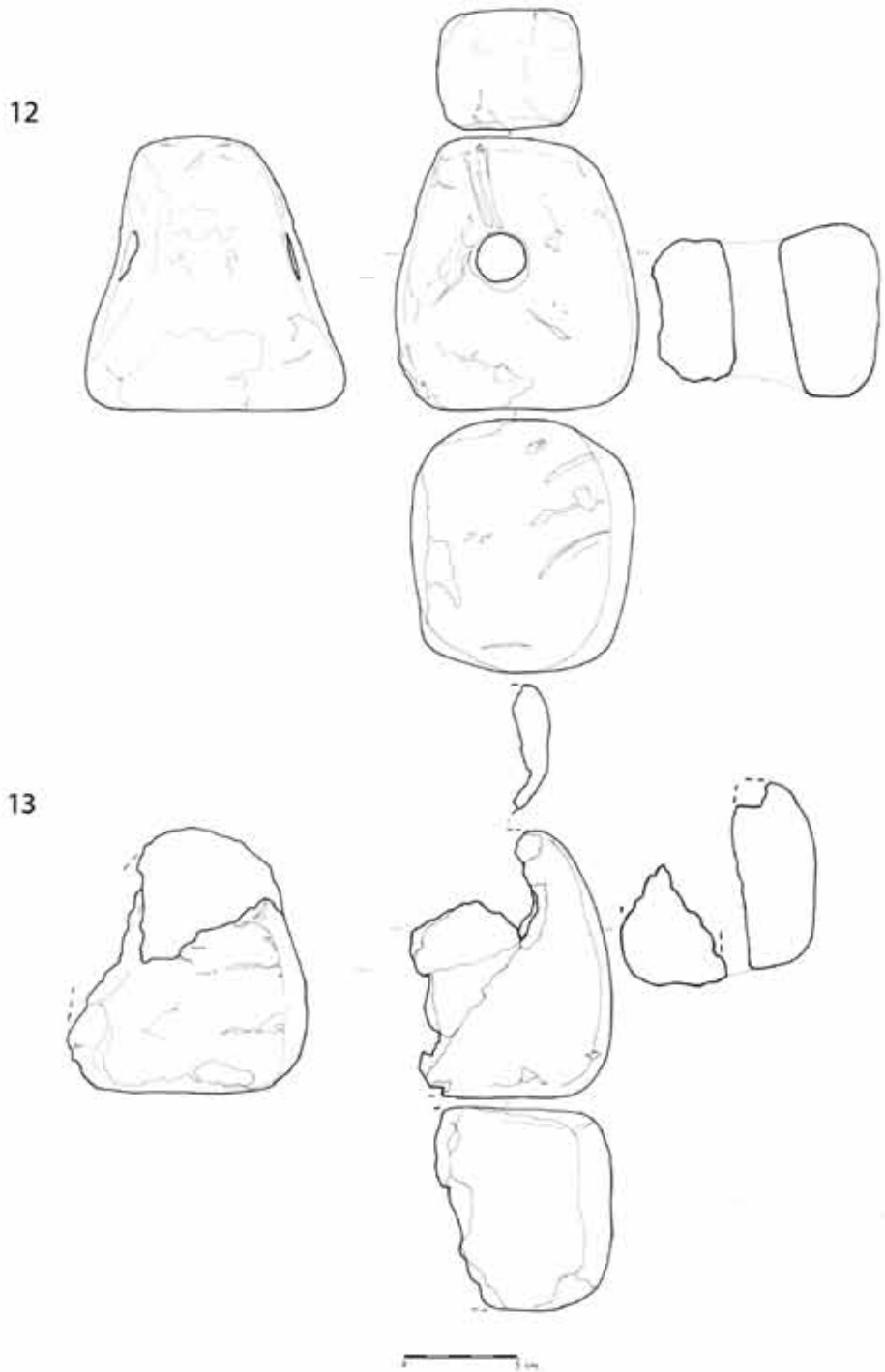

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Pl. 6 *Virje–Sušine*

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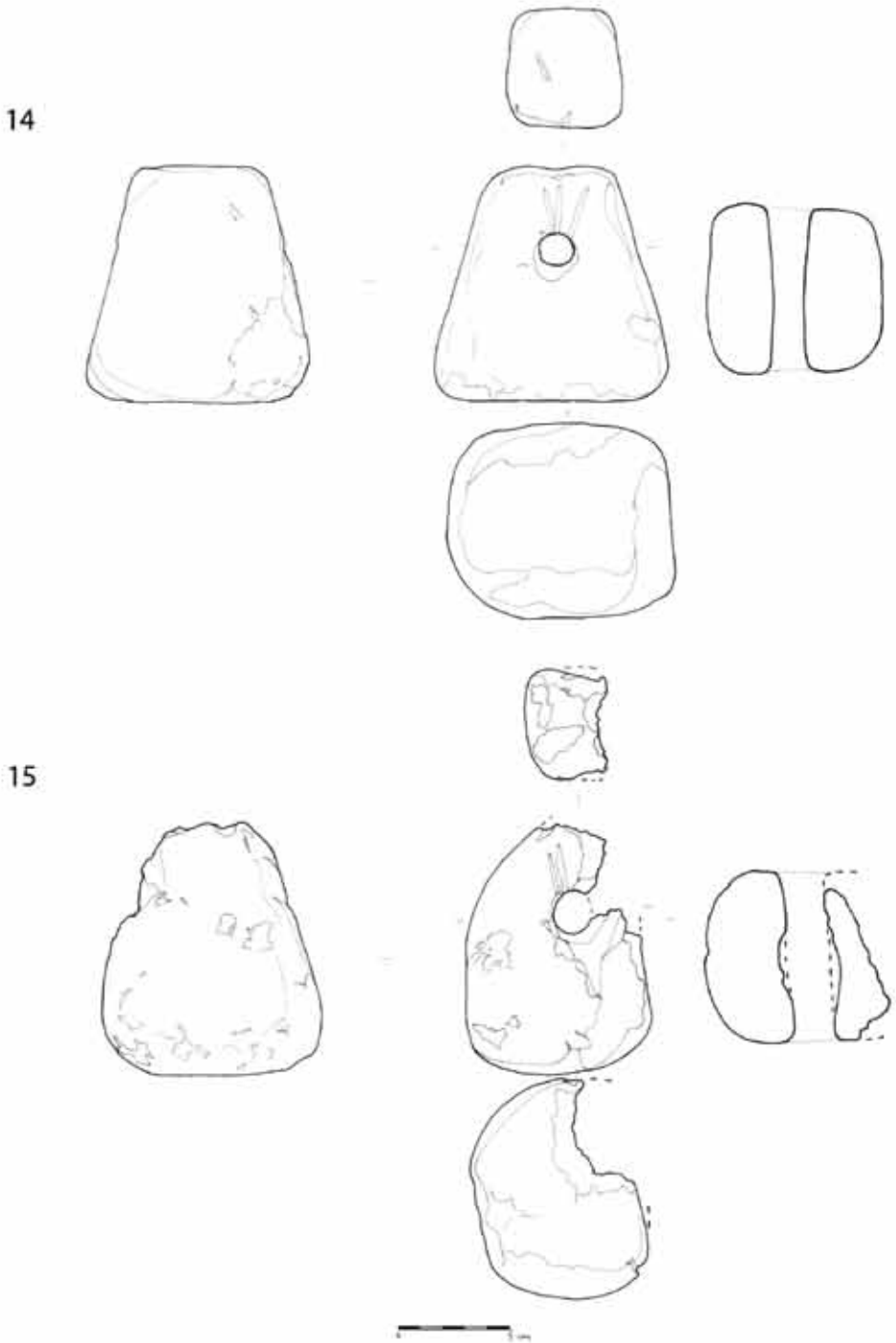

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Pl. 6 *Virje–Sušine*

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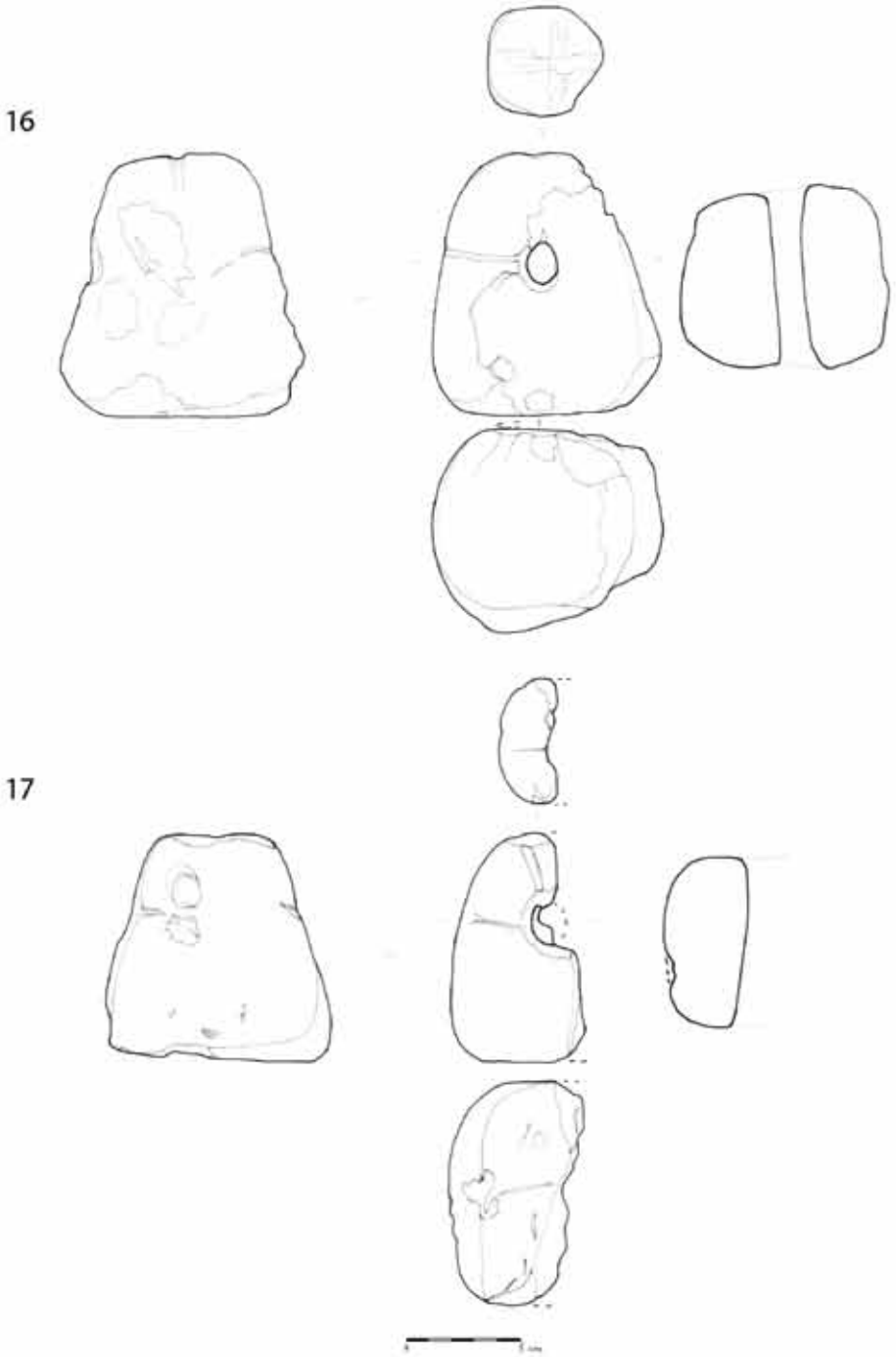
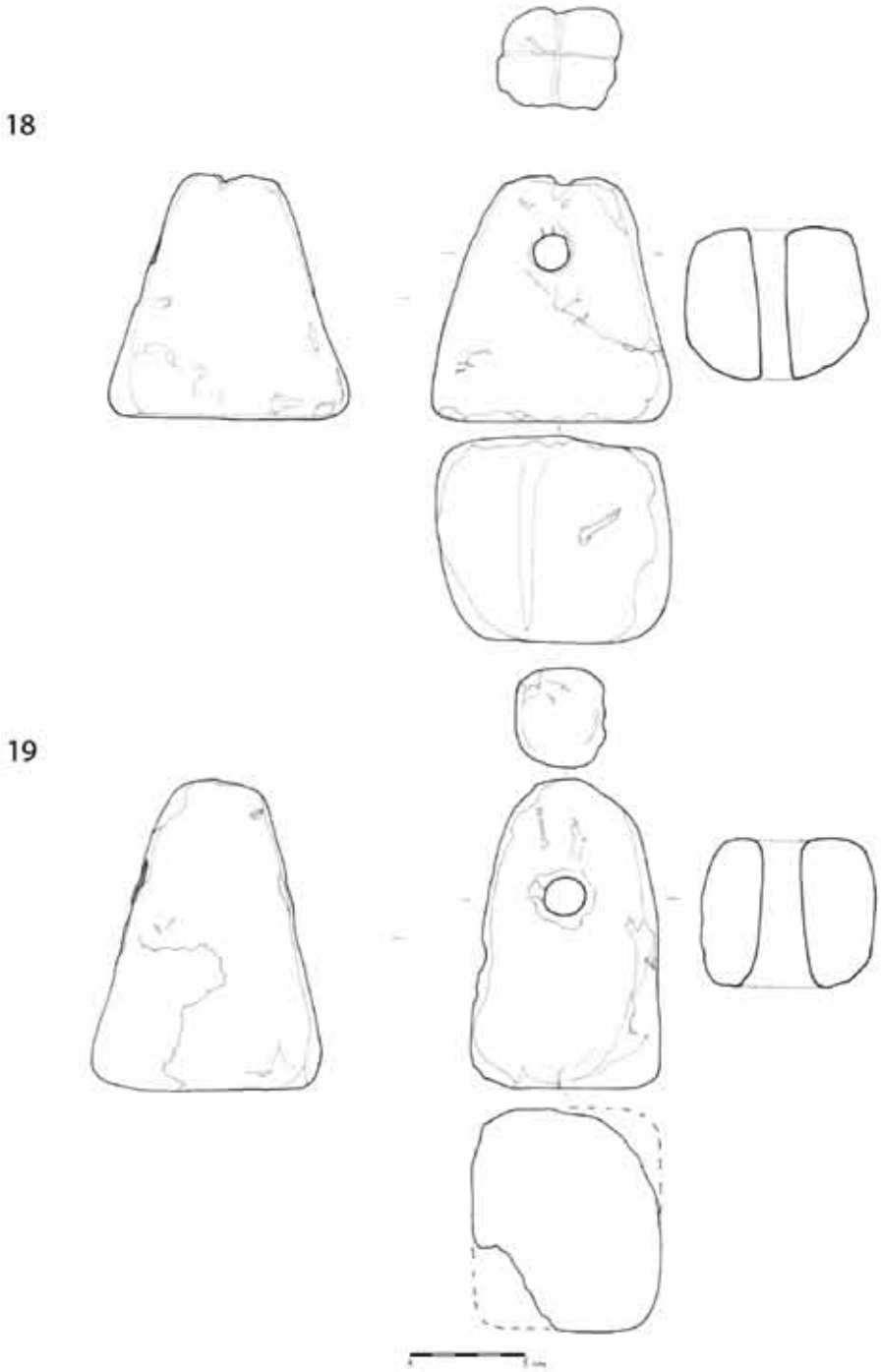


T. 9 Virje–Sušine
Pl. 9 *Virje–Sušine*

T. 9



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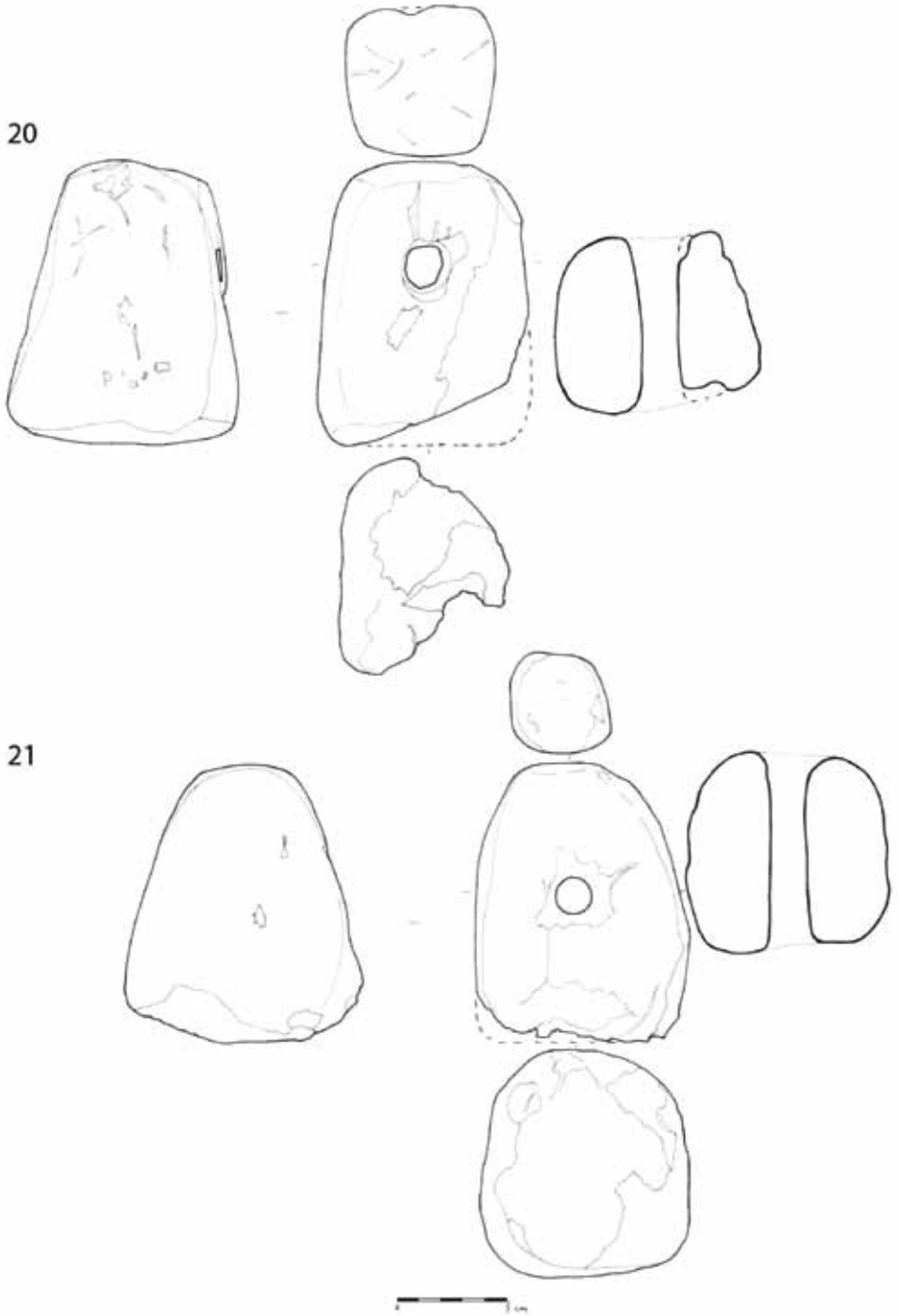

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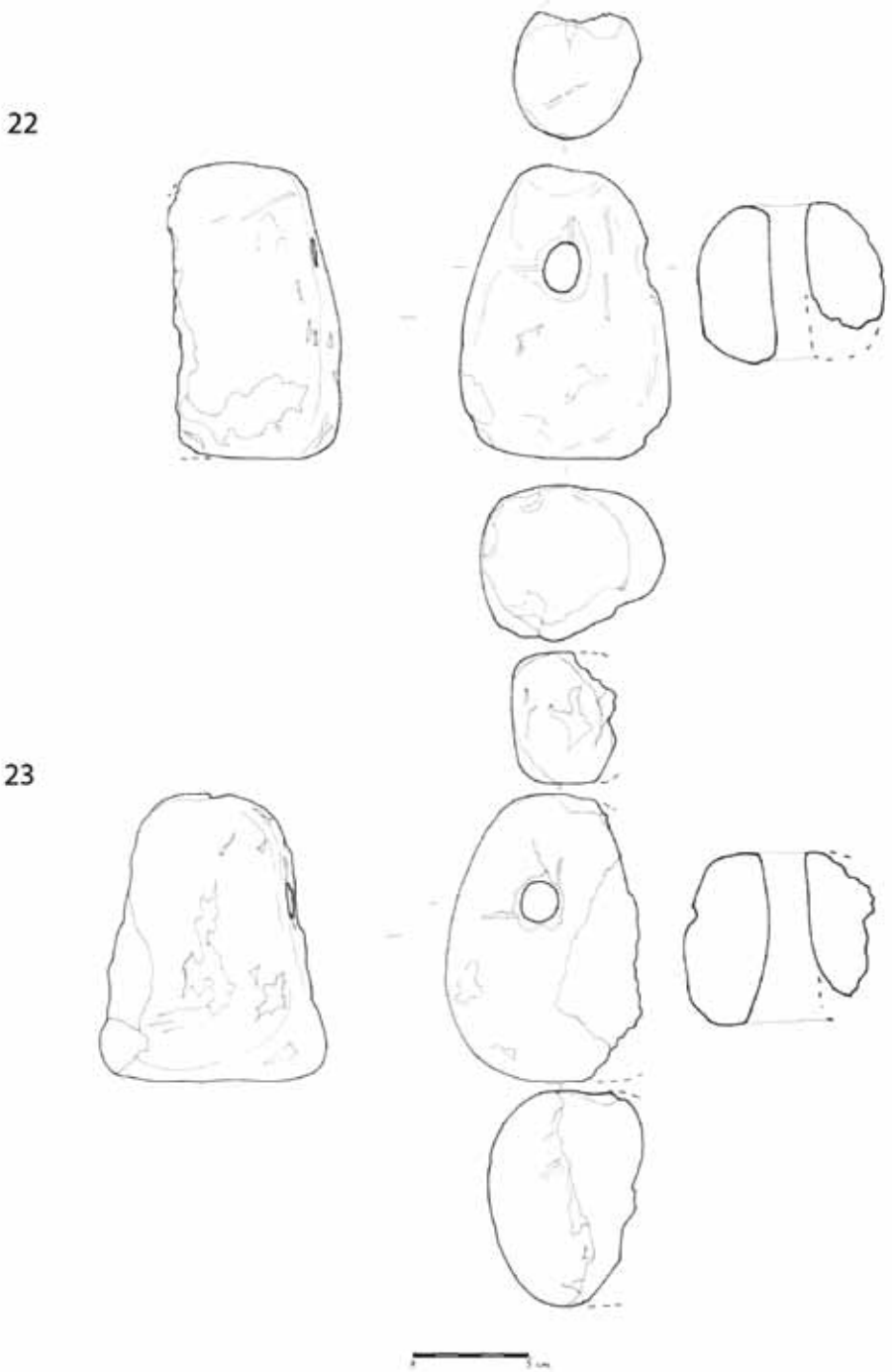

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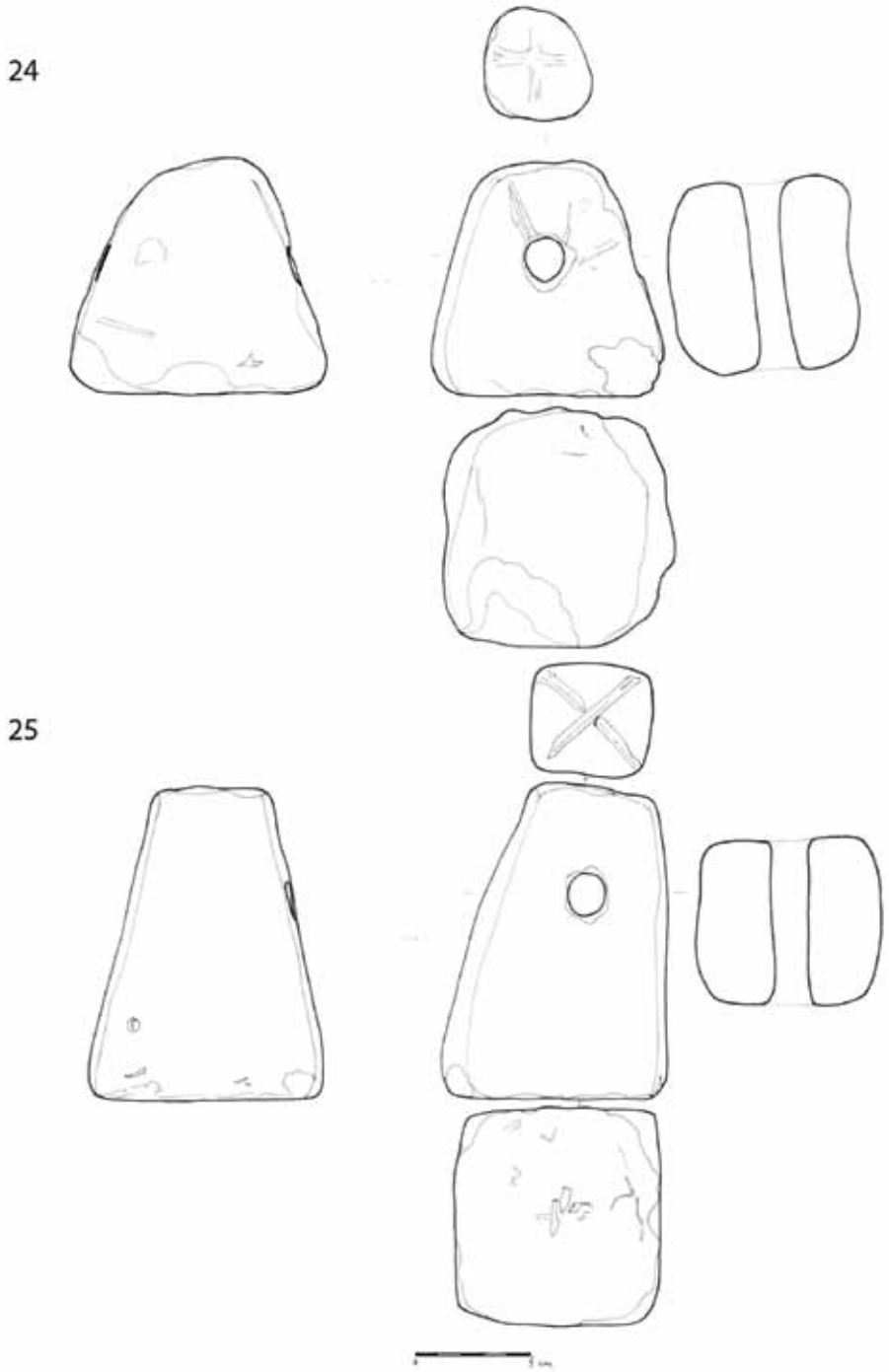

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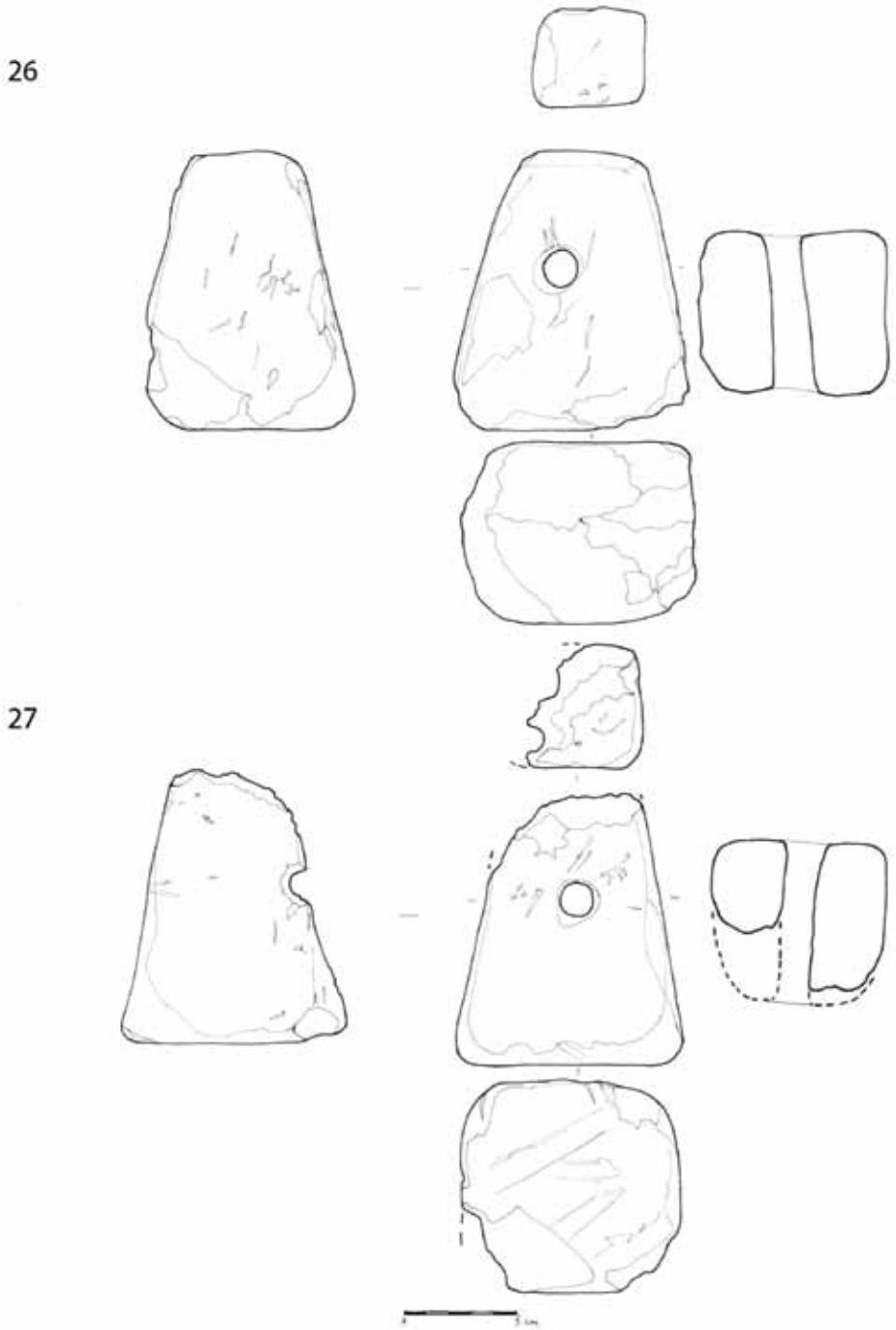

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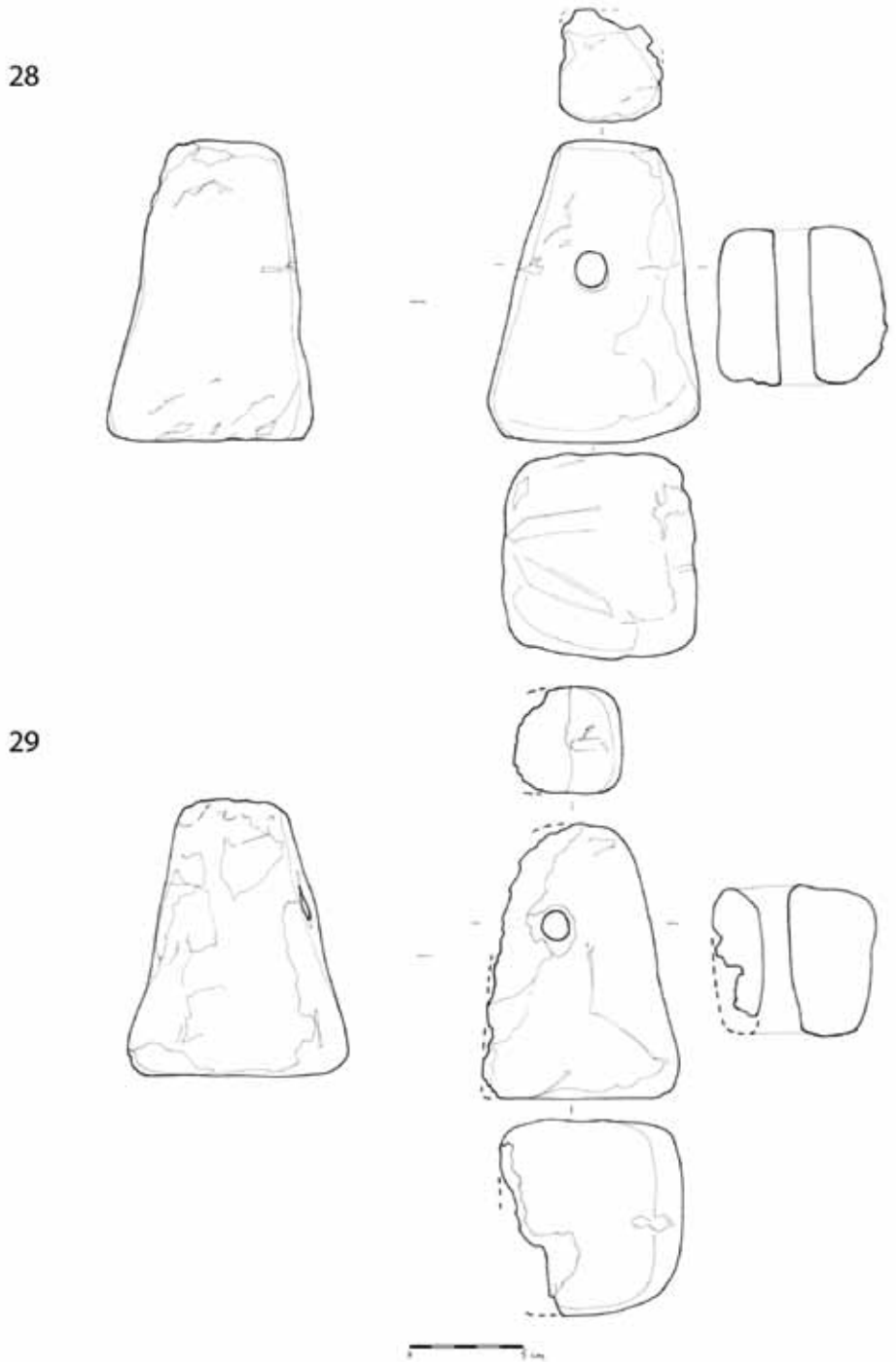

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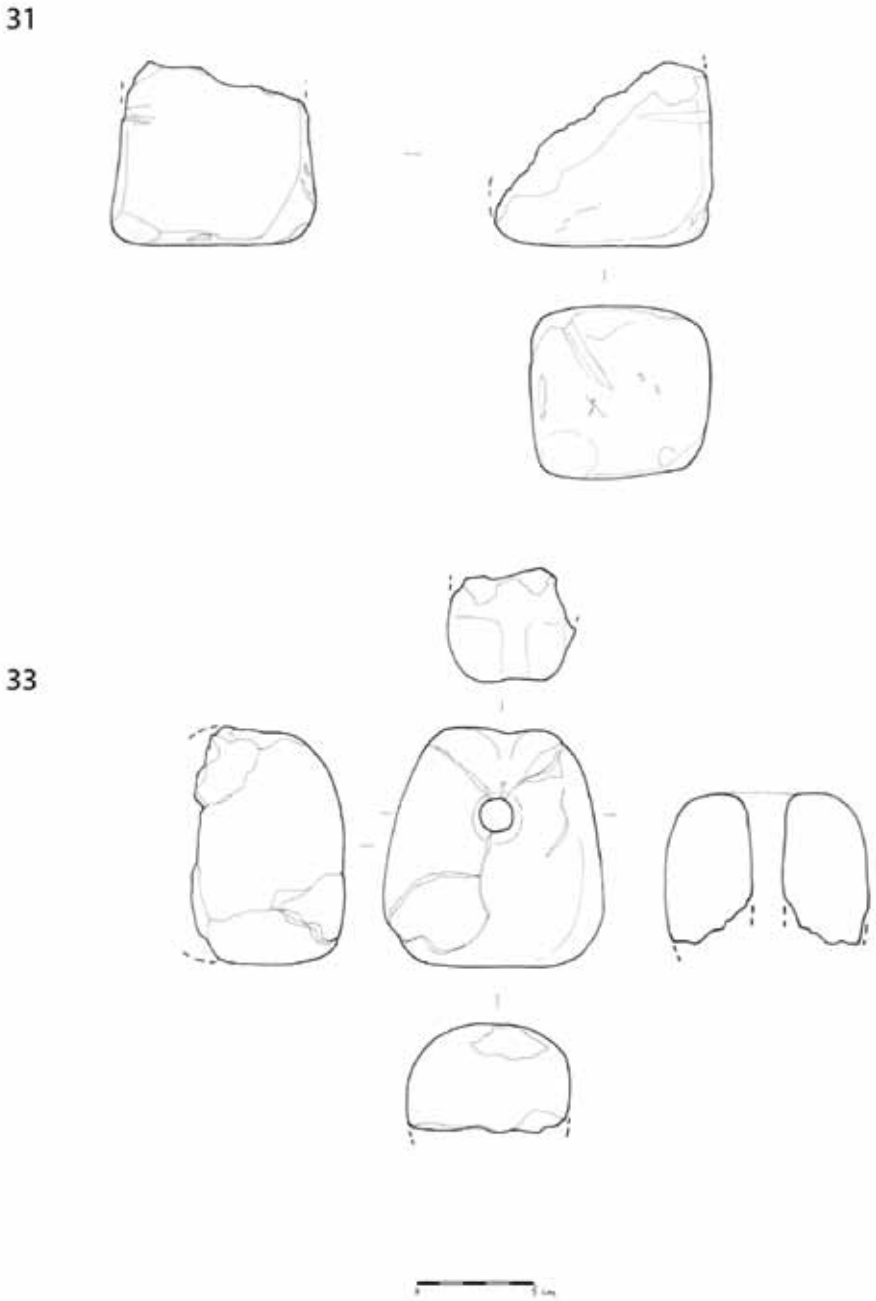

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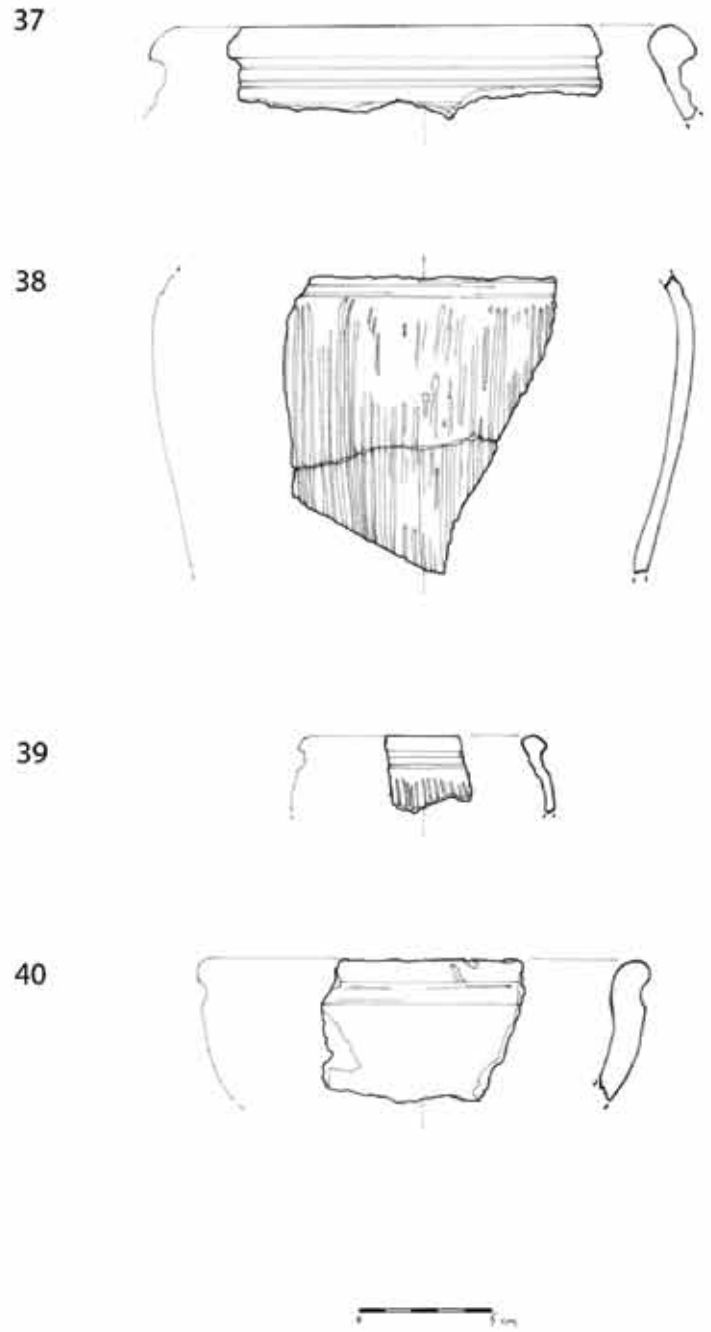

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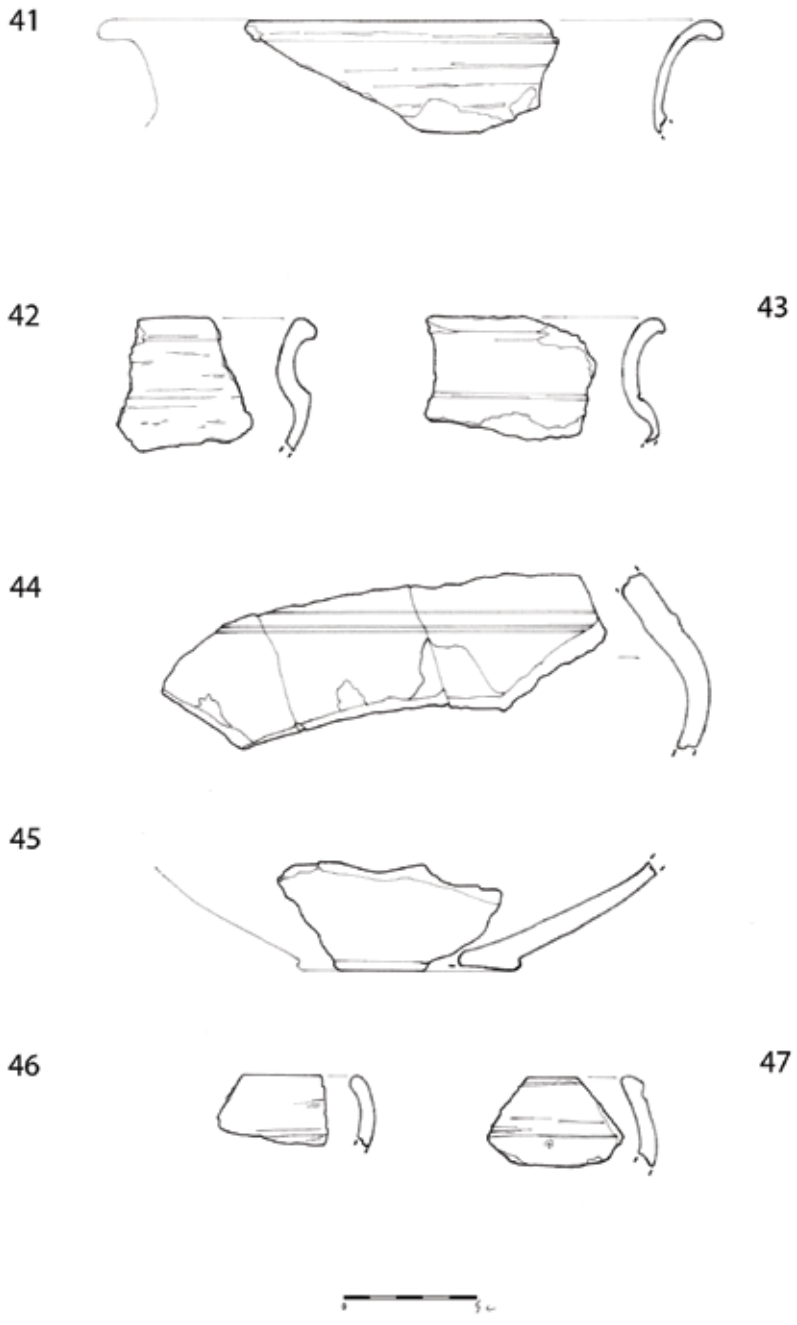

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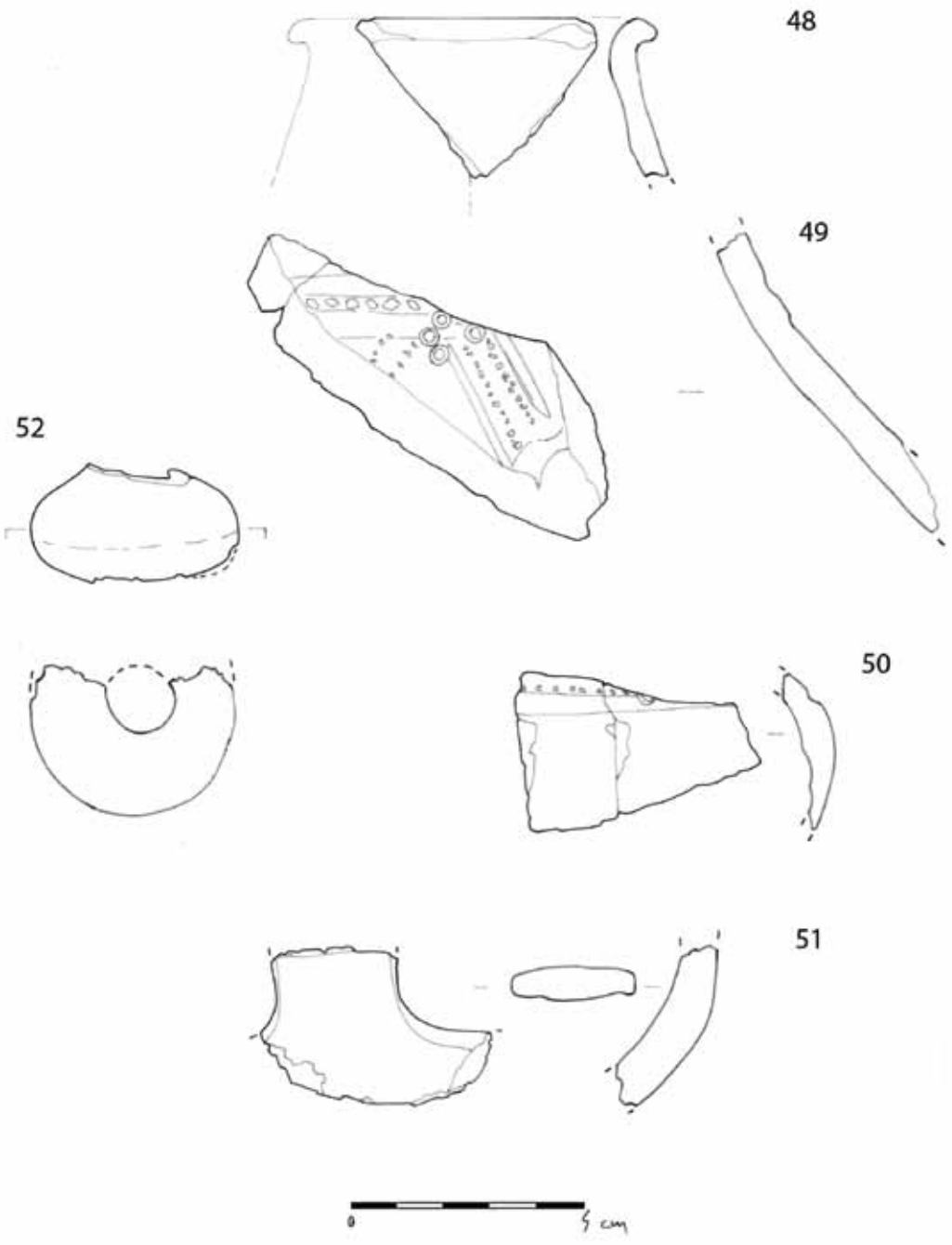

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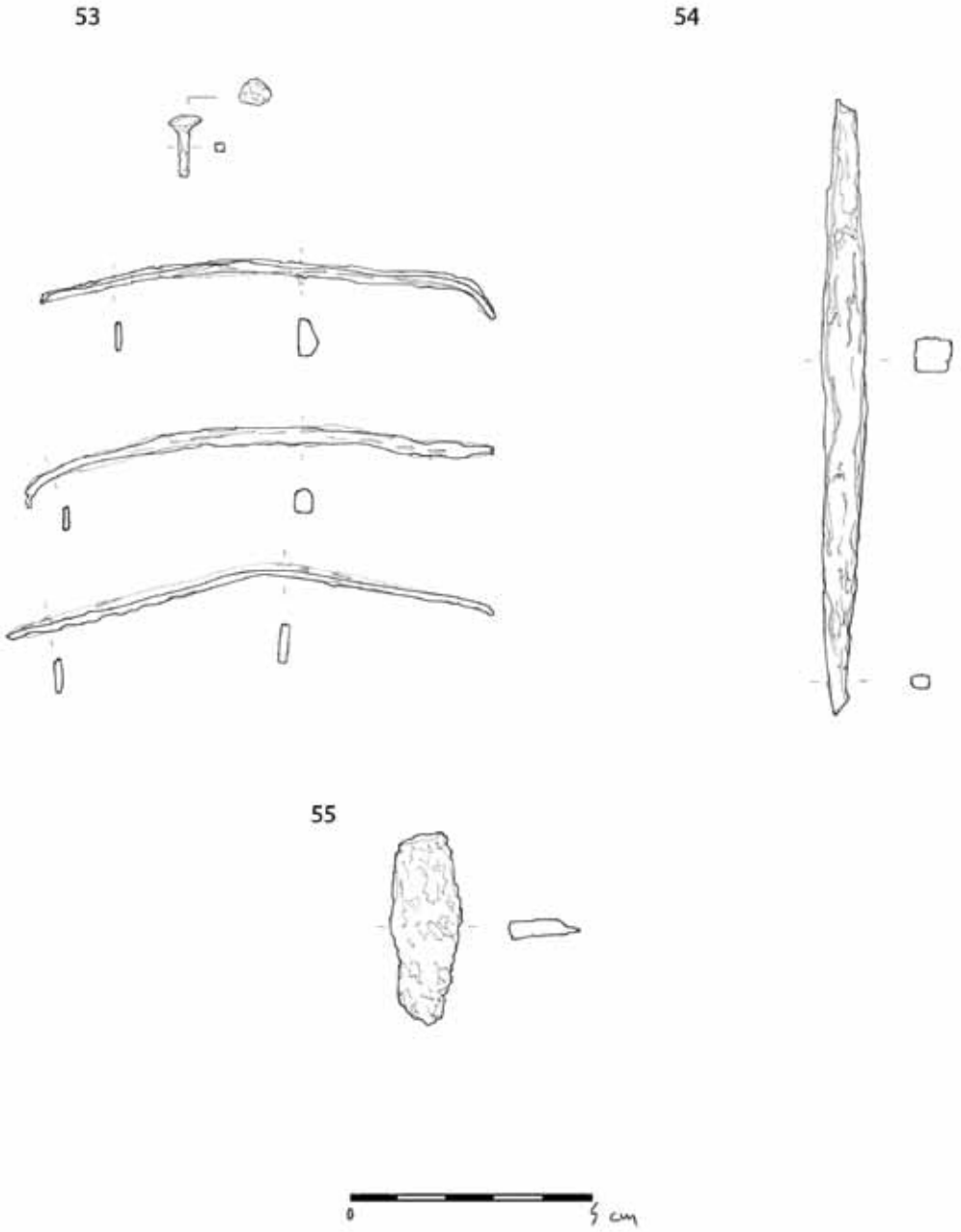

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