Đurđeva greda i neolitik Like

Đurđeva greda and the Neolithic of Lika

Izvorni znanstveni rad
Prapovijesna arheologija

Original scientific paper
Prehistoric archaeology

UDK/*UDC* 903'1(497.5–3 Lika)"634"

Primljeno/*Received*: 15. 02. 2013.
Prihvaćeno/*Accepted*: 09. 12. 2013.

STAŠO FORENBAHER
Institut za antropologiju
Zagreb, Ljudevita Gaja 32
staso.forenbaher@inantro.hr

NIKŠA VUJNOVIĆ
Kaducej d.o.o.
Split, Papandopulova 27
niksavujnovic@net.hr

U zaštitnim iskopavanjima provedenim 2010. godine istražen je dio pretpovijesnog naselja smještenog na Đurđevoj gredi, desetak kilometara istočno od Gospića. Riječ je o prvom nesporno neolitičkom nalazištu u Lici. Nalazi iz vremena prijelaza ranoga u srednji neolitik obuhvaćaju jame i ostatke nadzemnih struktura te lončariju i skupinu izrađevina koja upućuje na proizvodnju kamenih bradvi cijepanjem i glačanjem. Spomenuti nalazi svjedoče da su inovacije vezane uz neolitički način života dosegle Liku sredinom šestog tisućljeća prije Krista. Arheološka građa prikupljena s Đurđeve grede izravno utječe na postojeća tumačenja procesa širenja zemljoradnje u kontinentalno zaleđe istočnog Jadrana.

Ključne riječi: neolitik, Lika, naselje, lončarija, glačani kamen, litička tehnologija

Partially explored in rescue excavations in 2010, a prehistoric settlement located ten kilometres east of Gospić at Đurđeva greda is the first indisputable Neolithic site in Lika. Finds include pits, remains of structures and pottery, dating from the Early to Middle Neolithic transition, as well an assemblage of artefacts that indicates the production of stone adzes by flaking and grinding. These innovations, related to the Neolithic way of life, reached Lika by the middle of the sixth millennium BC. The archaeological evidence from Đurđeva greda directly affects current interpretations of the spread of farming into the continental hinterland of the eastern Adriatic.

Key words: Neolithic, Lika, settlement, pottery, ground stone, lithic technology

UVOD

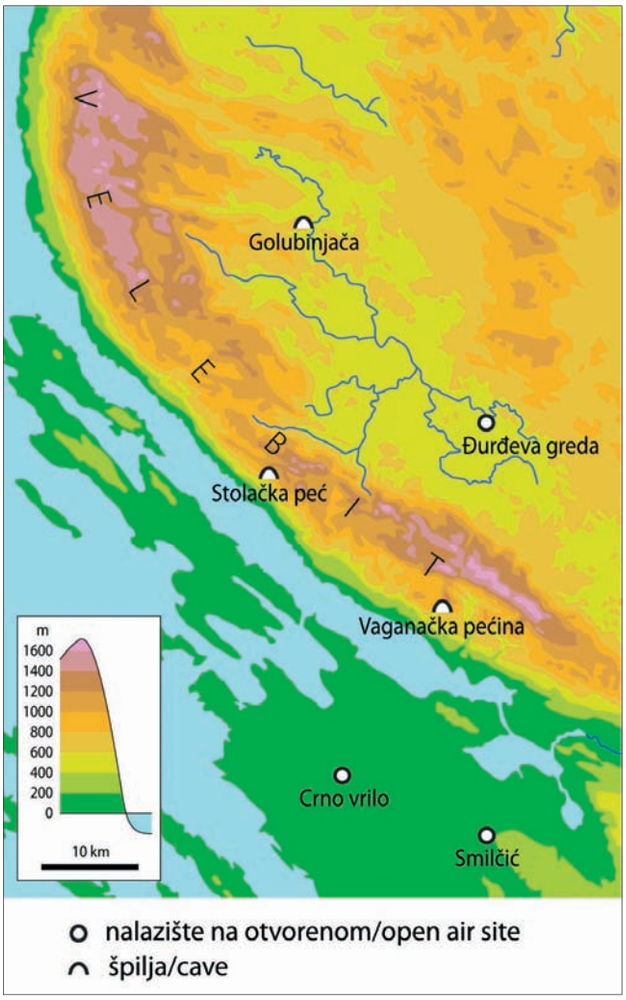
Pretpovijest Like od ranoga brončanog doba do osvita povijesti prilično je dobro poznata. Nasuprot tomu, ranija pretpovijesna razdoblja zastupljena su tek s nekoliko problematičnih, pojedinačnih ili slučajnih nalaza. Nameće se zaključak da je Lika sve do ranoga brončanog doba bila gotovo pusta, no takav zaključak vjerojatno odražava interese arheologa više od stvarnog stanja na terenu. Pozornost istraživača pretpovijesti Like bila je od samog početka izrazito usredotočena na gradine i groblja. Budući da ni lovci-sakupljači ni rani zemljoradnici u pravilu nisu smještali svoja naselja na lako branjive uzvisine a svoje mrtve nisu pokopavali u formalno organiziranim grobljima, tako usmjerena istraživanja tek su rijetko i slučajno mogla naići na tragove ranijih razdoblja pretpovijesti.

Postojeća nepotpuna i po svoj prilici iskrivljena slika prošlosti Like pomalo se mijenja zahvaljujući sve brojnijim i kvalitetnijim zaštitnim istraživanjima koja posljednjih godina prate velike razvojne infrastrukturne projekte. Sustav-

INTRODUCTION

The prehistory of Lika from the Early Bronze Age until the dawn of history is relatively well known. As opposed to that, earlier prehistoric periods are represented by only a handful of problematic, isolated chance finds. One might conclude that up to the Early Bronze Age Lika was almost uninhabited, but such a conclusion probably sooner reflects the interests of archaeologists rather than the actually existing archaeological record. Since the beginning of field research, exploration of Lika's prehistory was focused on hillforts and cemeteries. Unfortunately, hunter-gatherers and early farmers seldom positioned their settlements on easily defensible hilltops, and they did not bury their dead in formal cemeteries. As a consequence, investigation focused on hillforts and cemeteries could encounter their remains only rarely and by accident.

Thanks to the increasing number of carefully executed rescue explorations, which preceded the large development projects that were undertaken over the last few years,



Sl. 1 Neolitička nalazišta u Lici i njezinu neposrednom susjedstvu (izradio: S. Forenbaher)

Fig. 1 Neolithic sites in Lika and its immediate neighbourhood (drawn by S. Forenbaher)

ni terenski pregledi provedeni duž trasa novih prometnica zahvatili su velike prostore i različite segmente krajolika, uključujući i one kojima se prije nije poklanjala naročita pozornost. Stoga ne iznenađuje činjenica da zaštitna istraživanja koja su slijedila pružaju nove, drugačije, a ponekad i neočekivane podatke o arheološkim izvorima Like.

SMJEŠTAJ I POVIJEST ISTRAŽIVANJA NALAZIŠTA

Đ urđeva greda neizrazita je uzvisina nad južnom obalom rječice Jadove nedaleko od sela Vrebac, 11 km istočno od Gospića. Nalazi se pri sjevernom rubu Ličkog polja, na nadmorskoj visini od oko 575 m (sl. 1). Greda široka dvjestotinjak metara nadvisuje oštar zavoj korita Jadove za svega nekoliko metara. Sa zapada je omeđuje Mandarića potok i izvor zvan Crno vrelo, dok se prema jugu proteže u dužini od više stotina metara (sl. 2).

Prema pisanju R. Drechsler-Bižić, Josip Brunšmid je prilikom svojeg posjeta Vrepcu 1896. godine zabilježio da su na Đ urđevoj gredi pri oranju pronađeni kremeni nožići i jedna veća kalupasta sjekira, no pri površinskom pregledu lokali-

the existing incomplete and almost certainly skewed picture of Lika's prehistory is beginning to change. Systematic surveys, carried out along new highway right-of-ways, embraced large spaces and various segments of the landscape, including those that formerly were neglected. Unsurprisingly, the ensuing rescue excavations are providing new, different, and sometimes unexpected information about Lika's archaeological record.

SITE LOCATION AND RESEARCH HISTORY

Đ urđeva greda is an inconspicuous elevation overlooking the southern bank of the Jadova stream not far from the village of Vrebac, 11 km to the east of Gospić. It is located near the northern edge of the karstic plain of Lika, at an elevation of about 575 m (Fig. 1). A low, 200 m wide, flat-top ridge rises only a few metres above a tight bend of Jadova. Its boundary to the west is Mandarića creek and a spring called Crno vrelo, while it extends several hundred metres southwards (Fig. 2).

According to R. Drechsler-Bižić, when Josip Brunšmid visited Vrebac in 1896, he noted that flint knives and a sizable stone adze were found at Đ urđeva greda in the course of land cultivation. Nothing was recovered, however, during a surface inspection of the site in 1957 (Drechsler-Bižić 1958: 36). A survey report from 1988 again mentions chance finds of whetstones and flaked stone artefacts, collected by the landowners on several occasions (Proroković-Lazarević 1988).

The collected finds are on display as a part of the permanent exhibition of the Museum of Lika in Gospić. The collection consists of 35 small stone objects: 19 bifacial arrow points and 13 prismatic blade segments made of chert, as well as one complete and two broken groundstone axes. Most of the bifacial points are relatively short, winged and concave-based, of a type that is usually attributed to the Copper Age or Early Bronze Age (Petrić 1979, Pl. 20; Barfield 2001). Other objects are not chronologically sensitive and, while most could belong to the aforementioned periods, at least some of them probably belong to the Neolithic.

The surface of Đ urđeva greda was surveyed again on several occasions between 1999 and 2002, in the course of archaeological rescue work related to the construction of Highway A1, section Lički Osik – Sveti Rok (Kolak, Perkić 2002). Archaeological finds were not reported at the time, nor were they observed later, during highway construction. After completion of the road construction, the right-of-way was laid between the new highway and the Jadova stream for the main gas pipeline Gospić – Benkovac. According to the available information, that was the area where archaeological finds most likely could be expected. The conservation study therefore prescribed rescue excavations to be carried out along the axis of the proposed gas pipeline (Wiewegh, Kezunović 2009: 6).

The excavations were carried out by the contract archaeology company Kaducej from Split in 2010 (Forenbaher, Vujnović 2013). A trench 190 m long and one metre

Sl. 2 Zračna fotografija Đ urđeve grede s naznačenim položajem otkopanih dijelova nalazišta (izradio: S. Krošlin)
Fig. 2 Aerial photograph of Đ urđeva greda, indicating the location of the excavated areas of the site (produced by S. Krošlin)

teta 1957. godine nisu pronađeni nikakvi nalazi (Drechsler-Bižić 1958: 36). U izvještaju o rekognosciranju iz 1988. godine ponovno je zabilježeno da su vlasnici zemljišta u više navrata pri obradi zemlje pronalazili kremene artefakte i brusno kamenje (Proroković-Lazarević 1988).

Prikupljena građa izložena je u sklopu stalnog postava Muzeja Like u Gospiću. Riječ je o ukupno 35 malih kamenih predmeta: 19 bifacijalnih šiljaka strelica i 13 segmenata prizmatičnih sječiva izrađenih od rožnjaka te jedne cijele i dva ulomka sjekirica od glačanog kamena. Većina šiljaka pripada razmjerno kasnom tipu kratkih bifacijalnih šiljaka s konkavnom bazom i krilcima koji se obično pripisuju bakrenom ili ranom brončanom dobu (Petrić 1979, T. 20; Barfield 2001). Preostale predmete teško je pobliže vremenski odrediti. Većina njih mogla bi pripadati istom vremenu, no barem neki vjerojatno pripadaju neolitiku.

U razdoblju između 1999. i 2002. godine, u sklopu zaštitnih radova vezanih uz izgradnju dionice autoceste A1 Lički Osik – Sveti Rok (Kolak, Perkić 2002), u više je navrata površinski pregledan prostor Đ urđeve grede. Ni tada a ni kasnije prilikom praćenja izvođenja građevinskih radova na autocesti koja je odmaknuta od Jadove pedesetak metara nisu zabilježeni arheološki nalazi. Po završetku izgradnje, prostorom između autoceste i Jadove položena je trasa magistralnog plinovoda Gospić – Benkovac. Prema postojećim pokazateljima, upravo na tom prostoru moglo se očekivati značajnije arheološke nalaze. Zbog toga je konzervatorwide was excavated across the full width of Đ urđeva greda, transecting the site along the proposed pipeline axis. The trench was widened to three metres wherever clusters of archaeological finds were encountered. Near the eastern end of the explored area, excavation was expanded further due to particularly interesting finds (Fig. 2). About 400 sq.m of the site had been exposed in total. Excavation was carried out by hand tools, but excavated sediments were not sieved. Soil samples were collected from selected contexts for laboratory analyses.

STRATIGRAPHY, STRUCTURES AND FEATURES

A thin layer of humus originally covered the entire site. Before excavation began, it was damaged in places by the movement of heavy building machinery. This layer contained occasional archaeological finds in a secondary context. Across much of the explored area, the surface humus lay directly on archaeologically sterile soil (compact *terra rossa*) or bedrock (calcareous rock). Finds were concentrated in places where the remains of cultural deposits were preserved below the surface humus, either in slight depressions of the subsoil, or in pockets between blocks of bedrock. The original cultural layer may have been thicker and it may have covered the entire elevated area along the bank of Jadova. It was damaged by later land cultivation activities and eventually eroded away.

Remains of the cultural layer, features and artefacts clus-

skom studijom određeno da se na Đurđevoj gredi duž osi plinovoda provede zaštitno iskopavanje (Wiewegh, Kezunović 2009: 6).

Iskopavanje je 2010. godine provela tvrtka Kaducej d.o.o. iz Splita (Forenbaher, Vujnović 2013). Duž osi plinovoda otkopana je čitavom širinom Đurđeve grede traka široka 1 m, ukupne dužine 190 m. Na mjestima gdje se duž tako iskopanog presjeka kroz nalazište naišlo na koncentracije arheoloških nalaza, širina iskopa je povećana na tri metra. Pri istočnom kraju istraženog prostora iskop je dodatno proširen zbog naročito zanimljivih nalaza (sl. 2). Ukupno je istražena površina od oko 400 m^2. Cjelokupni iskop proveden je ručno, bez upotrebe sita, a iz odabranih konteksta uzeti su uzorci tla za laboratorijske analize.

STRATIGRAFIJA I NEPOKRETNI NALAZI

Čitavo nalazište prekrivao je tanki sloj humusa koji je već prije početka istraživanja bio mjestimice oštećen prolaskom građevinskih strojeva. Taj površinski sloj sadržavao je ponešto arheoloških nalaza u sekundarnom kontekstu. Na znatnom dijelu istraženog prostora humus je ležao izravno na zdravici (kompaktnoj crvenici bez arheoloških nalaza) ili na živcu (karbonatnoj stijeni). Arheološki nalazi bili su koncentrirani ondje gdje su se pod površinskim humusom sačuvali ostaci kulturnog sloja, u blagim depresijama zdravice ili među živcem. Pretpostavljamo da je kulturni sloj izvorno bio deblji te je možda prekrivao čitav izdignuti prostor duž obale Jadove, ali je oštećen kasnijim poljoprivrednim radovima i sapran s grede erozijom.

Ostaci kulturnog sloja, tvorevine i koncentracije pokretnih nalaza pronađeni su na tri izdvojena mjesta duž plinovodom zadanog presjeka Đurđeve grede, u zapadnom, središnjem i istočnom sektoru prostora obuhvaćenog istraživanjem (sl. 2).

Zapadni sektor

Ostaci kulturnog sloja (SJ 05) koji sa sjeverne strane omeđuje živac protežu se otkopanim prostorom u dužini od nepunih 14 m (sl. 3, gore). Kulturni sloj debeo oko 20 cm sastoji se od tamnosmeđe, masne i vrlo kompaktne ilovače te sadrži kamene izrađevine i ulomke lončarije. Pri dnu toga sloja, na ovalnom prostoru promjera oko pola metra, naišlo se na znatniju koncentraciju ulomaka lončarije (SJ 06). Dva metra istočnije nalazila se mala i plitka jama ukopana u zdravicu, zapunjena zemljom koja se jedva razlikovala od kulturnog sloja. Uz ulomke lončarije i vrlo skromne tragove gara, jama je sadržavala izrađevine od cijepanog rožnjaka (nekoliko alatki i odbojaka te sitnu lomljevinu prikupljenu iz uzorka uzetog za flotaciju) i napola dovršenu bradvu od dijagenetskog rožnjaka.

Središnji sektor

Ostaci kulturnog sloja (SJ 08) najveće debljine oko 25 cm protežu se otkopanim prostorom u dužini od oko 23 m (sl. 3, sredina). Pri sredini sektora, u dužini od oko 6 m, spomenuti sloj bio je prekriven nepovezanim krupnim kamenjem. Prema svojim općim obilježjima, kulturni sloj (SJ 08) podudara

tered at three separate locations along the cut that followed the axis of the proposed pipeline. We refer to those three locations as the Western Sector, the Middle Sector and the Eastern Sector of the excavation (Fig. 2).

Western Sector

Remains of the cultural layer (SU 05) extended for some 14 m along the exposed area and were bounded by bedrock at its northern end (Fig. 3, top). The layer consisted of a dark brown, plastic, very compact silty clay, which was about 20 cm thick and contained stone artefacts and potsherds. A concentration of potsherds was encountered near its base, in an oval area measuring about half a metre in diameter (SU 06). A small, shallow pit was dug into the subsoil two metres to the east of SU 06. Its fill, which was barely distinguishable from the overlying cultural deposit, contained potsherds, a very modest amount of soot, flaked stone artefacts (a few tools and flakes, as well as chips recovered from a soil sample by flotation), and an unfinished adze made of diagenetic chert.

Middle Sector

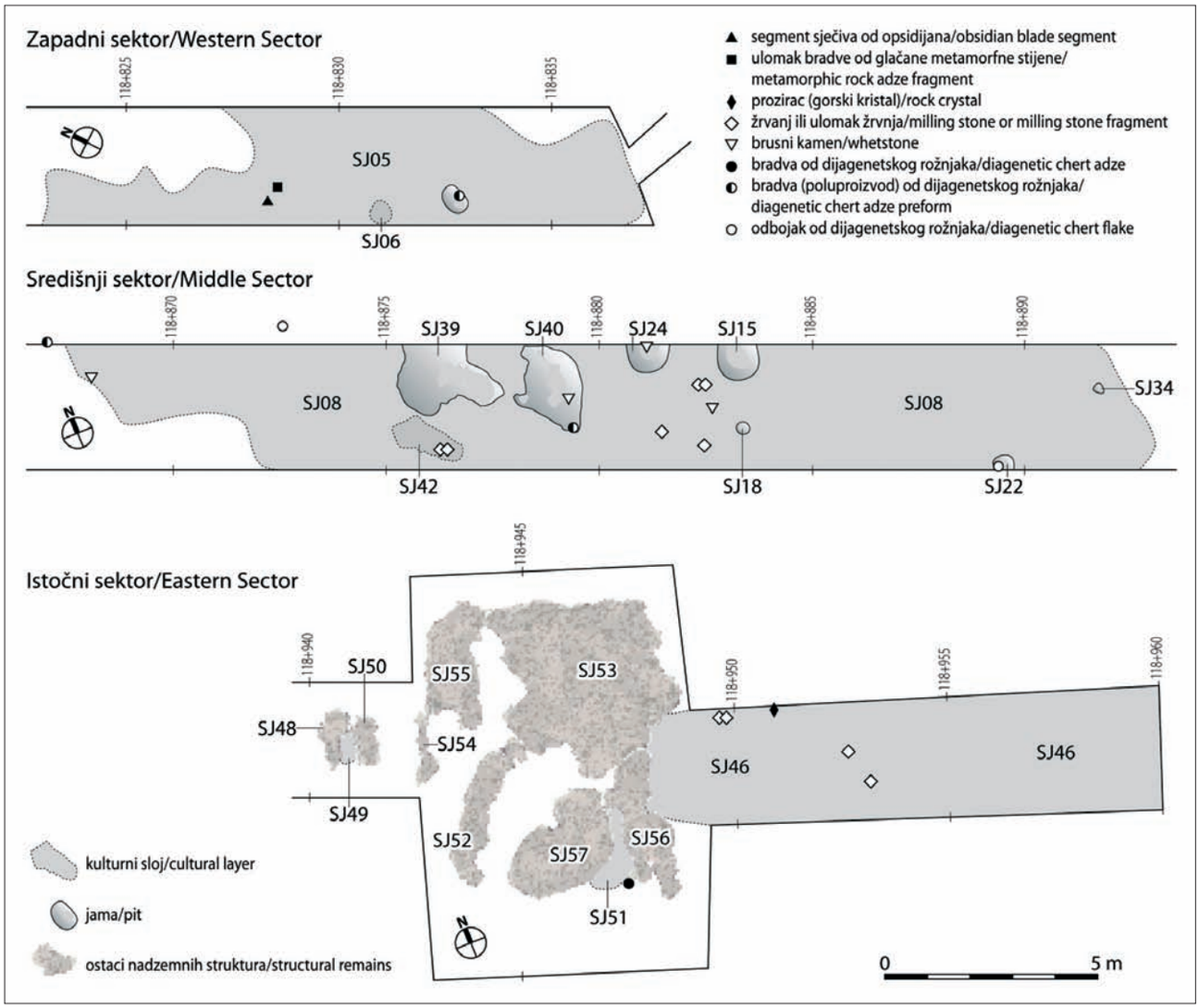
Up to 25 cm thick remains of the cultural layer (SU 08) extended for some 23 m along the exposed area and overlay a series of shallow pits (Fig. 3, middle). Its general characteristics corresponded to those of the cultural layer (SU 05) in the Western Sector. Near the middle of the sector, a 6 m long stretch of SU 08 was covered by large, loose rocks.

All pits were dug into the subsoil and filled with silty clay that differed very little from the cultural layer by compactness or colour. Most of them contained potsherds and a few stone artefacts. The first one of the three small oval pits in the eastern part of the sector (SU 15, SU 22 and SU 24) was excavated down to bedrock. Its fill contained some soot and a few fragments of charcoal. Two very small oval pits (SU 18 and SU 34) are probably post holes. Two irregularly shaped, shallow and wide pits in the western part of the sector (SU 39 and SU 40) abutted bedrock, which separated the two pits. A patch of cultural layer that filled a natural depression in bedrock was excavated as a separate stratigraphic unit (SU 42).

Eastern Sector

An up to 20 cm thick cultural layer (SU 46) extended for some 12 m along the eastern part of the exposed area (Fig. 3, bottom). Its general characteristics corresponded to those of the cultural layer in the Western and Middle sectors of the site (SU 05 and SU 08). Two patches of the same layer, 10-15 cm thick, were preserved near the middle of the sector where they were protected by rocks and a depression in subsoil (SU 49 and SU 51).

The remains of stone structures directly overlying subsoil, or slightly dug into it, were encountered near the middle of the exposed area (Fig. 4). The irregularly shaped structure (SU 53), roughly 4 m long and 3.5 m wide, consisted of a few larger flat stones and a dense scatter of fist-sized rocks (5-20 cm) that were pressed into the subsoil. Along the northern and eastern sides of the structure, two



Sl. 3 Tlocrti otkopanih površina u zapadnom, središnjem i istočnom sektoru nalazišta (izradili: S. Krošlin i S. Forenbaher)
Fig. 3 Plans of excavated areas in the Western, Middle and Eastern sectors of the site (drawn by S. Krošlin and S. Forenbaher)

se s kulturnim slojem (SJ 05) u zapadnom sektoru te preslojava niz plitkih jama.

Sve jame bile su ukopane u zdravicu i ispunjene ilovačom koja se bojom ili kompaktnošću tek neznatno razlikovala od kulturnog sloja. Većina je sadržavala ulomke lončarije i poneku izrađevinu od kamena. U istočnom dijelu sektora, prva od tri omanje ovalne jame (SJ 15, SJ 22 i SJ 24) bila je ukopana do živca, a njezina ispuna sadržavala je tragove gara i nekoliko komadića drvenog ugljena. U dvjema posve malenim ovalnim jamicama (SJ 18 i SJ 34) vjerojatno su stajali drveni stupovi. U zapadnom dijelu sektora, dvije plitke i široke jame nepravilnog tlocrta (SJ 39 i SJ 40) bile su ukopane uz živu stijenu koja ih je razdvajala. Kao zasebna stratigrafska jedinica istražen je kulturni sloj (SJ 42) koji je ispunjavao prirodnu udubinu u živcu.

Istočni sektor

Kulturni sloj (SJ 46) debljine do dvadesetak centimetara koji se u dužini od 12 m proteže istočnim dijelom otkopa-

fairly straight edges defined by a series of larger rocks met roughly at a right angle. We presume that these remains may represent a hut floor.

Towards the south and east of this floor extended three more-or-less parallel, elongated stone structures, 3-4 m long and between 0.6 and 1.2 m wide (SU 52, SU 54+SU 55 and SU 56). They consisted of rocks of various sizes (mostly, 10-40 cm), densely placed upon subsoil or bedrock, the latter sometimes serving as a part of the structure. Between them and towards the south was an irregularly shaped concentration of rocks (SU 57). Finally, just to the west of those structures, two short, parallel alignments of large rocks were encountered (SU 48 and SU 50).

Some of the described structures may represent the remains of drystone wall bases or collapsed drystone walls. Especially suggestive are the outlines of structures (SU 52) and (SU 56), but the relatively small size of the constituent stones does not support such an assumption. More likely, all

nog prostora (sl. 3, dolje), prema svojim općim obilježjima odgovara kulturnom sloju u zapadnom i središnjem sektoru nalazišta (SJ 05 i SJ 08). Skromni ostaci toga sloja sačuvali su se pri sredini sektora na još dva mjesta gdje su bili zaštićeni kamenjem i uleknućem zdravice (SJ 49 i SJ 51), u debljini od 10 do 15 cm.

Pri sredini otkopanog prostora se neposredno ispod površine tla naišlo na ostatke kamenih nadzemnih struktura koji su ležali izravno na zdravici ili su bili plitko ukopani u nju (sl. 4). Strukturu (SJ 53) nepravilnog tlocrta, približnih dimenzija 4x3,5 m, činilo je zbijeno kamenje veličine od 5 do 20 cm utisnuto u zdravicu te pokoja veća kamena ploča. Sa sjeverne i istočne strane struktura je bila omeđena nizom većih kamenova položenih duž približno ravnih rubova koji su se spajali otprilike pod pravim kutem. Pretpostavljamo da bi mogla biti riječ o ostatku podnice nekoga nadzemnog objekta.

Južno i zapadno od spomenute podnice pružale su se tri više ili manje usporedne, izdužene kamene strukture dugačke od 3 do 4 m i široke između 0,6 i 1,2 m (SJ 52, SJ 54+SJ 55 i SJ 56). Sastojale su se od gusto složenog kamenja različite veličine (većinom, dimenzija od 10 do 40 cm) koje je ležalo na zdravici ili na živcu, pri čemu se i sam živac ponekad koristio kao sastavni dio strukture. S južne strane nalazila se između njih nakupina kamenja nepravilnog tlocrta (SJ 57). Napokon, zapadno od spomenutih struktura nalazila su se dva kratka usporedna niza krupnijeg kamenja (SJ 48 i SJ 50).

Neke od opisanih struktura možda predstavljaju ostatke temelja ili ruševine suhozida. U tom smislu naročito je sugestivan tlocrtni obris struktura (SJ 52) i (SJ 56), no razmjerno sitno kamenje od kojih su sastavljene kosi se s takvom pretpostavkom. Možda bi prije mogla biti riječ o tome da kamene strukture od SJ 52 do SJ 57 sve zajedno predstavljaju ostatke podnice jednoga nadzemnog objekta četverokutnog tlocrta, približnih dimenzija 5x7,5 m, poremećene i dijelom uništene kasnijim poljoprivrednim radovima. Karakter i svrha toga objekta (ili objekata) ne može se pobliže odrediti zbog loše očuvanosti.

POKRETNI NALAZI

Pokretna arheološka građa obuhvaća lončariju i izrađevine od kamena. Donekle iznenađuje činjenica da nisu pronađeni nikakvi koštani ostaci životinja, unatoč sustavno provedenom uzorkovanju i pažljivom prikupljanju nalaza. Intenzivno procjeđivanje oborinskih voda kroz tanki površinski sloj tla može dovesti do ubrzanog propadanja kosti, pa bi se njihova odsutnost možda mogla objasniti obilježjima klime i taložine.

Lončarija

Preko polovice od ukupno 879 ulomaka lončarije (ukupne težine 3.471 g) prikupljeno je u središnjem sektoru nalazišta, oko trećina je iz zapadnog sektora, a ostatak je iz istočnog sektora. Ulomci su većinom vrlo malih dimenzija, s prosječnom razlomljenošću od 251 ulomka po kilogramu lončarije, što znatno otežava mogućnost rekonstrukcije oblika posuda.

stone structures together (from SU 52 to SU 56) may represent the floor remains of a rectangular hut, about 7.5 m long and 5 m wide, disturbed and partially destroyed by later land cultivation. Due to its bad preservation, other specifics about the character and function of this structure (or structures) remain elusive.

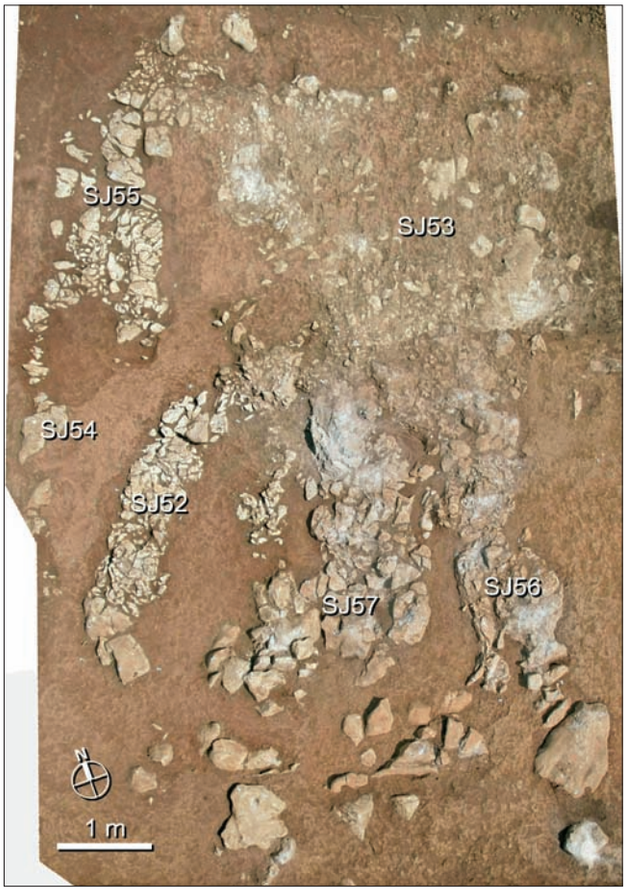
ARTEFACTS

The site has yielded ample stone and pottery artefact assemblages, but somewhat surprising is the complete absence of animal bones, which were not encountered despite careful sampling and recovery procedures. Climatic conditions and soil characteristics may provide an explanation, since intensive percolation of rainwater or snowmelt through a thin layer of surface soil may lead to the rapid decomposition of bone.

Pottery

More than half of the 879 potsherds, weighing in total 3.471 grams, were recovered from the Middle Sector of the site; about a third came from the Western Sector, while the rest is from the Eastern Sector. Most of the fragments are small, the average fragmentation being 251 shards per kilogram of pottery, which greatly limits the possibility of vessel shape reconstruction.

Virtually all shards (873 of them, which is 99.3%) come



Sl. 4 Ortogonalni fotografski snimak ostataka kamenih nadzemnih struktura u istočnom sektoru (izradio: B. Rožanković)

Fig. 4 Vertical photograph of structural remains in the Eastern Sector (produced by B. Rožanković)

Gotovo svi ulomci (njih 873, odnosno 99,3%) potječu od posuda koje su bile oblikovane slobodnom rukom. Glina od koje su posude bile napravljene sadrži danas vrlo malo krutih primjesa (uglavnom, sitnih zrnaca nekarbonatnih minerala), no ulomci su izrazito šupljikavi. Prostor brojnih sitnih šupljina (dimenzija oko 1 mm i manje) vjerojatno su nekad zauzimali sitni kristalići kalcita ili komadići drobljenog vapnenca koji su bili dodavani glini zbog prilagođavanja njezine plastičnosti. Uglate šupljine svojim oblikom odgovaraju romboedričnim kristalićima kalcita (sl. 5: 1). Pretpostavljamo da je agresivan okoliš tisućljećima pomalo nagrizao spomenuta karbonatna zrnca, sve dok ih procjedne vode nisu posve isprale iz lončarije. Mjerenje kiselosti pokazalo je da je tlo neutralno (pH 7,7), no oborinske vode mogu biti kisele zbog otopljenoga ugljičnog dioksida. U tom će slučaju procjedne vode nagrizati i ispirati kalcit, ne ostavljajući pritom nikakvog traga u tlu. Takva pojava posve je moguća u tankim površinskim tlima, u uvjetima vlažne klime obilježene obilnim oborinama poput one u Lici. Isti kemijski uvjeti koji su prouzročili ispiranje karbonata iz lončarije mogli su dovesti do potpunog nestanka koštanog materijala.

Crvenkastosmeđa površina ulomaka lončarije svjedoči o pečenju uz pristup zraka, no sredina presjeka često je sivkasta što upućuje na nepotpunu oksidaciju, razmjerno niske temperature i kratko trajanje pečenja. Iz toga slijedi da se posuđe vjerojatno peklo na otvorenoj vatri ili u jami.

Površina ulomaka posve je uništena prirodnim procesima trošenja. Sudeći po jednom jedinom ulomku sa sačuvanom glačanom površinom te još nekoliko njih s jedva zamjetnim tragovima glačanja, barem neke od posuda bile su glačane, no ni na jednom ulomku nisu zabilježeni tragovi ukrašavanja. To se ne može objasniti samo istrošenošću površine, jer bismo tada očekivali barem tragove urezanih ili utisnutih ukrasa, naročito na posudama posebne namjene kao što su "ritoni". Stoga pretpostavljamo da većina posuđa nije bila ukrašena.

Na osnovi 55 dijagnostičkih dijelova (oboda, dna, ručki,

from vessels that were not wheel-thrown. Today, the clay body contains very few aplastic inclusions (mostly, small grains of non-carbonate minerals), but the shards are very porous. Numerous fine pores (sized around 1 mm or smaller) probably used to contain small calcite crystals or grains of crushed limestone, which had been added to the clay in order to adjust its plasticity. The angular shape of voids corresponds to the rhombohedral shape of calcite crystals (Fig. 5: 1). Presumably, the aggressive environment in the course of millennia slowly corroded the carbonate inclusions, while rainwater and snowmelt leached the carbonate out of the shards. The acidity measurement indicated that the soil is neutral (pH 7.7), but precipitation may be acidic due to the dissolved carbon dioxide from the atmosphere. Acidic precipitation will corrode and leach calcite without leaving any trace in the soil. This is very likely to happen in thin surface soils, in a relatively wet climate marked by heavy seasonal precipitation, like the one in Lika. The same conditions that caused the leaching of carbonates from pottery may have caused the complete decomposition of bone.

The reddish brown surface of shards testifies to oxidation firing, but the middle part of the break is often of a grayish colour that indicates incomplete oxidation, a relatively low firing temperature and short duration of firing. Presumably, vessels were fired in open fires or in fire pits.

Shard surfaces have been completely eroded by natural processes. Judging by a single piece with a preserved burnished surface, as well as a few others with barely discernible traces of burnish, at least some of the vessels were burnished. None of the shards show any trace of decoration. This cannot be merely a consequence of their heavily worn surfaces, since in that case one would expect to find traces of incised or impressed designs, especially on special-purpose vessels such as "rhytons". It seems, therefore, that most of the vessels were plain.

Partial reconstruction of specific vessel shapes is based on 55 diagnostic vessel parts (rims, bases, handles, lugs and

Sl. 5 1: Čepasta nožica "ritona" na kojoj se jasno vidi šupljikava struktura lončarije; 2–5: ulomci fine neolitičke lončarije (figuline) (snimio: S. Forenbaher)

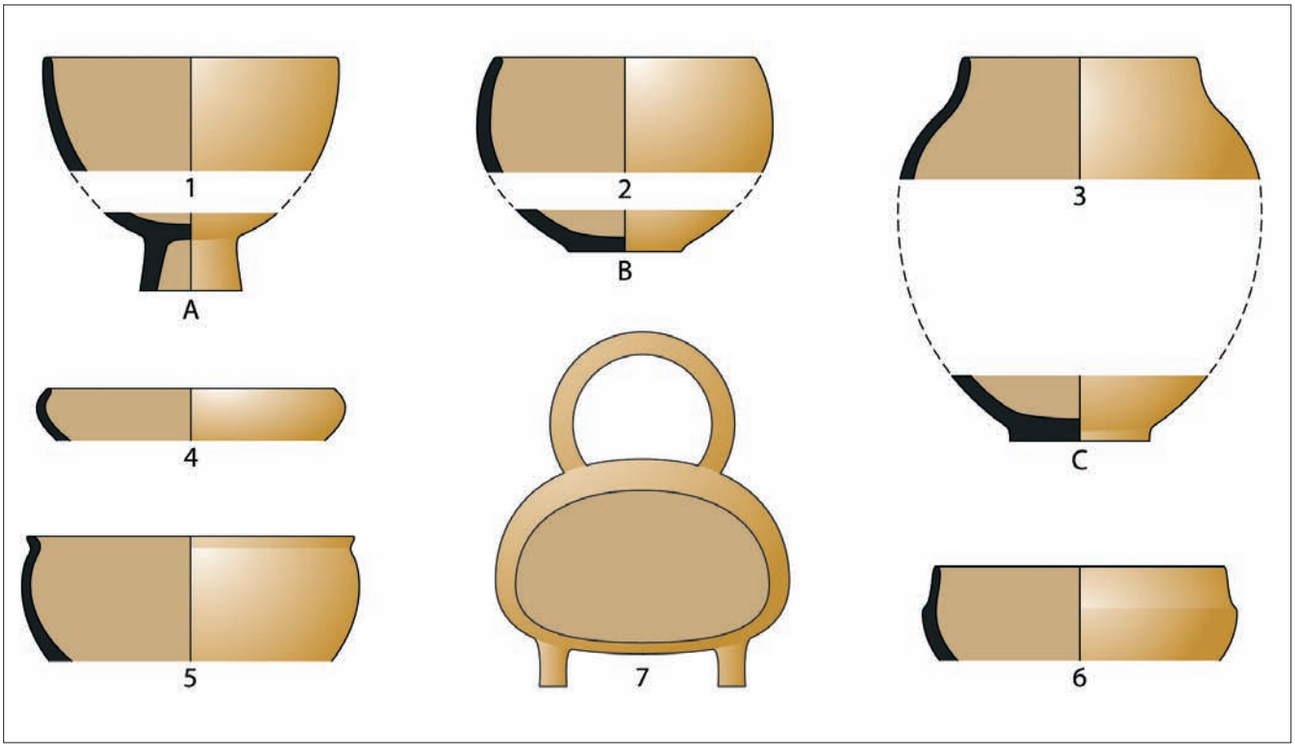
Fig. 5 1: Stubby foot of a "rhyton" with a clearly visible porous pottery structure; B: fragments of fine Neolithic pottery (figulina) (photographed by S. Forenbaher)

držaka i nožica), često sastavljenih od više ulomaka, mogli smo tek djelomično rekonstruirati pojedine oblike posuda. Većinom je riječ o jednostavno oblikovanim dubokim zdjelama ili loncima otvorenog ili blago stegnutog oboda, ponekad s neizrazitim prstenastim vratom (sl. 6: 1–3; T. 1). Usna oboda gotovo uvijek je zaobljena, a samo je u pojedinačnim primjercima zaravnjena (T. 1: 7) ili zadebljana s vanjske strane (sl. 6: 5; T. 1: 2; T. 2: 2). Dna su ravna i u pravilu jasno istaknuta u odnosu na donji dio posude, a prilično su česte posude na visokoj nozi (sl. 6: A–C; T. 2: 7–8). Neke od posuda imale su kratke, zdepaste ručke plankonveksnog presjeka (T. 3: 4–5) ili jednostavne plastične naljepke koji su mogli poslužiti kao drški (T. 3: 1–2). Prikupljena su i dva ulomka zdjela stanjenoga prstenastog vrata i jasno naznačenog ramena (sl. 6: 6; T. 2: 1; T. 3: 3) te jedan ulomak plitke zdjele stegnutog oboda (sl. 6: 4; T. 1: 5). Napokon, prikupljeno je i nekoliko karakterističnih ulomaka posuda posebne namjene s koso položenim otvorom, čepastim nožicama i visokom ručkom, takozvanih "ritona" (sl. 6: 7; T. 3: 6–9).

Devet slobodnom rukom oblikovanih ulomaka (oko 1% od ukupnog broja) tehnološki se posve razlikuje od ostale lončarije. Napravljeni su od fino pročišćene gline i ravnomjerno pečeni u oksidacijskim uvjetima (sl. 5: 2–5). Pripisujemo ih najfinijoj kategoriji neolitičke lončarije, takozvanoj "figulini" (Spataro 2002: 13). Potječu od trbuha tri različite posude nepoznatog oblika i tankih stijenki. Površina im je posve istrošena pa ne znamo jesu li možda bili oslikani.

Napokon, samo šest ulomaka (oko 0,7% od ukupnog broja) pripadalo je posudama izrađenim na lončarskom kolu koje pripisujemo novijim povijesnim razdobljima.

feet), often refitted from several shards. Most of the shapes are simple and include open or slightly restricted bowls or jars, sometimes with an inconspicuous cylindrical neck (Fig. 6: 1–3; Pl. 1). Rim lips are almost always rounded, with rare examples of flat rims (Pl. 1: 7) and externally thickened rims (Fig. 6: 5; Pl. 1: 2; Pl. 2: 2). Bases are usually well-defined as a distinctive lowest part of the vessel, and pedestal bases are fairly common (Fig. 6: A–C; Pl. 2: 7–8). Some of the vessels were provided by short, plump handles of planoconvex section (Pl. 3: 4–5), or simple plastic applications that may have served as lug handles (Pl. 3: 1–2). Two fragments were recovered of bowls with thin-walled cylindrical necks and distinctly shaped shoulders (Fig. 6: 6; Pl. 2: 1; Pl. 3: 3), as well as a single shard of a shallow restricted rim bowl (Fig. 6: 4; Pl. 1: 5). Finally, several characteristic fragments belonged to special-purpose vessels with a slanting mouth, a high handle, and stubby feet, known as "rhytons" (Fig. 6: 7; Pl. 3: 6–9).



Sl. 6 Idealne rekonstrukcije zastupljenih oblika posuda (izradio: S. Forenbaher)
Fig. 6 Ideal reconstructions of the represented vessel shapes (drawn by S. Forenbaher)

Nine shards of hand-shaped vessels (about 1% of the total) differ markedly from the rest of the assemblage by their technology. They were made of carefully refined clay and uniformly fired in an oxidizing environment (Fig. 5: 2–5). We attribute these shards to the finest Neolithic ware known as "figulina" (Spataro 2002: 13). All are body shards, coming from three different thin-walled vessels of unknown shape. Since their surfaces are completely worn, we do not know whether they had been decorated by painting.

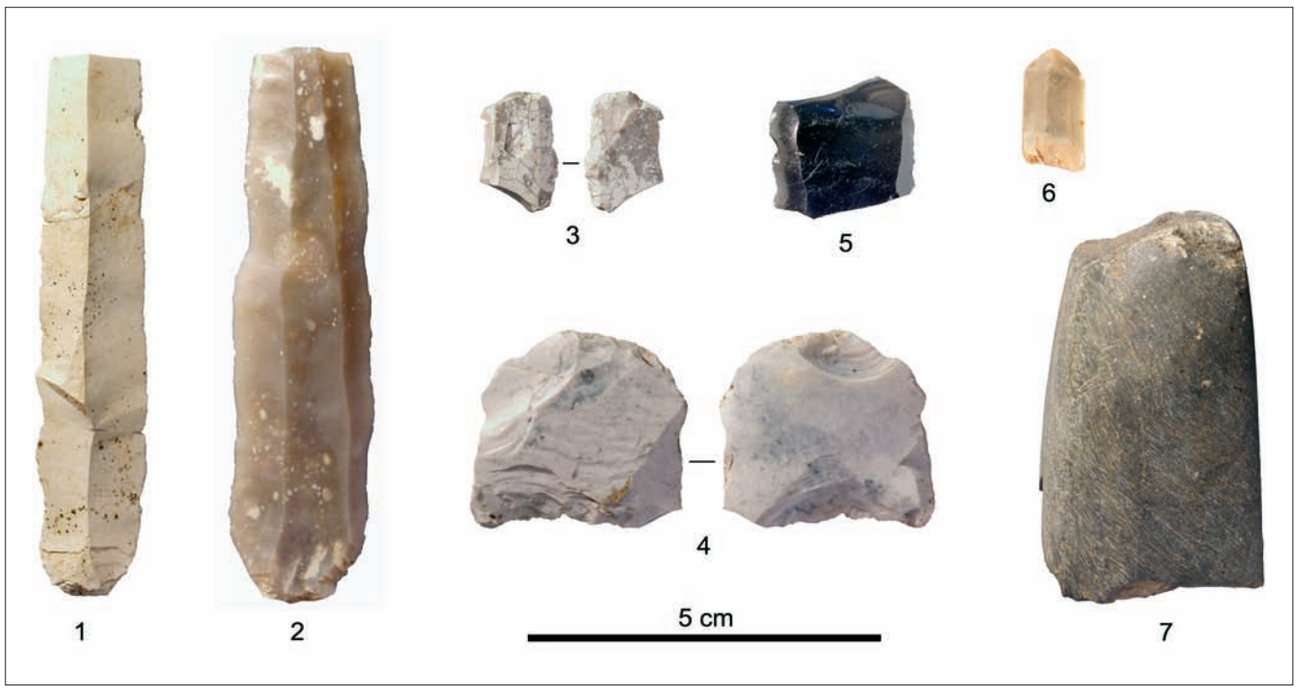
Finally, only six shards (about 0.7% of the total) came from wheel-thrown vessels. We attribute those shards to recent historical periods.

Izrađevine od kamena

Prikupljeno je ukupno 50 kamenih predmeta napravljenih od različitih vrsta rožnjaka, pješčenjaka, metamorfne stijene, opsidijana i gorskog kristala. Opisat ćemo ih po skupinama, prema tehnikama kojima su izrađeni i sirovinama od kojih su napravljeni.

Stone artefacts

A total of fifty objects were recovered, made of various kinds of cherts, sandstones, metamorphic rock, obsidian and rock crystal. We shall present them grouped by techniques used in their production, and by raw material.



Sl. 7 Kamene izrađevine. 1, 2: prizmatična sječiva; 3: retuširani segment sječiva; 4: iskrzani komadić; 5: segment sječiva; 6: nemodificirani kristal; 7: ulomak sjekire ili bradve (1–4: rožnjak; 5: opsidijan; 6: gorski prozirac; 7: metamorfna stijena) (snimio: S. Forenbaher)

Fig. 7 Stone artefacts. 1, 2: prismatic blades; 3: retouched blade segment 4: scaled piece; 5: blade segment; 6: unmodified crystal; 7: axe or adze fragment (1–4: chert; 5: obsidian; 6: rock crystal; 7: metamorphic rock) (photographed by S. Forenbaher)

Prvi skup nalaza sastoji se od 24 predmeta napravljena cijepanjem (tab. 1). Kao sirovine za njihovu izradu korišteni su kvalitetni rožnjaci pravilnoga školjkastog loma i voštanog sjaja, no njihovu boju, uklopljene strukture i ostale makroskopske osobine često nije moguće preciznije odrediti zbog patiniranosti ili sekundarnih toplinskih oštećenja. Budući da u stijenama Like nalazimo rožnjake, neke izrađevine možda su napravljene od lokalnih sirovina, dok su druge vjerojatno napravljene od rožnjaka pribavljenih iz znatno udaljenijih

Kategorija i tip / *Class and Type*	N	%
Alatke / Tools	2	8,3
Retuširano sječivo / Retouched blade	1	
Iskrzani komadić / Scaled piece	1	
Debitaž / Debitage	10	41,7
Prizmatična sječiva / Prismatic bades	4	
Odbojci / Flakes	6	
Lomljevina / Debris	12	50,0
Sitnež / Chips	10	
Komadi / Chunks	2	
UKUPNO / TOTAL	24	100,0

Tab. 1 Skup nalaza od cijepanog rožnjaka i opsidijana

Tab. 1 Flaked stone assemblage (chert and obsidian)

The first assemblage consists of 24 flaked stone artefacts (Tab. 1). They were made of high quality cherts that exhibit a regular conchoidal fracture and a waxy luster. Their colour, inclusions and other visual characteristics often cannot be reliably determined due to patination or heat damage. Since cherts are present in the sedimentary rocks of Lika, some of the artefacts may have been made of local raw materials. Others probably were made of cherts acquired from much more distant sources. For instance, the raw material for the prismatic blade (Fig. 7: 2) may originate from Monti Lessini, the southernmost foothills of the Alps near Verona in northern Italy. Included in this assemblage is a short blade segment made of black translucent obsidian (Fig. 7: 5). Obsidian certainly is an exotic raw material that was imported from afar, but since its chemical analysis has not been completed, we do not know whether it came from Mediterranean or from Carpathian sources.

Debris constitutes a half of this small assemblage. It must be noted that all of the chips (a total of ten) were recovered by flotation of two soil samples. This cautions us that most of the chips and other small artefacts from excavated deposits probably escaped recovery. Debitage constitutes most of the rest of the assemblage, blades being well-represented, although slightly less numerous than flakes. All blades are prismatic (having sub-parallel edges

izvorišta. Primjerice, sirovina za prizmatično sječivo (sl. 7: 2) mogla bi potjecati iz područja Monti Lessini, s najjužnijih obronaka Alpa kod Verone u sjevernoj Italiji. Ovom skupu nalaza pridružili smo i kratki segment sječiva napravljen od crnoprozirnog, staklasto sjajnog opsidijana (sl. 7: 5). Posve je sigurno riječ o egzotičnoj sirovini uvezenoj izdaleka, no s obzirom na to da njezin kemijski sastav još nije analiziran, za sada ne znamo je li riječ o sredozemnom ili o karpatskom opsidijanu.

Polovica od ovoga malog skupa nalaza otpada na lomljevinu (bezoblične komade i sitnež). Pri tome ističemo da je svih deset komada sitneža prikupljeno flotiranjem dvaju uzoraka tla. To upozorava na vjerojatnost da je većina sitneža i drugih izrađevina malih dimenzija iz otkopanih slojeva promakla prikupljanju. Ostatak skupa nalaza uglavnom čini debitaž, pri čemu su sječiva dobro zastupljena, iako su nešto manje brojna od odbojaka. Sva su sječiva prizmatičnog oblika (približno usporednih rubova i dorsalnih grebena) i širine od 11 do 20 mm. Nijedno nije sačuvano u punoj dužini, no neki od segmenata duži su od 7 cm (sl. 7: 1–2). Prisutne su samo dvije formalne alatke: vatrom oštećeni retuširani segment sječiva (sl. 7: 3) i iskrzani komadić (sl. 7: 4). Nema jezgara ni njihovih dijelova.

Drugi skup nalaza čini osam predmeta napravljenih od jedne specifične sirovine koja se također ubraja u rožnjake (u širem smislu). Riječ je o kriptokristalastoj silicijskoj stijeni blijedomaslinaste boje nastaloj dijagenetskim procesima silicifikacije vulkanoklastita (tufa) koju ćemo u nastavku ovog rada nazivati "dijagenetskim rožnjakom". Vrlo slične sirovine pojavljuju se u litološki heterogenim naslagama uz potok Popovača kod Donjeg Pazarišta, kamo su vjerojatno dospjele iz trijaskih klastičnih naslaga obližnjih obronaka Velebita (Sokač et al. 1974; Perhoč, Altherr 2011: 10). Donje Pazarište nalazi se pri zapadnom kraju Ličkog polja, tridesetak kilometara sjeverozapadno od Đurđeve grede, no riječni tokovi mogli su sirovinu odatle transportirati bliže arheološkom nalazištu. Poput ostalih rožnjaka, dijagenetski rožnjak odlikuje se tvrdoćom 7 prema Mohsovoj ljestvici i relativno pravilnim školjkastim lomom, no plohe loma nisu sjajne ni posve glatke (sl. 8). Rubovi odbojaka prilično su krhki pa nije dobar za izradu oštrih alatki namijenjenih rezanju ili strugaju, ali je pogodan za izradu težih alatki bifacijalnim cijepanjem, brušenjem i glačanjem. Svi predmeti napravljeni od opisane sirovine mogu se povezati s proizvodnjom malih kamenih bradvi.[1]

Skup nalaza od dijagenetskog rožnjaka sastoji se od jednoga bezobličnog komada sirovine, tri bradve u različitim fazama izrade i četiri odbojka. Bezoblični komad (sl. 8: 5) vjerojatno je bio premalen da bi se od njega moglo napraviti željenu alatku pa je umjesto toga korišten kao čekić za lomljenje kamena, o čemu svjedoče mnogobrojne udarne naprsline na njegovu radnom kraju. Mali odbojci (sl. 8: 1–4) predstavljaju proizvodni otpad iz prve faze izrade spomenutih bradvi, a istoj fazi pripada i poveliki odbojak

1 Oštrica bradve stoji poprijeko u odnosu na držak, a poprečni presjek joj je asimetričan; za razliku od toga, oštrica sjekire usporedna je s drškom, a poprečni presjek joj je simetričan.

and dorsal ridges) and 11-20 m wide. None of them have been preserved in full length, but some of the segments are more than 7 cm long (Fig. 7: 1–2). Only two formal tools are present: a heat-damaged retouched blade segment (Fig. 7: 3), and a scaled piece (Fig. 7: 4). Cores or core fragments are absent.

The second assemblage consists of eight objects, made of a specific raw material that can also be regarded as chert (in the wider sense). This cryptocrystalline silica rock of a pale olive colour, to which we shall refer here as "diagenetic chert", was formed by silification of tuff. Very similar rocks appear in lithologically heterogeneous deposits along the Popovača creek near Donje Pazarište, where they probably arrived from the Triassic clastic deposits of the neighbouring foothills of the Velebit Mountain (Sokač et al. 1974; Perhoč, Altherr 2011: 10). Donje Pazarište is located near the western end of the polje of Lika, some 30 km to the northwest of Đurđeva greda, but rivers may have transported this raw material closer to the archaeological site. Like other cherts, diagenetic chert has a hardness of 7 on the Mohs scale and a relatively regular conchoidal fracture, although flaked surfaces are opaque and not completely smooth (Fig. 8). Since flake edges are relatively brittle, it is unsuitable for the production of sharp-edged cutting or scraping tools, but it is suitable for the production of heavier tools by bifacial flaking, grinding and polishing. All artefacts made of this raw material are related to the production of small stone adzes.[1]

The diagenetic chert assemblage contains a single chunk of raw material, three adzes in various stages of completion, and four flakes. The chunk (Fig. 8: 5) probably was judged as too small to be used as a blank for the desired tool. It was used as a flaking hammer instead, which is suggested by numerous impact fractures at its working end. Small flakes (Fig. 8: 1–4) represent production waste from the first phase of adze production. A large flake (Fig. 8: 6) belongs to the same production phase. The outline and planoconvex section of an adze roughout have been shaped by removing small flakes from its dorsal side, while the ventral side remains untouched (aside from recent damage). An unfinished adze (Fig. 8: 7) represents the second production phase. The implement has been roughly shaped by bifacial flaking and partially ground. Most of its ventral surface has been polished, while grinding of the dorsal side was only begun by removing the most prominent ridges between flake scars. Finally, the implement in Fig. 8: 8 is a large fragment of a finished (or almost finished) adze that broke during use, or near the end of its production. Parts of flaking scars that were not fully removed by grinding are still visible along its lateral edges, but large parts of both faces are polished, including the carefully ground distal (working) edge.

The third assemblage consists of sixteen objects made of various sandstones. The light olive brown, weakly cemented sandstone that contains a large proportion of fine quartz grains is particularly suitable for grinding. Its surface

1 An adze has a working edge that is perpendicular to the handle and its cross-section is asymmetrical, while an axe has a working edge that is parallel to the handle and its cross-section is symmetrical.

Sl. 8 Izrađevine od dijagenetskog rožnjaka. 1–4: odbojci; 5: čekić; 6–8: bradve u različitim fazama izrade (snimio: S. Forenbaher)
Fig. 8 Diagenetic chert artefacts. 1–4: flakes; 5: hammerstone; 6–8: adzes in various production phases (photographed by S. Forenbaher)

(sl. 8: 6). Grubim retuširanjem njegove dorsalne strane tek je naznačen obris i plankonveksni presjek bradve, dok mu je ventralna strana još uvijek netaknuta (izuzev recentnih oštećenja). Poluproizvod (sl. 8: 7) predstavlja drugu fazu

self-regenerates during use, while the loose abrasive grains reduce friction between the whetstone and the object that is being shaped by grinding (Harding 1987: 37). Traces of use-wear indicate that the four flat objects made of this ma-

izrade. Predmet je grubo oblikovan bifacijalnim cijepanjem i zatim djelomično izbrušen. Veći dio njegove ventralne strane je uglačan, dok je brušenje dorsalne strane tek započeto uklanjanjem najistaknutijih grebena između ožiljaka od lomljenja. Napokon, predmet na slici 8: 8 veći je dio gotove (ili skoro gotove) bradve, slomljene pri uporabi ili pri kraju izrade. Duž njezinih bočnih rubova vidljivi su tragovi ožiljaka od cijepanja koji nisu posve uklonjeni brušenjem, no veliki dijelovi obaju lica su uglačani, uključujući i pažljivo oblikovani distalni (radni) rub.

Treći skup nalaza sadrži šesnaest predmeta napravljenih od različitih vrsta pješčenjaka. Svijetlomaslinastosmeđi slabije vezani pješčenjak koji sadrži veći udio sitnih zrna kvarca naročito je pogodan za brušenje jer se njegova trošna površina uporabom sama od sebe obnavlja, dok otpala abrazivna zrnca smanjuju trenje između brusa i predmeta koji se brusi (Harding 1987: 37). Sudeći po tragovima trošenja, četiri plosnata predmeta napravljena od toga materijala bila su upotrijebljena kao brusno kamenje. Cjeloviti primjerci izduženog su oblika, dužine dvadesetak centimetara, s jasnim tragovima mehaničkog trošenja na jednoj ili više ploha (sl. 9: 1). Po svoj prilici, korišteni su kao ručni brusovi tijekom druge faze izrade bradvi od dijagenetskog rožnjaka, možda prilikom njihova konačnog dotjerivanja ili brušenja oštrica (Harding 1987: 41).

Preostalih dvanaest predmeta od krupnozrnatih pješčenjaka crvenkastosmeđe i maslinastosive boje ulomci su žrvnjeva. Jedini cjeloviti žrvanj ovalnog je oblika, dimenzija 21x15 cm i težine 2,7 kg (sl. 9: 2). Obje spomenute vrste pješčenjaka prisutne su u okolnim geološkim formacijama.

Uz opisane, prikupljena su još dva kamena nalaza napravljena od sirovina stranog podrijetla. Ulomak sjekire ili bradve (sl. 7: 7) napravljene brižljivim glačanjem od tamnomaslinastosive metamorfne stijene izradom i sirovinom posve odudara od ranije opisanih bradvi. Napokon, nemodificirani kristal gorskog prozirca (sl. 7: 6) također je morao biti donesen izdaleka. Podrijetlo obiju ovih sirovina vjerojatno treba potražiti na prostoru Bosne.

VREMENSKO OPREDJELJENJE NALAZA I NALAZIŠTA

Za kronometrijsko datiranje nalazišta stoji nam na raspolaganju rezultat radiokarbonske analize uzorka drvenog ugljena prikupljenog iz jame (SJ 15) u središnjem istraženom sektoru nalazišta, Beta-293836: 6710±50 BP, odnosno 5716-5542 cal BC (2σ).[2]

Gotovo sva prikupljena arheološka građa s Đurđeve grede može se pripisati neolitiku. Većina dijagnostičkih ulomaka lončarije potječe od jednostavno oblikovanih dubokih zdjela ili lonaca (sl. 6: 1–3) kakvi se pojavljuju tijekom čitavoga šestog tisućljeća prije Krista (odnosno, ranog i srednjeg neolitika), a i kasnije, ali tada zajedno s drugim oblicima posuđa. Istom se vremenu mogu pripisati masivne ručke i plastični naljepci (e. g., Korošec 1958; Batović 1959; 1961). Uz njih su razmjerno česti ulomci posuda na visokoj nozi (sl. 6:

2 Radiokarbonske datume navodimo u skladu sa standardima časopisa Radiocarbon, preuzetim s mrežne stranice http://www.radiocarbon.org/Authors/author-info.pdf (15. 11. 2012.).

Sl. 9 Izrađevine od pješčenjaka. 1: brusni kamen; 2: žrvanj (snimio: S. Forenbaher)

Fig. 9 Sandstone artefacts. 1: whetstone; 2: milling stone (photographed by S. Forenbaher)

terial were used as whetstones. The complete specimens are elongated, about 20 cm long, and exhibit clear traces of mechanical wear on one or several of its surfaces (Fig. 9: 1). Most likely, they were used as handheld whetstones during the second phase of adze production, possibly during the final shaping and honing of the working edge (Harding 1987: 41).

The remaining twelve objects are milling stones made of coarse, reddish brown, or olive gray sandstone. The only complete example is ovally shaped, sized 21x15 cm, and weighs 2.7 kg (Fig. 9: 2). Nearby geological formations contain both kinds of sandstone mentioned above.

Two other stone finds were recovered in addition to those already described. Both are made of exotic raw materials. The first is a fragment of a carefully ground and polished axe or adze (Fig. 7: 7). This implement, made of dark olive gray metamorphic rock, differs from diagenetic chert adzes in both raw material and workmanship. Finally, the unworked rock crystal (Fig. 7: 6) also must have been brought from afar. Both of these raw materials probably were imported from Bosnia.

CHRONOLOGICAL DETERMINATION OF THE FINDS AND THE SITE

Chronometric dating of the site relies on a single radiocarbon determination. A charcoal sample, recovered from a pit (SU 15) in the Middle Sector of Đurđeva greda, yielded the date Beta-293836: 6710±50 BP, or 5716-5542 cal BC (2σ).[2]

Almost all archaeological evidence from Đurđeva greda is attributable to the Neolithic. Most of the diagnostic potsherds come from simply shaped deep bowls or jars (Fig. 6: 1–3), which are common throughout the sixth millennium BC (Early and Middle Neolithic), and continue into later periods, when they appear with other vessel shapes. Plump handles and plastic applications belong to the same period (*e.g.,* Korošec 1958; Batović 1959; 1961). Pedestalled vessels

2 When reporting radiocarbon dates, we follow the standard of Radiocarbon journal, accessible at <http://www.radiocarbon.org/Authors/author-info.pdf> (Nov. 15, 2012).

A), kao i čepaste nožice i ručke "ritona" (sl. 6: 7), oblika koji obilježavaju srednji neolitik širega istočnojadranskog prostora (Batović 1979: 534). Tom razdoblju pripisali bismo i plitku zdjelu stegnutog oboda (sl. 6: 4). Pri tome ističemo da nema urezanih geometrijskih motiva ni drugih ukrasa uobičajenih za srednji neolitik a ni utisnutih ukrasa uobičajenih za rani neolitik.

Slični skupovi nalaza neukrašene ranoneolitičke ili srednjoneolitičke lončarije prikupljeni su s nekoliko nalazišta razasutih duž istočnojadranske obale, od Edere na tršćanskom Krasu (Biagi 1995: 12), preko Škarinog samograda u zaleđu Šibenika (Müller 1988: 222, 233) do Spile kod Nakovane na Pelješcu (Forenbaher, Kaiser 2010: 27). Na geografski najbližem neolitičkom nalazištu Đurđevoj gredi, u Vaganačkoj pećini na Velebitu, upravo takva neukrašena lončarija obilježava najdublje neolitičke kontekste u sondi 3 koji leže neposredno ispod danilskih konteksta (Forenbaher, Vranjican 1985: 8). Zanimljivo je da su, unatoč stratigrafskim nesigurnostima vezanim uz Škarin samograd (Marijanović 2009: 129–131), svi trenutačno raspoloživi radiokarbonski datumi za takvu lončariju međusobno vrlo bliski te je datiraju oko 5600. god. pr. Kr. (tab. 2). Buduća istraživanja pokazat će je li riječ o slučajnosti ili stvarnom horizontu neukrašene lončarije na prijelazu iz ranoga u srednji neolitik.

Lončarija s Đurđeve grede također je blisko usporediva s pretežno neukrašenom lončarijom kakanjske faze neolitičkog naselja Obre I u središnjoj Bosni (Gimbutas 1974: 21–24; Benac 1979: 396–400). Gimbutas pretpostavlja da spomenuta faza započinje oko 5600. god. pr. Kr., iako je najraniji radiokarbonski datum za spomenutu fazu otprilike dva stoljeća mlađi: UCLA-1605F: 6430±60 BP, odnosno 5509-5303 cal BC (Gimbutas 1974: 16, 21).

Najfinija neolitička lončarija ("figulina") (sl. 5: 2–5) obično

(Fig. 6: A) and "rhytons" represented by relatively numerous fragments of stubby feet and high handles (Fig. 6: 7) are defining characteristics of the Middle Neolithic in the wider region of the eastern Adriatic (Batović 1979: 534). The shallow restricted rim bowl (Fig. 6: 4) may be attributed to the same period. One should note that the incised geometric designs and other characteristic Middle Neolithic decoration, as well as the Early Neolithic impressed decoration, are conspicuously absent.

Similar Early or Middle Neolithic plain pottery assemblages have been recovered from several sites that are scattered along the eastern Adriatic coast, from Edera in Trieste Karst (Biagi 1995: 12), through Škarin samograd in the hinterland of Šibenik (Müller 1988: 222, 233), to Spila at Nakovana on the Pelješac peninsula (Forenbaher, Kaiser 2010: 27). At Vaganačka pećina on Velebit Mountain, the Neolithic site that is closest to Đurđeva greda, this kind of plain pottery marked the deepest Neolithic contexts in Trench 3 that directly underlay Danilo levels (Forenbaher, Vranjican 1985: 8). Remarkably, all currently available radiocarbon dates for the Neolithic plain pottery cluster tightly around the year 5600 BC (Tab. 2), regardless of undeniable stratigraphic uncertainties at Škarin samograd (Marijanović 2009: 129–131). Future research will show whether a plain pottery horizon marks the transition from the Early to Middle Neolithic, or if this is just a coincidence.

Furthermore, the pottery from Đurđeva greda is closely comparable to the mostly plain pottery assemblage from the Kakanj phase of the Neolithic settlement of Obre I in central Bosnia (Gimbutas 1974: 21–24; Benac 1979: 396–400). Gimbutas presumed that this phase began around 5600 BC, although the earliest associated radiocarbon date, UCLA-1605F: 6430±60 BP, or 5509-5303 cal BC, is about two centuries younger (Gimbutas 1974: 16, 21).

On the eastern side of the Adriatic, the finest Neolithic pottery ("figulina") (Fig. 5: 2–5) is usually attributed to the

Nalazište i kontekst / Site and context	Laboratorijski broj / Laboratory number	Godina prije sadašnjosti / Age BP	Godina prije Krista (95% vjerojatnost) / Age BC	Izvor / Source
Đurđeva greda SJ 15 / SU 15	Beta–293836	6710±50	5716–5542	1
Edera Faza 3a / Phase 3a	GX–19569	6700±130	5882–5380	2
Škarin samograd Faza 1 / Phase 1	HD–12094	6750±60	5743–5555	3
Škarin samograd Faza 1 / Phase 1	HD–11773	6740±50	5729–5561	3
Spila (Nakovana) Faza 2 / Phase 2, Kontekst 375 / Context 375	OxA–18123	6711±36	5708–5559	4
Spila (Nakovana) Faza 2 / Phase 2, Kontekst 325 / Context 325	OxA–18124	6609±37	5618–5487	4

Tab. 2 Radiokarbonski datumi za skupove nalaza neukrašene lončarije. Izvori: 1. Forenbaher, Vujnović (2013); 2. Biagi (1995); 3. Chapman, Müller (1990); 4. Forenbaher et al. (2013). Za kalibraciju radiokarbonskih datuma korišten je računalni program OxCal v.4.1 (Bronk Ramsey 2009) i kalibracijska krivulja InitCal 09.

Tab. 2 Radiocarbon dates for plain pottery assemblages. Sources: 1. Forenbaher, Vujnović (2013); 2. Biagi 1995; 3. Chapman, Müller 1990; 4. Forenbaher et al. (2013). Calibrated by OxCal v.4.1 computer program (Bronk Ramsey 2009), using the calibration curve InitCal 09.

se na istočnoj strani Jadrana pripisuje srednjem neolitiku, odnosno drugoj polovini šestog ili samom početku petog tisućljeća prije Krista (Čečuk, Radić 2005: 112–115; Marijanović 2005: 40–45; Forenbaher et al. 2013). Na zapadnojadranskim nalazištima takva se lončarija ponekad pojavljuje i ranije, zajedno s ranoneolitičkom impreso lončarijom (Spataro 2002: 179; Skeates 2003: 169).

Samo četiri dijagnostička ulomka mogla bi pripadati kasnijim razdobljima. Ulomak zdjele stegnutog, izvana zadebljalog oboda (sl. 6: 5) može se pripisati kasnom neolitiku (Forenbaher, Kaiser 2008: 43, 51–55), dok dva ulomka zdjela stanjenoga prstenastog vrata i jasno naznačenog ramena (sl. 6: 6) vjerojatno pripadaju eneolitiku (Čečuk, Radić 2005: 224–225; Hulina et al. 2011: 154). Sva tri spomenuta ulomka pronađena su zajedno, u istočnom sektoru nalazišta, unutar SJ 49. Njihova prisutnost možda bi se mogla povezati s već spomenutim slučajnim nalazima bifacijalno cijepanih šiljaka strelica bakrenodobnog tipa. Napokon, ulomak posude prstenastog vrata koji lomom prelazi u trbušasto rame vjerojatno treba pripisati brončanom ili željeznom dobu.

Uzimajući u obzir sve raspoložive pokazatelje, zaključujemo da se na Đurđevoj gredi intenzivnije boravilo sredinom 6. tisućljeća prije Krista, u vrijeme koje se na istočnoj obali Jadrana smatra prijelazom iz ranog u srednji neolitik. U Lici bi to moglo biti vrijeme početne neolitizacije, no na tu temu vratit ćemo se u zaključnoj raspravi ovoga rada. Za sada postoje tek vrlo skromne naznake korištenja istog položaja u kasnijim pretpovijesnim razdobljima.

INTERPRETACIJA NALAZIŠTA

Prema raspoložívim podacima čini se da je neolitičko nalazište zauzimalo razmjerno malen prostor između rječice Jadove i današnje autoceste, širok pedesetak i dug dvjestotinjak metara (sl. 2). Zaštitno iskopavanje obuhvatilo je tek oko 4% te površine pa je posve moguće da se na Đurđevoj gredi pod površinskim humusom krije još nekoliko objekata i jama sličnih onima istraženima.

Istražene tvorevine (jame i nadzemne strukture) i prikupljeni pokretni nalazi upućuju na nalazište opće namjene na kojem su se obavljale raznovrsne aktivnosti vezane uz svakodnevne poslove. Mogli bismo ih protumačiti kao ostatke nastambe i pratećih objekata jednog kućanstva, takozvani "household cluster" (Winter 1976; Netting et al. 1984). Za sada možemo tek pretpostavljati da nije riječ o izoliranom domaćinstvu nego o ostacima malog sela. Ne znamo je li riječ o trajnom ili sezonskom naselju i nemamo elemenata na osnovi kojih bismo mogli procijeniti njegovo ukupno trajanje. Postojeća skromna arheološka građa upućuje na nizak intenzitet boravka, no pri tome ne smijemo zaboraviti da je nalazište tisućljećima bilo izloženo razornim prirodnim procesima i ljudskim aktivnostima koji su mogli izbrisati velik dio arheoloških izvora.

Pod pretpostavkom da kamene strukture (sl. 4) predstavljaju ostatke podnice nadzemnog objekta dimenzija 5x7,5 m, mogla bi biti riječ o nastambi koja bi svojom veliči-

Middle Neolithic, that is, to the second half of the sixth millennium or the very beginning of the fifth millennium BC (Čečuk, Radić 2005: 112–115; Marijanović 2005: 40–45; Forenbaher et al. 2013). On the western side of the Adriatic, figulina sometimes appears in earlier contexts, together with the Early Neolithic Impressed Ware (Spataro 2002: 179; Skeates 2003: 169).

Only four diagnostic potsherds may point to later periods. An externally thickened rim fragment of a slightly restricted bowl (Fig. 6: 5) may be attributed to the Late Neolithic (Forenbaher, Kaiser 2008: 43, 51–55), while two fragments of bowls with thin-walled cylindrical necks and distinctly shaped shoulders (Fig. 6: 6) probably belong to the Copper Age (Čečuk, Radić 2005: 224–225; Hulina et al. 2011: 154). These three fragments were found together in SU 49, in the Eastern Sector of the site. Their presence may be linked with the aforementioned chance finds of bifacial arrow points, which are attributable to the Copper Age. Finally, a fragment of a vessel with a cylindrical neck and a prominent, rounded shoulder probably should be attributed to the Bronze Age or the Iron Age.

Considering all of the available evidence, we conclude that fairly intensive occupation of Đurđeva greda occurred around the middle of the sixth millennium BC, around the time that in the eastern Adriatic is regarded as transitional between the Early and Middle Neolithic. In Lika, that may have been the time of initial neolithisation, a topic that we shall revisit in the concluding discussion of this paper. Only very modest indications exist for now of the site's occupation during later prehistoric periods.

INTERPRETATION OF THE SITE

The available archaeological evidence suggests that the Neolithic site extended over a relatively small area between the Jadova stream and the modern highway, which is about 200 m long and some 50 m wide (Fig. 2). Since only about 4% of that area was exposed by rescue excavation, it is quite possible that a number of structures and features, similar to those excavated, remain hidden below the surface humus of Đurđeva greda.

The excavated structures and features, as well as the recovered artefacts, indicate a general-purpose site at which various quotidian activities took place. Those finds may be interpreted as the remains of a "household cluster" (Winter 1976; Netting et al. 1984) that consisted of a single dwelling and a group of associated pits. We can only assume that this household was not isolated, but constituted a part of a small hamlet. We do not know whether settlement was seasonal or permanent, and the recovered evidence does not allow us to assess the overall duration of its occupation. While the relatively modest finds would suggest a low intensity of occupation, one should remember that the site was exposed for a very long time to destructive natural processes and human activities, which may have obliterated a large part of its archaeological record.

Assuming that the stone structures (Fig. 4) are the remains of a hut floor sized 5x7.5 m, this dwelling would have been large enough to accommodate a nuclear family. Better preserved remains of similar structures are known from Crno vrilo, an Early Neolithic settlement in northern Dalmatia

nom zadovoljavala potrebe jedne nuklearne obitelji. Bolje sačuvani ostaci sličnih nadzemnih objekata otkopani su na ranoneolitičkom nalazištu Crno vrilo u sjevernoj Dalmaciji (Marijanović 2009: 34–46). O svakodnevnim aktivnostima poput pripremanja i konzumiranja hrane svjedoče ulomci žrvnjeva i lonaca odgovarajućih dimenzija i oblika. Iako nije otkopano nijedno netaknuto vatrište, na nekoliko mjesta zabilježeni su tragovi gara, a prikupljena je i manja količina bezobličnih ulomaka terakote koji možda potječu od uništenih ognjišta. Nema naznaka da su razmjerno malobrojne alatke od cijepanog kamena bile izrađivane na licu mjesta. Prisutnost sitne lomljevine rožnjaka u uzorcima za flotaciju prije bi se mogla objasniti doradom i održavanjem alatki koje su bile proizvedene na nekom drugom mjestu.

Najbolje posvjedočena pojedinačna aktivnost je izrada bradvi od dijagenetskog rožnjaka. Malen ali vrlo informativan skup nalaza obuhvaća alate za cijepanje i brušenje kamena, poluproizvode u različitim fazama izrade i proizvodni otpad (sl. 8; sl. 9: 1). Zalijevanje brusnog kamena vodom može znatno olakšati posao, jer voda pri brušenju djeluje kao mazivo i uklanja čestice otpadnog materijala (Harding 1987: 39). Zbog toga valja podsjetiti da je nalazište smješteno neposredno uz rječicu Jadovu u kojoj obično ima vode u izobilju. Važno je napomenuti da nema naznaka zanatske specijalizacije koje bi upućivale na radioničku proizvodnju (Costin 1991). Naprotiv, sudeći po maloj količini otpada i posvemašnjoj odsutnost standardizacije, bradve su bile izrađivane unutar domaćinstva za vlastite potrebe. Prema veličini, obliku i položaju oštrice, ponajprije su mogle poslužiti za obradu drva, a možda i za rušenje manjih stabala, no prelagane su da bi se mogle koristiti pri obradi zemlje.

Relativno brojni ulomci posuda posebne namjene, takozvanih "ritona", razasuti su čitavom dužinom istraženog presjeka nalazišta. Njihov prostorni raspored ni po čemu ne odudara od rasporeda ostalih ulomaka lončarije. Mnogi autori pretpostavljaju da su takve posude imale neku nejasno definiranu obrednu namjenu, dok manjina smatra da za njihov neobičan oblik postoji praktično objašnjenje (Mlekuž 2007: 267–269). Prihvatimo li moguću ili vjerojatnu povezanost "ritona" i obrednog ponašanja, slijedi zaključak da su se na Đurđevoj gredi obredne i svakodnevne aktivnosti međusobno ispreplitale. Takvo prožimanje svjetovnog i duhovnog bilo je u pretpovijesti uobičajena pojava (Blake 2005: 120–121).

ĐURĐEVA GREDA I PRIJELAZ NA ZEMLJORADNJU U LICI

Ako izuzmemo špilju Golubinjaču kod Kosinja iz koje potječu dva ulomka (vjerojatno) srednjoneolitičke lončarije (Drechsler-Bižić 1970: 12–13), Đurđeva greda je prvo nesporno neolitičko nalazište u Lici. Nove informacije koje nam je ono pružilo izravno utječu na postojeća tumačenja procesa širenja zemljoradnje u kontinentalno zaleđe istočnog Jadrana.

Nalazi s Đurđeve grede nedvosmisleno svjedoče da je niz inovacija vezanih uz neolitički način života dosegao Liku sredinom šestog tisućljeća prije Krista. Među njima su lončarija, prizmatična sječiva i različite alatke od glačanog

(Marijanović 2009: 34–46). Daily activities such as preparation and consumption of food are attested by milling stones and fragments of pottery vessels of suitable shape and size. While well-preserved hearths were not found, occasional amorphous lumps of burned soil may represent the remains of disturbed hearths, and soot and charcoal fragments were encountered at several locations. Nothing suggests that the relatively few flaked stone tools were produced at the site. Chert chips that were recovered from soil samples by flotation probably testify to the modification and maintenance of tools that had been produced somewhere else.

The production of diagenetic chert adzes is the single best attested activity. The small but highly informative assemblage contains flaking and grinding tools, half-products in various phases of completion, and production waste (Fig. 8; Fig. 9: 1). The efficiency of grinding can be much improved by pouring water over the grinding stone, because water acts as a lubricant and removes waste particles (Harding 1987: 39). In this regard, one should note that Đurđeva greda is located next to the Jadova stream, which at most times of the year is full of water. Importantly, there are no indications of craft specialization or workshop production (Costin 1991). On the contrary, judging by the small quantity of production waste and the absence of standardization, adzes were made within the household and for household use. Their size and shape, and the position of their working edge, suggest that they were used for woodworking, and maybe also for felling small trees, but they are too lightweight to be use in land cultivation.

Relatively numerous fragments of special-purpose vessels known as "rhytons" are strewn along the entire exposed cut through the site. Their spatial distribution is similar to that of other potsherds. Many authors presume that these vessels had some vaguely defined ritual function, while a minority offer practical explanations for their unusual shape (Mlekuž 2007: 267–269). Accepting the possible or probable connection of "rhytons" with ritual behaviour, we conclude that ritual and quotidian activities intertwined at Đurđeva greda. Such intermingling of the sacred and the profane was commonplace in prehistoric times (Blake 2005: 120–121).

ĐURĐEVA GREDA AND THE TRANSITION TO FARMING IN LIKA

Aside from Golubinjača Cave near Kosinj, which yielded a couple of (probably) Middle Neolithic potsherds (Drechsler-Bižić 1970: 12–13), Đurđeva greda is the first indisputable Neolithic site in Lika. The recently recovered information from that site has a direct bearing on our current understanding of the spread of farming into the eastern Adriatic hinterland.

The archaeological finds from Đurđeva greda clearly testify that a number of innovations related to the Neolithic way of life reached Lika around the middle of the 6th millennium BC. These innovations include pottery, prismatic blades, various ground stone implements, as well as substantial drystone structures (most probably, dwellings). Primary indicators of herding and farming (remains of domesticated animals and plants) are missing, but we consider their absence to be a consequence of the natural processes of decay, rather than proof of the absence of a farming subsistence strategy. The presence of a fairly large number of milling stone fragments supports this assumption.

kamena, kao i razmjerno trajne suhozidne strukture, najvjerojatnije stambenog karaktera. Nedostaju kosti domaćih životinja i ostaci udomaćenog bilja kao primarni pokazatelji stočarstva i ratarstva, no pretpostavljamo da je to posljedica prirodnih procesa razgradnje, a ne dokaz odsutnosti stočarsko-ratarske strategije opstanka. Prisutnost prilično velikog broj ulomaka žrvnjeva podupire takvu pretpostavku.

Većina autora smatra da postoje dva glavna smjera širenja zemljoradnje u Europu od kojih jedan vodi prema sjeverozapadu preko Balkana i srednjeg Podunavlja, a drugi prema zapadu duž obala Sredozemlja (Harris 1996; Whittle 1996; Price 2000; Ammerman, Biagi 2003; Hadjikoumis et al. 2011). Inovacije vezane uz zemljoradnju mogle su, prema tome, dospjeti u Liku dvama putovima: s jugoistoka, duž obale istočnog Jadrana i odatle preko Velebita, ili sa sjeveroistoka, dolinom rijeke Save te zatim dalje preko bosanskih planina. Arheolozi se pri traženju odgovora na slična pitanja često oslanjaju na lončarske stilove, no skromni, neukrašeni i istrošeni ulomci posuđa s Đurđeve grede mogu se podjednako dobro povezati s oba moguća smjera difuzije. Prisutne egzotične sirovine također su od slabe pomoći. Dok gorski prozirac i ulomak bradve od metamorfne stijene upućuju na veze s Bosnom, opsidijan je vjerojatno stigao preko Jadrana s Liparskih otoka, iako se bez provedenih kemijskih analiza ne mogu isključiti ni karpatski izvori, odakle bi opsidijan dospio u Liku preko Bosne i srednjeg Podunavlja (Tykot 2011: 38, 40).

Prvi od dva pretpostavljena puta čini se ipak vjerojatnijim zbog nekoliko razloga. Najranija zemljoradnička sela u sjevernoj Dalmaciji, osnovana oko tri stoljeća prije naselja na Đurđevoj gredi (Marijanović 2009; Legge, Moore 2011; Forenbaher et al. 2013), udaljena su tek četrdesetak kilometara. Od Like ih dijeli razmjerno nizak i uzak hrbat jugoistočnog Velebita preko kojeg vodi nekoliko prilično lako prohodnih prijevoja. Otvoreni krajolik toga dijela Velebita naročito je pogodan za sezonsku ispašu sitne stoke (Marković 1980). Postoje jasne naznake da je sezonsko korištenje velebitskih pašnjaka od strane sjevernodalmatinskih pastira započelo već u ranom neolitiku, no raspoloživa građa ograničena je na primorsku padinu južnog Velebita i nadmorske visine do oko tisuću metara (Forenbaher, Vranjican 1984; 1990; Forenbaher 2011). Budući da u jugoistočnom Velebitu postoji nekoliko prijevoja nižih od tisuću metara, sjevernodalmatinski neolitički stočari u potrazi za ispašom ondje su bez većih poteškoća mogli prijeći Velebit i spustiti se u Liku.

Širenje zemljoradnje srednjim Podunavljem odvijalo se otprilike istodobno kada i na Jadranu (Whittle et al. 2002; Forenbaher, Miracle 2005), no ritam širenja zemljoradnje Posavinom prema zapadu nije nam preciznije poznat. Zbog nedostatka radiokarbonskih datuma, za sada ne znamo dokle su sredinom šestog tisućljeća prije Krista stigle inovacije vezane uz ratarsko-stočarsku strategiju opstanka. Najbliža neolitička nalazišta u Posavini koja bi mogla pripadati tom vremenu (Dimitrijević 1979: 236–237) dijeli od Like oko 170 km pretežno planinskog terena, a još su udaljenija ranoneolitička sela središnje Bosne. Naselje u Obrima, jedino koje je radiokarbonski datirano (Gimbutas 1974: 16–18), osnovano

Most authors agree that farming spread into Europe along two major routes, one traversing the Balkans and the Middle Danube in a northwestwardly direction, the other heading west along the Mediterranean shores (Harris 1996; Whittle 1996; Price 2000; Ammerman, Biagi 2003; Hadjikoumis et al. 2011). It follows that innovations related to farming could have reached Lika from two sides: from the southeast, along the eastern Adriatic coast and across Velebit Mountain, or from the northeast, along the Sava River valley and across the mountains of Bosnia. Archaeologists often rely on pottery styles when seeking answers to such questions, but the modest, worn, plain potsherds from Đurđeva greda can be linked equally well to either of the two possible directions of diffusion. Likewise, the attested exotic raw materials are of little help. While the rock crystal and the fragment of an adze made of metamorphic rock suggest connections with Bosnia, obsidian probably arrived across the Adriatic from Lipari. In the absence of chemical sourcing analyses, however, one cannot exclude Carpathian sources, from which obsidian would have arrived to Lika across Bosnia and the Danubian Plain (Tykot 2011: 38, 40).

For several reasons, the first of the two proposed routes seems more probable. The earliest villages of northern Dalmatia, founded about three centuries before the Đurđeva greda settlement (Marijanović 2009; Legge, Moore 2011; Forenbaher et al. 2013), are only about forty kilometres away. A relatively narrow and low ridge of the southeastern Velebit Mountain, traversed by several fairly easily negotiable mountain passes, is all that separates them from Lika. The open landscape of this part of the mountain is particularly well suited for seasonal sheep and goat herding (Marković 1980). There are clear indications that seasonal use of Velebit mountain pastures by northern Dalmatian herders began already in the Early Neolithic, but the evidence has been restricted to the maritime slope of Velebit, up to the altitude of about one thousand metres (Forenbaher, Vranjican 1984; 1990; Forenbaher 2011). Since several of the mountain passes in southeastern Velebit lie well below that altitude, the northern Dalmatian Neolithic herders in search of pasture may have crossed the mountain and descended into Lika with relative ease.

Roughly at the same time when farming was spreading along the Adriatic, it was also spreading along the Middle Danube (Whittle et al. 2002; Forenbaher, Miracle 2005). The closer timing of its spread westwards along the Sava River valley remains unknown, however, due to the scarcity of radiocarbon dates. We do not know how far west the innovations related to farming reached by the middle of the sixth millennium BC. Neolithic sites in the Sava River valley that possibly belong to that time (Dimitrijević 1979: 236–237) are separated from Lika by at least 170 km of mostly mountainous terrain, while the early Neolithic villages of central Bosnia are even farther away. Of the latter, only the settlement at Obre has been radiocarbon dated (Gimbutas 1974: 16–18). According to those dates, Obre was founded about two centuries before Đurđeva greda, but the absence of Neolithic sites in the intervening mountains of western Bosnia (Benac 1979: 373) does not support the assumption that farming reached Lika from the Northeast.

In the first half of the sixth millennium BC, according to the model for the spread of farming as proposed by Forenbaher and Miracle (Forenbaher, Miracle 2005; Forenbaher

je oko dva stoljeća prije naselja na Đurđevoj gredi, no odsutnost neolitičkih nalazišta na planinskom međuprostoru zapadne Bosne (Benac 1979: 373) za sada ne govori u prilog pretpostavci da je zemljoradnja stigla u Liku sa sjeveroistoka.

Prema modelu širenja zemljoradnje koji predlažu Forenbaher i Miracle (Forenbaher, Miracle 2005; Forenbaher et al. 2013), kontinentalno zaleđe Jadrana u prvoj polovini šestog tisućljeća prije Krista može se opisati kao "granični pojas zemljoradnje" (Zvelebil, Lillie 2000). Na tom prostoru tada borave posljednji lovci-sakupljači kojima neolitičke inovacije stoje na raspolaganju zahvaljujući dodirima sa susjednim zemljoradničkim zajednicama. Za pretpostaviti je da se prijelaz na zemljoradnju ne odvija jednako na čitavom spomenutom prostoru, pri čemu valja računati na širok spektar mogućnosti. Prihvaćaju li pojedine autohtone zajednice čitav "*neolitički paket*" inovacija, ili odabiru tek pojedine njegove elemente, ili ga uopće ne prihvaćaju pa pojava inovacija znači dolazak stranog stanovništva? Što bi nam o tome mogli reći nalazi s Đurđeve grede?

Prikupljena arheološka građa prilično jasno svjedoči da su stanovnici Đurđeve grede barem dio svoje hrane priskrbljivali uzgojem udomaćenih biljaka. Žrvnjevi upućuju na mljevenje zrnja i pripremu hrane (vjerojatno, od udomaćenih žitarica), dok su bradve od glačanog kamena možda korištene prilikom krčenja polja. Razmjerno masivna materijalna kultura i tragovi nadzemnih objekata svjedoče o znatno smanjenoj pokretljivosti zajednice, ako ne o posve sjedilačkom načinu života. Takav način života na prostoru Like nespojiv je s lovno-sakupljačkom strategijom opstanka zbog razmjerno skromnih, sezonski ograničenih i široko razasutih izvora divlje hrane (Miracle, O'Brien 1998). Znatno bi nam pomogli izravni pokazatelji prehrane, odnosno otpaci hrane, no oni nam, nažalost, posve nedostaju. Uzorci tla uzeti za flotaciju iz slojeva i jama još nisu analizirani pa ne znamo sadrže li makrobotaničke ostatke divljeg ili udomaćenog bilja. Budući da se životinjske kosti nisu sačuvale, ne znamo jesu li divlje ili domaće životinje bile glavni izvor životinjskih proteina zajednice koja je živjela na Đurđevoj gredi.

Velebit je nesumnjivo predstavljao ozbiljnu prirodnu prepreku, no velebitski pašnjaci bili su potencijalni prostor susreta zajednica naseljenih s obje strane planine, naročito kada je riječ o pokretljivim strategijama opstanka kao što su lov, sakupljanje i sezonsko stočarenje. Potraga sjevernodalmatinskih pastira za ispašom mogla je dovesti do dodira i preuzimanja inovacija od strane ličkih lovaca-sakupljača, ili pak dovesti same sjevernodalmatinske stočare u Liku. Za sada ne znamo imamo li na Đurđevoj gredi posla sa starosjedilačkim lovcima koji su preuzeli pojedine inovacije vezane uz zemljoradnju, s doseljenicima koji posve ovise o proizvodnji hrane, ili s nekom miješanom zajednicom nastalom kretanjem pojedinaca unutar graničnog pojasa zemljoradnje.

No, što ako je Lika za mezolitika bila nenaseljena? Tada bi doseljeni zemljoradnici bili njezini prvi stanovnici. Za sada nema nikakvih pouzdanih informacija o mezolitiku Like (Komšo 2008: 74), iz čega bi se možda moglo zaključiti da je taj prostor za mezolitika doista bio pust. No, odmah treba

et al. 2013), the continental hinterland of the Adriatic would have represented the agricultural frontier zone (Zvelebil, Lillie 2000). Neolithic innovations would have been available to the last hunter-gatherers who occupied the area, thanks to the contacts with the neighbouring farming communities. One may presume that, even within the area in question, the transition to farming would have been marked by considerable variability. Some indigenous communities may have accepted the entire "*Neolithic package*", while other communities may have adopted only selected items. Still other communities may have rejected the innovations entirely, in which case those innovations would signal the arrival of a foreign population. How helpful in this regard is the new evidence from Lika?

The archaeological record of Đurđeva greda indicates that the site's inhabitants obtained at least a part of their food from cultivated plants. Milling stones would have been used for grinding seeds (presumably, of domesticated plants), while ground stone adzes may have been employed in land clearance. The relatively massive material culture and the remains of substantial structures testify to the community's reduced mobility, if not outright sedentism. In Lika, where wild food resources were relatively modest, widely scattered and seasonally restricted (Miracle, O'Brien 1998), such a lifestyle would have been incompatible with a hunter-gatherer subsistence strategy. Food remains would be of much help, but those direct indicators of diet unfortunately are completely lacking. Since analyses of soil samples taken for flotation from layers and pits have not been completed, we do not know whether they contain any macrobotanical remains of wild or domesticated plants. Likewise, since animal bones were not preserved, we do not know whether wild or domesticated animals provided the Đurđeva greda community with most of the necessary animal protein.

While Velebit Mountain undoubtedly presented a serious natural barrier, its high pastures provided a venue for contacts between communities that occupied opposite sides of the mountain, especially if those communities practiced mobile strategies such as hunting, gathering, or seasonal herding. The search for pastures by northern Dalmatian herders may have led to contacts that resulted in the adoption of innovations by Lika's hunter-gatherers. Alternatively, it may have brought Dalmatian herders themselves into Lika. For the time being, at Đurđeva greda we do not know whether we are dealing with indigenous hunter-gatherers adopting selected innovations related to farming, with immigrants who are fully dependent on food production, or with a mixed community formed by individual frontier mobility.

But, what if Lika was uninhabited during the Mesolithic? In that case, pioneering farmers would have been its first inhabitants. Currently, there is no reliable evidence in Lika attributable to the Mesolithic (Komšo 2008: 74), from which one might conclude that the region indeed was abandoned during that period. One should immediately note, however, that Mesolithic research in Croatia is only at its beginnings, and that Lika has been completely neglected in that regard. As a consequence, one should not draw any hasty conclu-

napomenuti da je istraživanje mezolitika u Hrvatskoj tek u povojima, pri čemu je Lika posve zapostavljena. Zbog toga ne valja žuriti sa zaključcima. Uostalom, sve do nedavnog otkrića na Đurđevoj gredi mislili smo da je Lika bila pusta sve do brončanog doba.

ZAHVALE

Josipu Burmazu i tvrtki Kaducej d.o.o. iz Splita zahvaljujemo što su nam na analizu ustupili građu predstavljenu ovim radom te nam omogućili korištenje cjelokupne terenske dokumentacije. Tatjani Kolak iz Muzeja Like u Gospiću zahvaljujemo za uvid u slučajne nalaze prikupljene s Đurđeve grede i izvještaj o rekognosciranju pohranjen u arhivu Muzeja. Urošu Barudžiji i Marti Mileusnić s Rudarsko-geološko-naftnog fakulteta u Zagrebu zahvaljujemo za provedene petrografske analize sirovine za izradu bradvi i analizu kiselosti tla. Zlatku Perhoču zahvaljujemo za informacije o potencijalnim izvorištima ostalih rožnjaka korištenih za izradu izrađevina od cijepanog kamena. Giovanniju Boschianu s Odsjeka za biologiju Sveučilišta u Pisi zahvaljujemo za informacije o mogućem agresivnom djelovanju oborinskih voda na lončariju i kosti. Analize pokretnih nalaza s Đurđeve grede provedene su u sklopu projekta Ministarstva znanosti, obrazovanja i sporta Republike Hrvatske #196-1962766-2740.

sions. After all, before the recent discovery at Đurđeva greda, we may have concluded that Lika was empty of people until the Bronze Age.

ACKNOWLEDGMENTS

We are grateful to Josip Burmaz and the Kaducej Company from Split for entrusting us with the analysis of all archaeological finds from Đurđeva greda and providing full access to field documentation. Thanks to Tatjana Kolak from the Museum of Lika in Gospić who has allowed us to examine chance finds collected from the site and consult field survey reports stored in the Museum's archives. Thanks to Uroš Barudžija and Marta Mileusnić from the Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb, for the petrographic analysis of the raw material that was used for adze production, as well as for soil acidity analysis. We are indebted to Zlatko Perhoč for information about potential sources of other cherts that were used as raw material for flaked stone artefacts. Thanks to Giovanni Boschian from the Department of Biology, University of Pisa, for sharing information about the possible corrosive effects of precipitation on pottery and bone. Analyses of artefact assemblages from Đurđeva greda were supported by the Ministry of Science, Education and Sports of the Republic of Croatia, project #196-1962766-2740.

Prijevod / Translation
Stašo Forenbaher

Lektura / Proofreading
Sanjin Mihelić

LITERATURA / BIBLIOGRAPHY

Ammerman, A. J., Biagi, P. (eds.), 2003, *The Widening Harvest*, Archaeological Institute of America, Boston.

Barfield, L. H. 2001, Beaker Lithics in Northern Italy, in: *Bell Beakers Today: Pottery, People, Culture, Symbols in Prehistoric Europe*, Nicolis F. (ed.), Servizio Beni Culturali, Trento, 507–518.

Batović, Š. 1959, Neolitsko nalazište u Smilčiću, *Diadora*, Vol. 1, 5–26.

Batović, Š. 1961, Neolitsko nalazište u Smilčiću, *Diadora*, Vol. 2, 31–116.

Batović, Š. 1979, Jadranska zona, in: *Praistorija jugoslavenskih zemalja, sv. 2: neolitsko doba*, Garašanin M. (ed.), Akademija nauka i umjetnosti Bosne i Hercegovine, Sarajevo, 473–635.

Benac, A. 1979, Prelazna zona, in: *Praistorija jugoslavenskih zemalja, sv. 2: neolitsko doba*, Garašanin M. (ed.), Akademija nauka i umjetnosti Bosne i Hercegovine, Sarajevo, 363–470.

Biagi, P. 1995, North Eastern Italy in the Seventh Millenium BP: a Bridge between the Balkans and the West?, in: *The Vinča Culture, its Role and Cultural Connections*, Drașovean F., Biagi P. (eds.), Mirton, Timișoara, 9–22.

Blake, E. 2005, The Material Expression of Cult, Ritual, and Feasting, in: *The Archaeology of Mediterranean Prehistory*, Blake E., Knapp A. B. (eds.), Blackwell, Oxford, 102–129.

Bronk Ramsey, C. 2009, Bayesian analysis of radiocarbon dates, *Radiocarbon*, Vol. 51, 337–360.

Chapman, J. C., Müller, J. 1990, Early Farmers in the Mediterranean Basin: the Dalmatian Evidence, *Antiquity*, Vol. 64, 127–134.

Costin, C. L. 1991, Craft Specialization: Issues in Refining, Documenting, and Explaining the Organization of Production, in: *Archaeological Method and Theory, Vol. 3*, Schiffer M. (ed.), University of Arizona Press, Tucson, 1–56.

Čečuk, B., Radić, D. 2005, *Vela spila: višeslojno pretpovijesno nalazište – Vela Luka, otok Korčula*, Centar za kulturu, Vela Luka.

Dimitrijević, S. 1979, Sjeverna zona: neolit u centralnom i zapadnom dijelu sjeverne Jugoslavije, in: *Praistorija jugoslavenskih zemalja, sv. 2: neolitsko doba*, Garašanin M. (ed.), Akademija nauka i umjetnosti Bosne i Hercegovine, Sarajevo, 229–360.

Dreschler-Bižić, R. 1958, Naselje i grobovi preistoriskih Japoda u Vrepcu, *Vjesnik Arheološkog muzeja u Zagrebu*, 3. s. 1, 1–34.

Dreschler-Bižić, R. 1970, Zaštitna iskopavanja pećine Golubinjače kod Kosinja, *Vjesnik Arheološkog muzeja u Zagrebu*, 3. s. 4, 111–117.

Forenbaher, S. 2011, Shepherds of a Coastal Range: the Archaeological Potential of the Velebit Mountain Range (Eastern Adriatic), in: *Hidden Landscapes of Mediterranean Europe*, van Leusen M., Pizziolo G., Sarti L. (eds.), British Archaeological Reports International Series 2320, Archaeopress, Oxford, 113–121.

Forenbaher, S., Kaiser, T. 2010, Grapčeva, Nakovana i neolitik istočnog Jadrana, in: *Arheološka istraživanja u Neretvansko–Dubrovačkoj županiji*, Perkić D. (ed.), Hrvatsko arheološko društvo, Zagreb, 25–31.

Forenbaher, S., Miracle, P. T. 2005, The Spread of Farming in the Eastern Adriatic, *Antiquity*, Vol. 79, 514–528.

Forenbaher, S., Vranjican, P. 1985, Vaganačka pećina, *Opuscula archaeologica*, Vol. 10, 1–21.

Forenbaher, S., Vranjican, P. 1990, Velebit: Rekognosciranje speleoloških objekata, *Arheološki pregled*, Vol. 29, 237–239.

Forenbaher, S., Vujnović, N. 2013, Đurđeva greda, *Hrvatski arheološki godišnjak*, Vol. 7 (2010), (u tisku).

Forenbaher, S., Kaiser, T., Miracle, P. T. 2013, Dating the East Adriatic Neolithic, *European Journal of Archaeology*, Vol. 16, 589–609.

Gimbutas, M. 1974, Chronology of Obre I and Obre II, *Wissenschaftliche Mitteilungen des Bosnisch–Herzegowinischen Landesmuseums (Archäologie)*, Vol. 4, 15–35.

Hadjikoumis, A., Robinson, E., Viner, S. (eds.), 2011, *The dynamics of neolithisation in Europe: Studies in honour of Andrew Sherratt*, Oxbow Books, Oakville.

Harding, P. 1987, An Experiment to Produce a Ground Flint Axe, in: *The Human Uses of Flint and Chert: Proceedings of the Fourth International Flint Symposium (Brighton 1983)*, Sieveking G. G., Newcomer M. H. (eds.), Cambridge University Press, Cambridge, 37–42.

Harris, D. R. (ed.), 1996, *The Origins and Spread of Agriculture and Pastoralism in Eurasia*, University College, London.

Hulina, M., Forenbaher, S., Miracle, P. T. 2012, Prapovijesna keramika iz unutrašnjeg dijela Pupićine peći (iskopavanje 2001. godine), *Histria archaeologica*, Vol. 42, 137–184.

Kolak, T., Perkić, D. 2002, Arheološki radovi na ličkim dionicama autoceste Zagreb–Split, *Obavijesti Hrvatskog arheološkog društva*, Vol. 34 (2), 51–56.

Komšo, D. 2008, Mezolitik u Hrvatskoj, *Opuscula archaeologica*, Vol. 30, 5–91.

Korošec, J. 1958, *Neolitska naseobina u Danilo Bitinju*, Jugoslavenska akademija znanosti i umjetnosti, Zagreb.

Legge, T., Moore, A. 2011, Clutching at Straw: the Early Neolithic of Croatia, in: *The Dynamics of Neolithisation in Europe: Studies in Honour of Andrew Sherratt*, Hadjikoumis A., Robinson E., Viner S. (eds.), Oxbow Books, Oakville, 176–195.

Marijanović, B. 2005, *Gudnja: višeslojno prapovijesno nalazište*, Dubrovački muzeji – Arheološki muzej, Dubrovnik.

Marijanović, B. 2009, *Crno vrilo 1*, Sveučilište u Zadru, Zadar.

Marković, M. 1980, Narodni život i običaji sezonskih stočara na Velebitu, *Zbornik za narodni život i običaje*, Vol. 48, 5–139.

Miracle, P. T., O'Brien, C. J. 1998, Seasonality of Resource Use and Site Occupation at Badanj, Bosnia-Herzegovina: Subsistence Stress in an Increasingly Seasonal Environment?, in: *Seasonality and Sedentism: Archaeological Perspectives from Old and New World Sites*, Rocek T. R., Bar-Yosef O. (eds.), Peabody Museum, Harvard, 41–74.

Mlekuž, D. 2007, 'Sheep Are Your Mother': Rhyta and the Interspecies Politics in the Neolithic of the Eastern Adriatic, *Documenta Praehistorica*, Vol. 34, 267–280.

Müller, J. 1988, Škarin Samograd – eine frühneolitische Station mit monochromer Ware und Impresso Keramik an der Ostadria, *Archäologisches Korrespondenzblatt*, Vol. 18 (3), 219–235.

Netting, R. McC., Wilk, R. R., Arnold, E. J. 1984, *Households: Comparative and Historical Studies of the Domestic Group*, University of California Press, Berkeley.

Perhoč, Z., Altherr R. 2011, Litički nalazi s otoka Sušca, *Opuscula archaeologica*, Vol. 35, 7–39.

Petrić, N. 1979, Hvarski tumuli, *Vjesnik za arheologiju i historiju dalmatinsku*, Vol. 72–73, 67–78.

Price, T. D. (ed.), 2000, *Europe's First Farmers*, Cambridge University Press, Cambridge.

Proroković-Lazarević, B. 1988, Vrebac, 12. 05. 1988, neobjavljeni izvještaj o rekognosciranju, Arhiv muzeja Like, Gospić.

Skeates, R. 2003, Radiocarbon Dating and Interpretations of the Mesolithic–Neolithic Transition in Italy, in: *The Widening Harvest,* Ammerman A. J., Biagi P. (eds.), Archaeological Institute of America, Boston, 157–187.

Sokač, B., Nikler, L., Velić, I., Mamužić, P. 1974, *Osnovna geološka karta SFRJ*,

List Gospić, 1 : 100 000, Savezni geološki zavod, Beograd.

Spataro, M. 2002, *The First Farming Communities of the Adriatic: Pottery production and circulation in the Early and Midle Neolithic*, Edizioni Svevo, Trieste.

Tykot, R. H. 2011, Obsidian Finds on the Fringes of the Central Mediterranean: Exotic or Eccentric Exchange?, in: *Exotica in the Prehistoric Mediterranean*, Vianello A. (ed.), Oxbow, Oxford, 33–44.

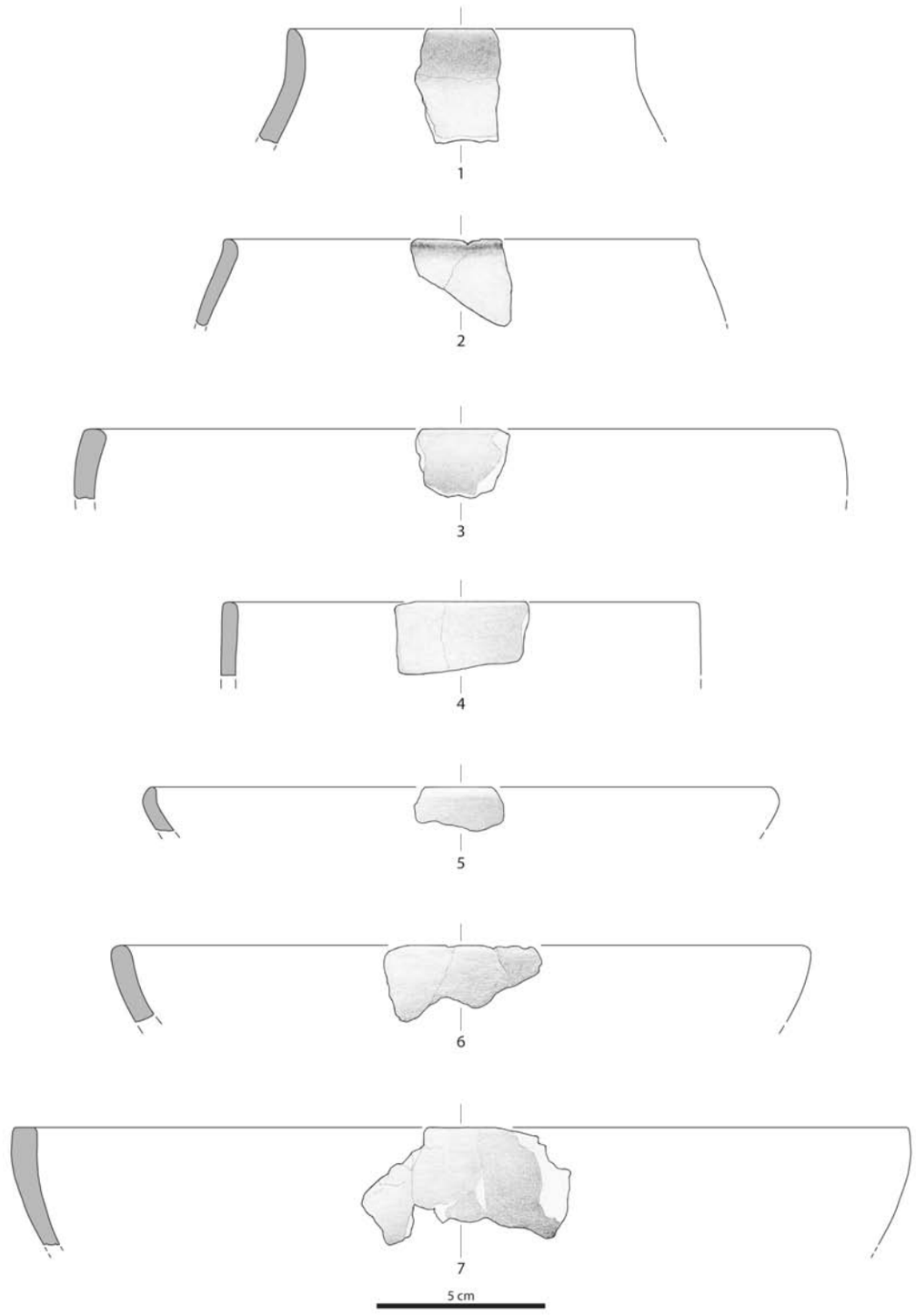
Whittle, A. 1996, *Europe in the Neolithic: the Creation of New Worlds*, Cambridge University Press, Cambridge.

Whittle, A., Borić, D., Bartosziewicz, L., Pettitt, P., Richards, M. 2002, In the beginning: new radiocarbon dates for the Early Neolithic in northern Serbia and south-east Hungary, *Antaeus*, Vol. 25, 1–51.

Wiewegh, Z., Kezunović, V. 2009, Konzervatorska studija za trasu plinovodnog sustava Like i Dalmacije – III. dio sustava od MČS – 3 Gospić do PČ/MRS Benkovac, Ministarstvo kulture RH, Uprava za zaštitu kulturne baštine, Zagreb.

Winter, M. C. 1976, The Archaeological Household Cluster in the Valley of Oaxaca, in: *The Early Mesoamerican Village*, Flannery K. (ed.), Academic Press, New York, 25–31.

T. 1



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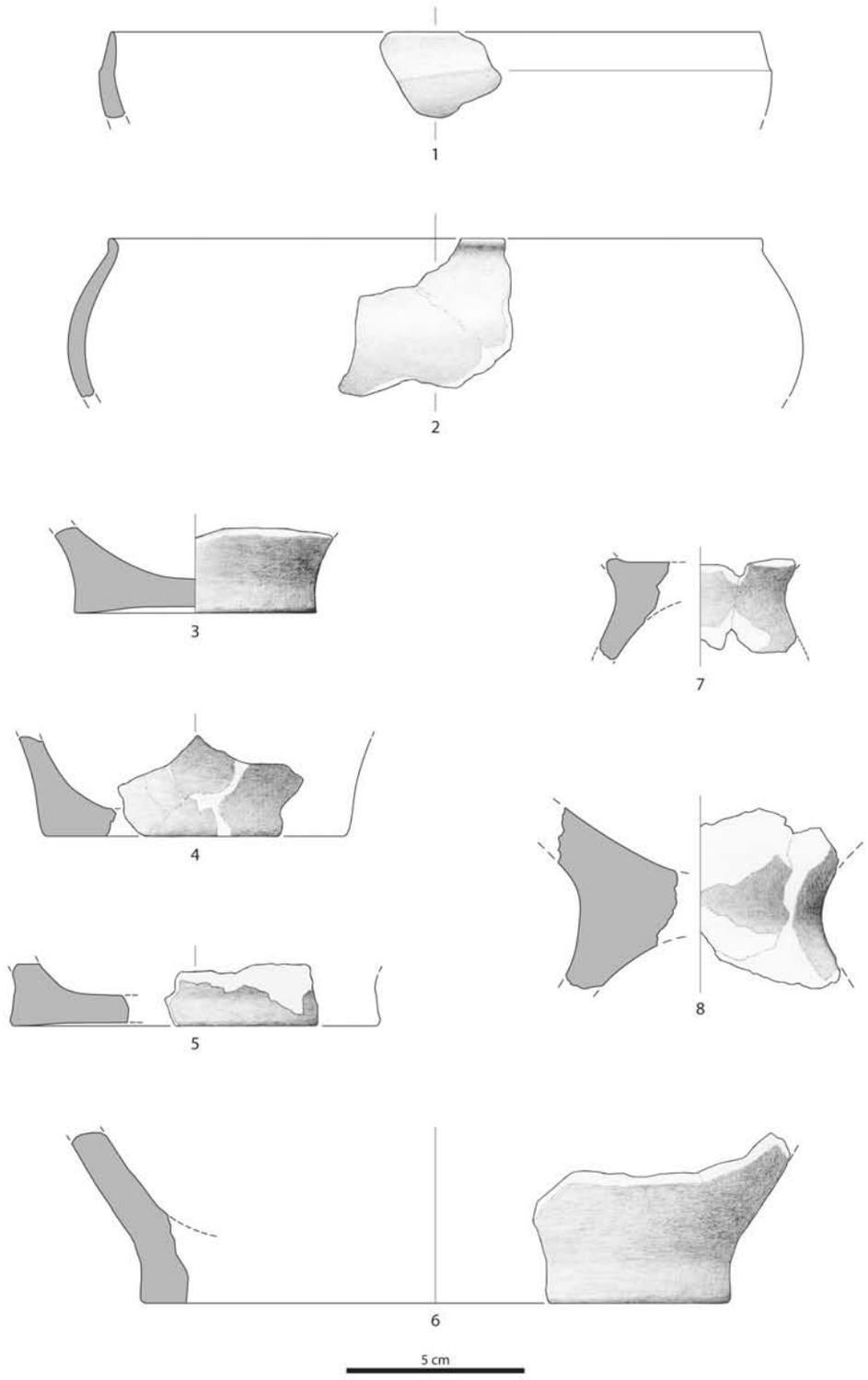

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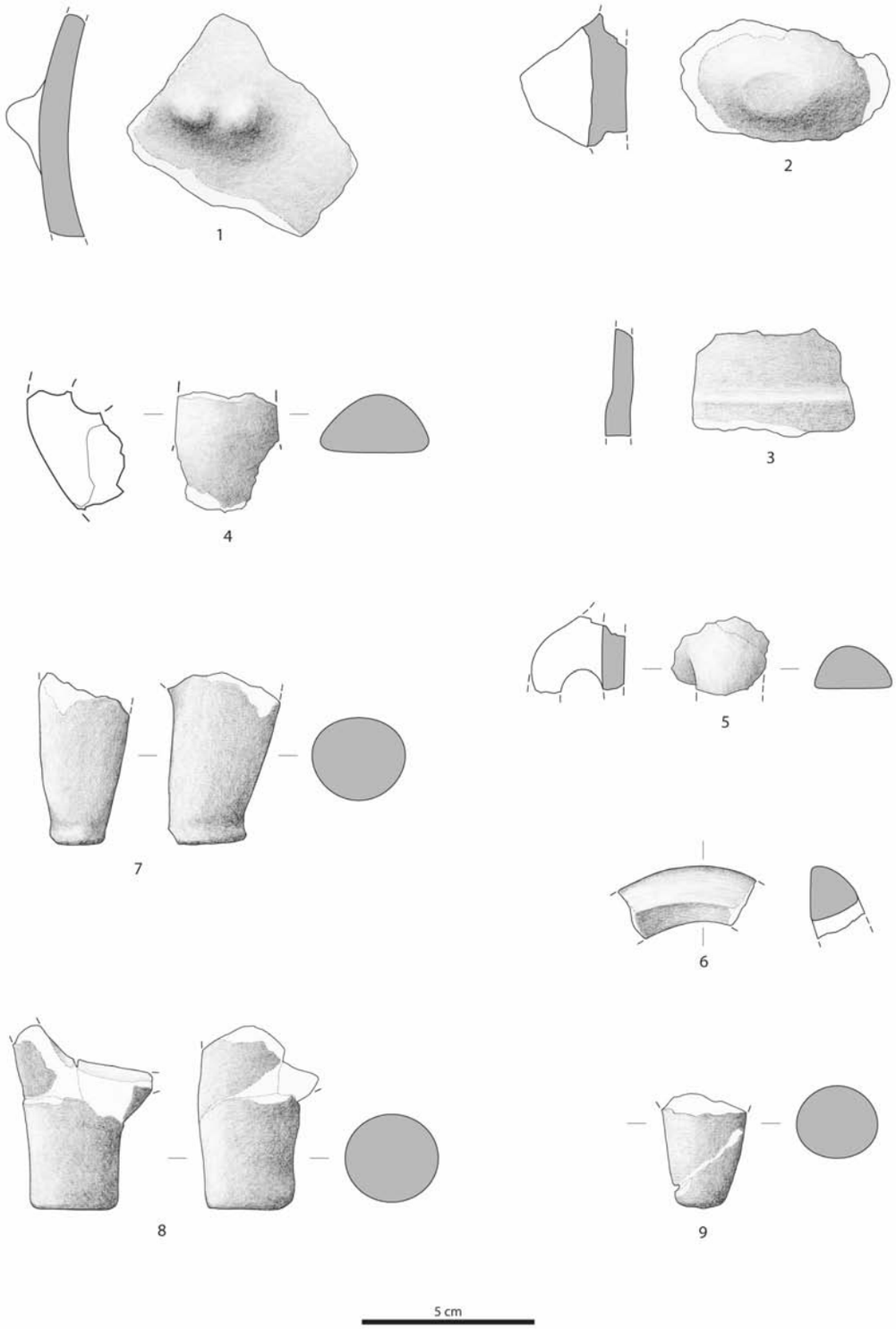

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Pl. 3 1, 9: SU 8; 2: SU 6; 3: SU 49; 4: SU 5; 5, 7: SU 7; 6: SU 45; 8: SU 46 (drawn by I. Marochini, L. Černicki and S. Forenbaher)