

Zalog pri Verdu

Zalog pri Verdu,
tabor kamenodobnih
lovcev na zahodnem robu
Ljubljanskega barja

Zalog near Verd,
Stone Age hunters camp
at the western edge of the
Ljubljansko barje

Uredil / Edited by
Andrej Gaspari



Zbirka / Series
Uredniki zbirke / Editors of the series

OPERA INSTITUTI ARCHAEOLOGICI SLOVENIAE 11

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ZALOG PRI VERDU

Tabor kamenodobnih lovcev na zahodnem robu Ljubljanskega barja

ZALOG NEAR VERD

Stone Age hunters' camp at the western edge of the

Ljubljansko barje

Uredil / Edited by
Recenzenti / Reviewed by
Prevod / Translation
Jezikovni pregled / Proof-reader
Likovno grafična zasnova zbirke /
Graphic Art and Design
Oblikovalska zasnova platnic / Cover Design
Realizacija oblikovanja platnic /
Realisation of cover design
Računalniški prelom / DTP
Risbe / Illustrations
Izdal in založil / Published by

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Inštitut za arheologijo ZRC SAZU in Založba ZRC /

Institute of Archaeology at ZRC SAZU and

ZRC Publishing

Oto Luthar, Jana Horvat

Vojislav Likar

Zanj / Represented by
Glavni urednik / Editor-in-Chief

Izid knjige so podprli /
Published with the support of

Agencija za raziskovalno dejavnost RS / Slovenian Research Agency;

Zavod za varstvo kulturne dediščine Slovenije, OE Ljubljana;

E & S SKUPINA, zavarovalniško zastopanje, d. o. o., Gorjupova ulica 1,

SI-1000 Ljubljana (Franci Wieser); CPA, d. o. o.;

Rokus, d. o. o.; Diagnostični center Bled; AFM Ažman, d. o. o.

Fotografija na ovitku / Cover photo

Ljubija pri Verdu (foto / photo Arne Hodalič)

CIP - Kataložni zapis o publikaciji
Narodna in univerzitetna knjižnica, Ljubljana

903(497.4-19)"631/634"(0.034.2)

ZALOG pri Verdu [Elektronski vir] : tabor kamenodobnih lovcev na zahodnem robu Ljubljanskega barja = Zalog near Verd : Stone Age hunters' camp at the western edge of the Ljubljansko barje / Andrej Gaspari ... [et al.] ; uredil, edited by Andrej Gaspari ; [prevod Andreja Maver ; risbe Miran Erič ... et al.]. - El. knjiga. - Ljubljana : Inštitut za arheologijo ZRC SAZU = Institute of archaeology at ZRC SAZU : Založba ZRC = ZRC Publishing, 2013. - (Opera Instituti archaeologici Sloveniae ; 11)

Vzpor. slov. besedilo in prevod v angl.

ISBN 978-961-254-517-8 (pdf)

<https://doi.org/10.3986/9789612545178>

1. Vzp. stv. nasl. 2. Gaspari, Andrej 3. Gaspari, Andrej
269357824



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Tabor kamenodobnih lovcev
na zahodnem robu Ljubljanskega barja

ZALOG NEAR VERD

Stone Age hunters' camp at the western edge
of the Ljubljansko barje

Andrej Gaspari
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Vesna Malez
Marija Štefančič
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LJUBLJANA 2006

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PREDGOVOR

Organizirane podvodne raziskave barjanskega dela reke Ljubljanice s pritoki, ki z večjo ali manjšo intenzivnostjo potekajo že četrto stoletja, so pokazale, da gre za nesporno enega najzanimivejših arheoloških kompleksov pri nas. Najdbe iz rečnih strug in bregov pričajo o bližnjih naselbinah, grobiščih, utrdbah, nadzornih točkah ali kulturnih mestih ter skupaj s plovili in drugimi sledovi izrabe vodnega prostora v marsičem dopolnjujejo poznavanje fenomena Ljubljanskega barja kot kulturne krajine in njegove specifične dinamike, ki se od starejših obdobjev prazgodovine naprej tesno prepleta z naravnimi spremembami okolja.

Do odkritja ostankov tabora kamenodobnih lovcev in nabiralcev pri Verdu ni prišlo po naključju. Zaradi posebnega statusa Ljubije je bil investitorju rekonstrukcije mostu na Verdu v okviru kulturno varstvenih pogojev predpisan tudi podvodni pregled odseka, ogroženega s spremembami v sedimentaciji, ki nastopijo po gradnji tovrstnih objektov. Radiokarbonske datacije in opredelitev gradiva iz plasti v brežini potoka kažejo, da gre za ostanke lovsko-nabiralniške skupnosti iz obdobja zgodnjega holocena, ki je pri nas zastopano z majhnim številom znanih najdišč. Že med prvimi posegi so postali očitni velik obseg ter bogata vsebina kulturnega horizonta s številnimi predmeti iz kamna, kosti in rogovine, ki postavljajo lokacijo ob bok referenčnim najdiščem v širšem merilu. Pomen enega najzanimivejših arheoloških odkritij zadnjega časa pri nas je še povečala najdba ženske lobanje, ki predstavlja enega najstarejših zanesljivo datiranih skeletnih ostankov človeka v Sloveniji.

Terenska dela so opravili arheologi potapljači, združeni v ekspertni Skupini za podvodno arheologijo Zavoda za varstvo kulturne dediščine Slovenije, ki je zadolžena za evidentiranje in oceno potenciala podvodnih najdišč ter zaščitne raziskave pred različnimi infrastrukturnimi posegi v vodni prostor. Izvedba tega dela raziskav ne bi bila mogoča brez potapljačev Anžeta in Gašperja Koširja, Mateja Vidriha, Anžeta Kreča in Mateja Mihailovskega ter študentov

arheologije Ivana Marije Hrovatina in Mateja Drakslerja. Prostorsko dokumentiranje najdišča je vodil mag. Sašo Poglajen, geodetsko opremo pa sta prispevala Inštitut za dediščino Sredozemlja ZRS UP ter podjetje HarphaSea, d.o.o. iz Kopra. Vsem hvala.

Zahvaljujem se avtorjem prispevkov dr. Metki Culiberg, Janezu Dirjecu, dr. Marijanu Govediču, dr. Zdravki Hincak, dr. Aleksandru Horvatu, dr. Francu Janžekoviču, Borisu Kavurju, dr. Vesni Malez, dr. Mariji Štefančič, dr. Borutu Toškani in mag. Tomažu Verbiču. Z diskusijo in nasveti je k boljšim besedilom pripomogel dr. Ivan Turk, za dragocena pojasnila pa se zahvaljujem Andreju Bidovcu.

Risbe so delo Borisa Kavurja, Dragice Knific Lunder in Ide Murgelj. Velik del pričujočih fotografij s terena je posnel Arne Hodalič, avtor fotografij gradiva pa je Robi Erjavec. Daniel Skočaj in mag. Matjaž Jogan s Fakultete za računalništvo sta omogočila tridimenzionalni posnetek lobanje, njeno vizualizacijo pa sta izvršila Marko Grzetič in Alenka Fink. Zahteven prevod v angleščino je opravila Andreja Maver.

Posebno zahvalo namenjam Janezu Kromarju in Borisu Vičiču z Zavoda za varstvo kulturne dediščine Slovenije, ki sta podprla poseg in zagotovila potrebna sredstva.

Uresničitev vsega zadanega ne bi bila mogoča brez mojega dolgoletnega prijatelja mag. Mirana Eriča, ki je opravil pomemben delež zahtevnega terenskega dela, zaslužen pa je tudi za računalniško obdelavo večjega dela grafične opreme v publikaciji. Mojo udeležbo pri raziskavi ostankov tabora je omogočil podoktorski projekt na Inštitutu za dediščino Sredozemlja Znanstveno-raziskovalnega središča v Kopru, ki ga je financiralo Ministrstvo za šolstvo, znanost in šport (Z6-6381). Menim, da odkritje najdišča v Ljubiji in objava rezultatov raziskav opravičujejo vložen trud in sredstva.

Andrej Gaspari

Ljubljana, september 2005

PREFACE

The Ljubljanica River with its tributaries has witnessed no less than a quarter of a century of organised underwater research, conducted in a more or less intense manner. The latter has shown that the archaeological complex there unquestionably ranks among the most interesting ones in Slovenia with the finds from the beds and banks of the waterways speaking of nearby settlements, cemeteries, forts, control points or places of cult. These, together with various types of river vessels and other traces of water exploitation, improve in many ways the knowledge of the phenomenon that is the Ljubljansko barje as a cultural landscape as well as its specific dynamics closely related to the natural changes in the environment from the early periods of the prehistory onwards.

The discovery of the remains of the Stone Age hunter-gatherers' camp at Verd was not accidental. It occurred during the reconstruction of a bridge at Verd, when the special status of the Ljubija Stream imposed on the investor, as part of the conditions of cultural protection, to enable an underwater survey of the section endangered by the changes in sedimentation that occur during this sort of construction work. Radiocarbon dates and identification of the material from the layers in the stream bank then revealed the site to be the remains of a hunter-gatherer community from the Early Holocene, represented in Slovenia by few other sites. Initial interventions on the site clearly showed its large extent as well as a rich cultural horizon with numerous stone, bone and antler objects that make the site comparable to reference sites on a wider scale. The importance of one of the most interesting archaeological discoveries of recent years is further underlined by the find of a female skull, which represents one of the oldest securely dated human skeletal remains in Slovenia.

The field work has been conducted by archaeologists - divers, gathered within the group of experts in the Group for underwater archaeology of the Institute for the Protection of Cultural Heritage of Slovenia. The group's task is to register and assess the potential

of underwater sites and rescue research prior to various infrastructural interventions in the water environment. The work could not have been conducted without the aid of divers Anže and Gašper Košir, Matej Vidrih, Anže Kreč and Matej Mihailovski as well as students of archaeology Ivan Marija Hrovatin and Matej Draksler. Spatial documentation of the site was conducted by mag. Sašo Poglajen, while the geodetic equipment was provided by the Institute for Mediterranean Heritage of the Science and Research Centre of Koper, University of Primorska, and the HarphaSea, d.o.o. company. Sincere thanks to all.

I would also like to thank the authors of the texts in this publication dr. Metka Culiberg, Janez Dirjec, dr. Marijan Govedič, dr. Zdravka Hincak, dr. Aleksander Horvat, dr. Franc Janžekovič, Boris Kavur, dr. Vesna Malez, dr. Marija Štefančič, dr. Borut Toškan and mag. Tomaž Verbič. I would also like to thank dr. Ivan Turk, who helped me to improve the text with discussion and advice, and also Andrej Bidovec for his precious explanations.

Drawings were made by Boris Kavur, Dragica Knific Lunder and Ida Murgelj. A large part of field photos included into the publication was taken by Arne Hodalič, while the finds were photographed by Robi Erjavec. Daniel Skočaj and mag. Matjaž Jogan from the Faculty of Computer and Information Science enabled a three-dimensional image of the skull while its visualization was made by Marko Grzetič and Alenka Fink. Andreja Maver had the demanding task of translating the texts into English.

I would like to express special thanks to Janez Kromar and Boris Vičič from the Institute for the Protection of Cultural Heritage of Slovenia who offered support for the intervention and provided the resources needed.

The realisation of all that was set out to be done could not have been possible without my long-time friend mag. Miran Erič who conducted an important part of the demanding field work, while he is also to be credited with the computer graphics presented in the publication.

My participation in the research of the camp remains was made possible by the postdoctoral project at the Institute for Mediterranean Heritage of the Science and Research Centre of Koper, financed by the Ministry for Educations, Science and Sports (Z6-6381). Having said that, I am of the opinion that the

discovery of the site in the Ljubija as well as the current publication of the results all go to justify the work and means invested.

Andrej Gaspari

Ljubljana, september 2005

1

PODVODNE ARHEOLOŠKE RAZISKAVE STRUGE LJUBIJE V ZALOGU PRI VERDU ODKRITJE, METODOLOGIJA RAZISKAV IN GEOMORFOLOŠKE ZNAČILNOSTI NAJDIŠČA

UNDERWATER RESEARCH IN THE BED OF THE LJUBIJA STREAM AT ZALOG NEAR VERD DISCOVERY, RESEARCH METHODOLOGY AND GEOMORPHOLOGIC CHARACTERISTICS OF THE SITE

Andrej GASPARI in Miran ERIČ

Izvleček

V prispevku so predstavljene podvodne arheološke raziskave mezolitskega najdišča v strugi potoka Ljubija na zahodnem robu Ljubljanskega barja. Najdbe vključujejo kamnite artefakte, rogovinaste sekire, koščena orodja in osti projektilov, človeško lobanjo, kosti živali ter ostanke lesenih in kamnitih struktur, ki sodijo na podlagi radiokarbonskih datumov v 9. tisočletje pred sedanjostjo.

Ključne besede: Slovenija, Ljubljansko barje, mezolitik, lovski tabor, podvodna arheologija, geomorfologija, rečne oblike, stratigrafija, ¹⁴C datumi

Abstract

The article presents the underwater archaeological research of the Mesolithic site in the bed of the Ljubija Stream at the western edge of the Ljubljansko barje. The finds include stone artefacts, antler axes, bone tools and projectiles, a human cranium, animal bones and remains of wooden and stone structures, which were attributed to the 9th millennium BP on the basis of radiocarbon dates.

Key words: Slovenia, the Ljubljansko barje, Mesolithic, hunters' camp, underwater archaeology, geomorphology, fluvial forms, stratigraphy, ¹⁴C dates

1 UVOD

Pri arheološkem nadzoru struge potoka Ljubija na Verdu sta bili poleti 2004 odkriti, dokumentirani in delno raziskani dve najdišči iz kamene in bronaste dobe. Najdišče iz kamene dobe, ki leži na skrajno severnem delu meandra ob ledini Zalog nedaleč od zaselka Podgora,¹ označujejo številni kamniti artefakti, rogovinaste sekire, koščena orodja in osti projektilov ter skeletni ostanke živali, za katere je bilo ugotovljeno, da izvirajo iz obsežne plasti v profilu desne brežine. Posebno pozornost je vzbudila najdba razmeroma dobro ohranjene človeške lobanje, ki je pospešila odločitev, da se hkrati z izdelavo prostorske in fotografske dokumentacije najdišča izvede površinska kolekcija premičnih najdb ter izvrši vzorčenje za potrebe naravoslovnih analiz. V prid dviga arheološkega gradiva je govorilo tudi dejstvo, da je na večjem delu predmetov iz kosti

¹ V katalogu najdb in terenski dokumentaciji se za kameno-dobno najdišče uporablja delovno poimenovanje Zalog II, za najdišče iz bronaste dobe pa Zalog I.

1 INTRODUCTION

Archaeological surveillance of the work in the bed of the Ljubija at Verd, in the summer of 2004, yielded two sites from the Stone Age and the Bronze period, respectively, that were documented and partially researched. The Stone Age site is situated at the northernmost part of the meander at the Zalog fallow, not far from the Podgora hamlet,¹ and is indicated by the numerous stone artefacts, antler axes, bone tools and projectiles as well as animal bone remains. All these objects were established as originating from an extensive layer in the profile of the right bank of the Ljubija. A particularly exciting find, however, was that of a relatively well preserved human skull. This accelerated the decision to conduct, in addition to the spatial and photo documentation of the site, also a surface collection of small finds and sampling for subsequent sci-

¹ The catalogue and the field documentation use the working name Zalog II for the Stone Age site and Zalog I for the Bronze Age site.

in rogovine opaziti poškodbe, ki jih najverjetneje povzroča korozivno delovanje vode. Poleg tega leži del predmetov v plitvini, ki je izpostavljena znatnemu nihanju vodne gladine, s tem pa škodljivi izmenični legi med vodo in zrakom.

Mlajše najdišče, ki ga okvirno pripisujemo mlajši fazi srednje bronaste dobe ali starejšemu delu pozne bronaste dobe (15.-11. stoletje pr. n. št.), leži na območju reguliranega zavoja v zahodnem delu meandra. Gradivo obsega fragmente keramičnih posod in manjše število kamnitih orodij, ki najverjetneje izvirajo iz še neugotovljenih naselbinskih plasti ali grobišča na kopnem.

Za arheološki poseg, ki se je vršil med 12. 07. in 31. 09. 2004, sta bila izdana kulturno varstveno soglasje ZVKDS OE Ljubljana (št. 416/91-BV) in Odločba Ministrstva za kulturo (št. 61701-61/2004-2). V devetnajstih delovnih dneh je sedemčlanska ekipa pregledala nekaj nad 700 metrov struge Ljubije med prvim zavojem nad cestnim mostom na Verdu in zaključkom okljuka okoli ledine Zalog. Od tega je tri dni trajalo rekognosciranje celotnega odseka ter dokumentiranje novoveške mostne konstrukcije čez Ljubijo, trije dnevi so bili potrebni za intenzivni pregled najdišča z brona-stodobno keramiko v dolžini 100 m, v dvanajstih dneh pa je bila izvedena zaščitna raziskava 130 m dolgega območja z mezolitskimi ostanki. Na terenu je bilo opravljenih skupno 550 delovnih ur, od tega 110 pod vodo. Kljub razmeroma hitremu toku so bili pogoji za delo dobri, saj je Ljubija poleti zelo bistra reka s temperaturo okoli 12 stopinj Celzija.

1.1 Metodologija terenskih raziskav

Glede na rezultate rekognosciranja, razmeroma majhno površino obeh najdišč ter izpostavljenost predmetov smo se odločili za dokumentiranje morfologije podvodnega in nadvodnega dela struge, ugotovitev značilnosti sedimentacije ter izvedbo intenzivnega pregleda s kolekcijo površinskih najdb. Pri podvodnih delih je ekipa uporabljala standardno potapljaško opremo, dopolnjeno s statičnimi vrvmi in prižemami, ki so omogočale lažje premikanje po toku navzgor in boljši nadzor nad pregledanim območjem.

Kot osnovo za prostorsko dokumentiranje smo uporabili digitalni model reliefa podvodnega in nadvodnega dela struge ter dela brežine. V ta namen smo

entific analyses. Speaking in favour of collecting the archaeological material was also the fact that most of the bone and horn objects showed signs of damage most probably caused by corrosion and increasing water pollution. Furthermore, part of the objects lies in shallow water exposed to a considerable fluctuation in the water level and thereby to the harmful shifts from a water to a dry environment.

The site of a later date, roughly ascribed to the later phase of the Middle Bronze Age or the earlier part of the Late Bronze Age Urnfield Culture (15th-11th century BC), is situated in the area of the regulated bend in the western part of the Ljubija meander at Zalog. The material includes fragments of clay vessels and a small number of stone artefacts that most probably originate from as yet unidentified settlement layers or a dry-land cemetery.

The archaeological intervention took place between 12th July and 31st September, 2004, acting upon the cultural protection agreement of the Institute for the Protection of Cultural Heritage of Slovenia, Regional Office Ljubljana (no. 416/91-BV) and the authorisation of the Ministry of Culture (no. 61701-61/2004-2). A team of seven members surveyed, in the nineteen working days, a little over 700 m of the Ljubija bed between the first bend above the road bridge at Verd and the end of the meander around the Zalog fallow. Three of the working days were spent for the reconnaissance of the entire section as well as documentation of the modern bridge construction across the Ljubija, three days to conduct an intensive survey of the site of the Bronze Age pottery in the length of 100 m and twelve days to conduct a rescue survey of the 130 m long area with Mesolithic remains. Altogether 550 working hours were spent for field work, 110 of which under water. Despite the relatively strong current, the working conditions were very good, since the Ljubija is very clear in summer with a temperature of around 12 degrees Celsius.

1.1 Methodology of field research

The results of reconnaissance as well as the relatively small surface of both sites and the exposed objects all led to a decision to document the morphology of the part of the bed under and above water, to establish the characteristics of sedimentation and to conduct an intensive survey during which surface finds would be collected. For the needs of underwater research the team used the standard diving gear as well as static rope and jumars that enabled easier movement up the stream and a better overview of the surveyed area.

The digital elevation model of the bed under and above water as well as of the bank was used for spatial documentation. For this purpose, over 2000 points in

posneli preko 2000 točk v mreži 0,5 x 0,5 m, na mejah morfoloških enot pa še gosteje.

Izvedba intenzivnega pregleda je zahtevala tudi odstranitev vodne vegetacije na ožjem območju najdišča. Pri določitvi zbiralnih območij smo se omejili na osrednji del struge oziroma predele z izpostavljeno glineno podlago, izpuščene pa so bile sipine, zamuljeni brežini ter z debli in odpadki zapolnjen tolmun v spodnjem delu najdišča. Razen odvzema vzorcev in človeške lobanje ter površinskega čiščenja brežine za potrebe dokumentiranja stratifikacije nismo posegali v plasti z arheološkimi ostanki.

Tehnika preiskovanja dna je bila omejena na vizualni pregled in ročno pobiranje najdb, s katerim smo zajeli večino predmetov, večjih od 1 cm. Uporaba vodne sesalke, s katero smo preizkusno pregledali tri kotanje (*sl. 1.9*: N 120-122) in večjo sipino (*sl. 1.9*: N 119), je opozorila na precej številčnejši pojav odbitkov in delcev kosti najmanjših velikosti, kot ga je bilo mogoče zaznati z ročnim zbiranjem. Na koncu odvodne cevi nameščena žična mreža oz. sito z milimetrsko prepustnostjo, ki omogoča učinkovito sejanje odstranjenega sedimenta in njegovo pregledovanje na kopnem, se je izkazala kot ključen kos opreme, ki bo v nadaljevanju raziskav zagotovil vpogled v celoten velikostni razpon in zastopanost najdb.

Zaradi izrazitega koncentriranja najdb ter večjih praznih območij s posamičnimi predmeti smo zbiralne enote prilagodili oblikovanosti dna, pri čemer gre večinoma za plitve kotanje do 1 m² velikosti. Potapljač je na mestu posamične najdbe ali v sredini koncentracije zapičil v dno plastično tablico z zaporedno številko točke, dal predmete v vrečko in jih opremil z identifikacijskimi listki, ki jih je imel nanizane na žici.

Najdbe so bile prostorsko dokumentirane s totalno postajo in pripadajočo prizmo na podaljšanem nosilcu, na enak način pa so bili izmerjeni tudi ostanki lesenih struktur, potek plasti z najdbami, mesta vzorčevanja z jedrniki, oslonilne točke za fotografsko dokumentiranje ter točke za izdelavo digitalnega modela reliefa. Stojišča so bila umeščena v prostor oziroma državni koordinatni sistem z GPS napravo visoke natančnosti.

Celoten odsek arheološko zanimivega profila desne brežine smo opremili z 28 pari oslonilnih točk v razmiku 2 m in posneli z digitalnim in analognim fotoaparatom, detajli poglobitve z ostanki struktur pa so bili narisani tudi klasično. Pomembnejše najdbe so bile fotografsko dokumentirane *in situ*.

Na mezolitskemu najdišču smo za potrebe dendrokronoloških in ¹⁴C analiz odvzeli vzorce šestih debel. Dva metra visok stolpec spodnjega dela stratigrafske sekvence, namenjen sedimentološkim in pedološkim ter paleobotaničnim raziskavam, je bil pridobljen s pomočjo 50 x 10 x 10 cm velikih škatel iz nerjaveče pločevine. Stolpec je zajel arheološko najzanimivejši

a 0.5 x 0.5 m grid were taken, on the edges of morphological units even more.

In order to conduct the intensive survey, the water vegetation in the area of the Stone Age site had to be removed. The collection areas were determined within the limits of the central part of the bed or the parts with an exposed clayey base, while the dunes, the silted banks and the pool at the lower end of the site, filled with tree trunks and refuse, were left out. The layers with archaeological remains were left untouched except for the samples and the skull that were taken as well as the surface cleaning of the banks, done so as to document the stratification.

The investigation of the stream bottom was limited to visual surveying and hand-collection of the finds whereby most objects larger than 1 cm were collected. However, the use of a water dredge during test surveillance of three basins (*Fig. 1.9*: N 120-122) and a large dune (*Fig. 1.9*: N 119) drew our attention to a much higher number of flakes and bone fragments of minute sizes impossible to detect by hand-collection. In that respect, a 1 mm mesh was placed at the end of the hose, which enabled effective sieving of the removed sediment and its subsequent examination on land and proved to be a key piece of equipment that would, in further research, ensure an insight into the entire size span as well as the finds represented.

The intense concentrations of finds as well as large "empty" areas with few finds led us to adapt the collection units to the form of the stream bottom, composed mostly of shallow basins of up to 1 m² in size. During collection, the diver placed a plastic tag with the sequential number on the spot of an individual find or in the centre of a concentration, put the objects in bags and tagged them with identification cards that he had threaded on a wire.

The finds were spatially documented using the total station with the prism on an extended pole. The remains of wooden structures, the course of the layer with finds, the points of core sampling, the reference points for photo-documentation as well as points for the subsequent digital elevation model were all measured using the same method. The standing points were spatially situated in the state system of coordinates with a high-precision GPS instrument.

The entire section of the archaeologically interesting profile of the right bank was marked with 28 pairs of reference points placed in a 2 m interval and recorded with digital and analogue cameras, while the details of the deeper part of the palaeochannel with the remains of structures were drawn also manually. Finds of greater importance were photographed *in situ*. In order to conduct dendrochronological ¹⁴C analyses, six tree trunks were sampled, while for the subsequent sedimentological, pedological and palaeobotanic analyses, a two-metre high column of the lower part of

del profila med 288 in 488 cm (286,21-288,21 m nm. v.) pod površjem okoliške ravnine (Culiberg, v tem zborniku; Verbič, v tem zborniku).

the stratigraphic sequence was obtained with the aid of 50 x 10 x 10 cm large boxes of rust-resistant sheet metal. The column included the archaeologically most interesting part of the profile between 288 and 488 cm (286.21-288.21 m above sea level) underneath the surface of the surrounding plain (Culiberg, in this publication; Verbič, in this publication).

2 LJUBLJANSKO BARJE

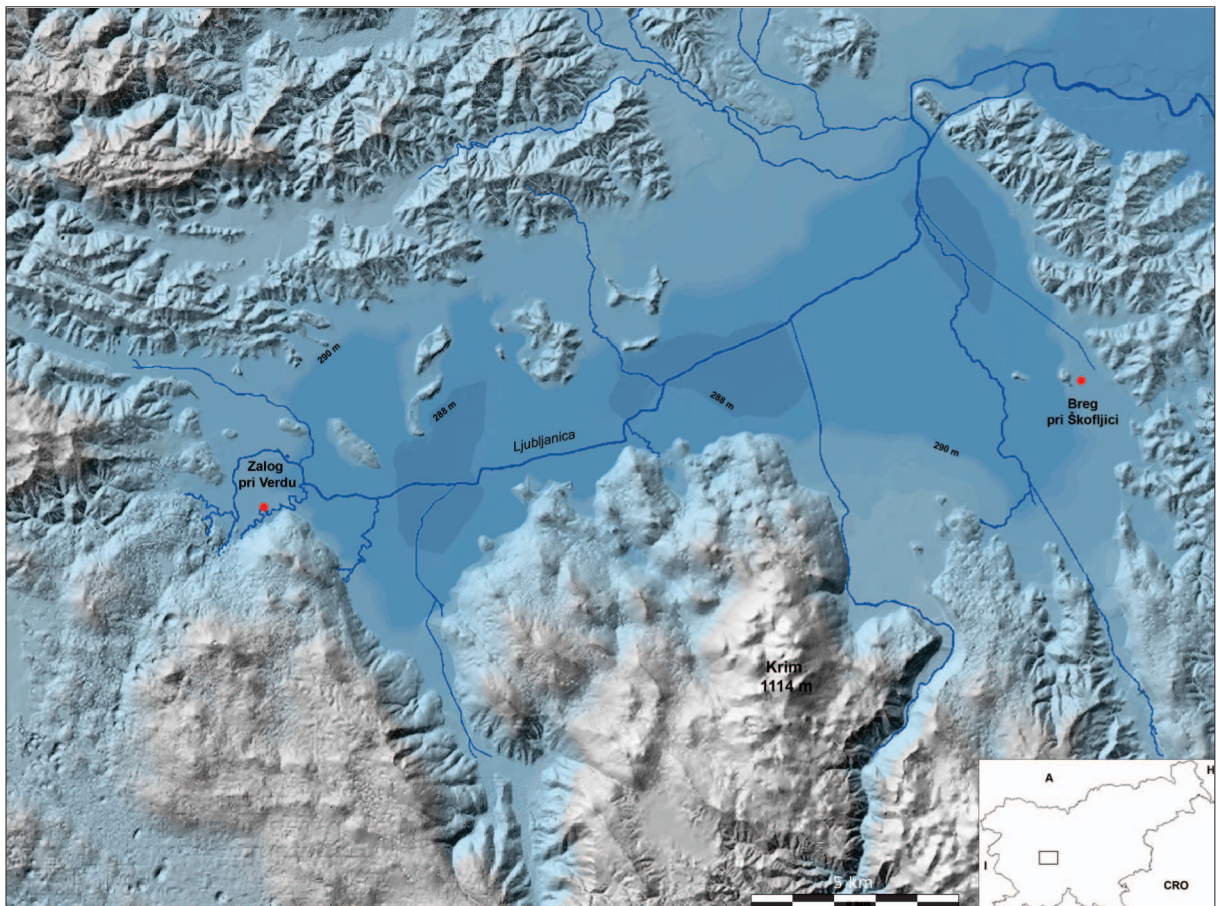
Ljubljansko barje je samostojna, okoli 20 km dolga in 10 km široka tektonska depresija z naplavljenim dnom v skrajnem južnem delu Ljubljanske kotline (*sl. 1.1*). Leži na stiku treh različnih geografskih regij, vzhodnoalpskega predgorja, Dolenjskega krasa in visokih dinarskih planot ter predstavlja osrednji del izrazito prehodnega ozemlja med severnim Sredozemljem in

2 THE LJUBLJANSKO BARJE

The Ljubljansko barje (Ljubljana Moor) is an independent, roughly 20 km long and 10 km wide tectonic depression with an alluvial floor, situated in the southernmost part of the Ljubljana basin (*Fig. 1.1*). It lies on the meeting point of three different geographical regions: the eastern Alpine foothills, the karst region of Dolenjska and the high plateaus of the Dinaric Alps. It represents the central part of a highly transitory territory between the northern Mediterranean and the Danube basin. Its north-eastern part is connected to the Ljubljana polje with three river valleys, while on the other three sides it is surrounded by hills that, in the Krim massive at the south-western edge, rise over 1000 m above sea level. The central part of the floodplain, spreading fairly evenly on 287-290 m above sea level, is studded with isolated hills and traversed by

Sl. 1.1: Ljubljansko barje (izvedba: Miran Erič).

Fig. 1.1: The Ljubljansko barje (production: Miran Erič).



Podonavjem. V severovzhodnem delu je Ljubljansko barje s tremi dolinskimi vrzeli povezano z Ljubljanskim poljem, na ostalih straneh pa ga obrobja gričevnat in hribovit svet, ki se v masivu Krima na jugozahodnem obrobju vzpne prek 1000 m nm. v. Po osrednjem delu poplavne ravnine z dokaj enotno nadmorsko višino 287-290 m, iz katere se dvigajo posamezni osamelji griči, teče kraška reka Ljubljanka, ki zbira vode iz izvira obsežnega kraškega zaledja (1850 km²).

Ljubljansko barje je nastalo v okviru zadnje faze ugrezanja širšega območja ljubljanskega prostora, ki se je začela na prehodu iz pliocena v pleistocen. Vrtnice in geofizikalne meritve so pokazale, da je dno tektonske udorine sestavljeno iz različno globoko pogreznjenih blokov in globeli, ki jih prepredajo dinarsko (SZ-JV) in mediteransko (SV-JZ) usmerjeni prelomi (Mencej 1990). Velika debelina pleistocenskih sedimentov, ki na vzhodnem delu kotanje presega 170 m, nakazuje intenzivno pogrezanje, medtem ko o istočasnem dvigovanju obrobja pričajo starejše terase na različnih višinah barskega zaledja ter globoke doline, ki so jih vanj vrezali potoki iz krimsko-mokrškega in Polhograjskega hribovja (Rakovec 1955).

Ob pogrezanju barskega dna ali dvigovanju obrobja so vode s prodom zasipavale ravnino, v času mirovanja pa so se odlagale finejše peščene in glinene plasti, ki vsebujejo do dva metra debele temnejše vložke z visokim odstotkom organskega detrita. Pelodne analize so pokazale, da se je barjansko dno v mlajšem pleistocenu ugrezalo hitreje kot v srednjem pleistocenu (Šerclj 1966).

Sodeč po analizah prodnikov je bila v srednjem in mlajšem pleistocenu hidrografska mreža podobna današnji. Debelejše plasti proda kažejo na intenzivnejše pogrezanje v hladnih obdobjih, medtem ko so tanjši vložki lahko tudi posledica vremenskih motenj. Največ prodnih naplavin so prinašali potoki iz južnega in severozahodnega obrobja, medtem ko je v nasipavanju Ljubljanskega polja in tudi severnega dela Barja prevladovala Sava. Predhodnica Ljubljance je kot kraška reka nanašala glinene sedimente, bogate s kalcijevim karbonatom, prav tako predhodnika njenih pritokov Ljubije in Bistre (Pohar 1978).

Iz pelodnih analiz izhaja, da so se plasti gline z različno vsebnostjo kalcijevega karbonata (gline, karbonatne gline in jezerska kreda) usedale v toplih obdobjih pleistocena in v holocenu, medtem ko vložki gyttje in detrita kažejo na zamočvirjenja po umiku jezera ali občasno suha tla. Do občasnih ojezeritev je prihajalo zaradi nasipanja Save, ki je s prodom iz alpskih moren večkrat zajezila odtok vode z Barja (Šerclj 1963, 379). Na podobne sedimentacijske pogoje, kot so vladali v obdobju nastanka sive jezerske krede (polžarice), ki se je začela odlagati ob otoplitvah v končnih fazah pleistocena, opozarjata še dve plasti visoko karbonatne gline na globini med 22 in 23 m

the Ljubljanka River that gathers waters from a wide karst hinterland (1850 km²).

The Ljubljansko barje was formed during the last phase of sinking of the wider Ljubljana area that began roughly in the transition period between the Pliocene and the Pleistocene. Drill holes and geophysical measurements revealed the floor of the tectonic depression to be composed of blocks, sunk to various depths, and hollows traversed by rifts in the Dinaric (NW-SE) and the Mediterranean (NE-SW) directions (Mencej 1990). The considerable depth of the Pleistocene sediments, exceeding 170 m in the eastern part of the basin, indicates intensive sinking. Simultaneously, however, the basin's outskirts were rising as attested to by the old terraces on various heights of the Ljubljansko barje hinterland as well as deep valleys cut into it by the streams flowing in from Krim and Mokrec and surrounding hills to the south and the Polhov Gradec Hills to the north (Rakovec 1955).

Concurrently with the sinking of the moor's floor or the rising of its outskirts, the waterways were filling up the plain with gravel, while during the period of stagnation they deposited finer grained sandy and clayey layers that include up to two metres thick dark insertions with a high percentage of organic detritus. Pollen analyses showed that the floor sunk faster during the Late than during the Middle Pleistocene (Šerclj 1966). According to the pebble analysis, the hydrographic system of the Middle and Late Pleistocene greatly resembled the present one. The thick layers of gravel indicate a more intensive sinking in the cold periods, while the thinner insertions could also be the consequence of weather disturbances (Pohar 1978). Most gravel alluvia were brought by the streams from the southern and north-western outskirts, while the alluviation of the Ljubljansko polje as well as the northern part of the Ljubljansko barje was mostly caused by the Sava. The predecessor of the Ljubljanka brought in, as a karstic river, clayey sediments rich in calcium carbonate, similarly to the predecessors of its tributaries, the Ljubija and the Bistra Streams (Pohar 1978).

Pollen analyses show that the layers of clay with varying contents of calcium carbonate (clays, carbonate clays and lacustrine chalk) sunk to the floor during the warm periods of the Pleistocene and during the Holocene. Insertions of gyttja and organic detritus indicate either moor formation after the lake withdrew or the occasionally dry soil. The occasional lake formation was caused by the activity of the Sava that brought in gravel from the Alpine moraines and barred the outflow of water from the moor on several occasions (Šerclj 1963, 379). Similar conditions of sedimentation as those in the period of formation of the lacustrine chalk (*polžarica*), that began to be deposited with the first warmer spells in the final phases

in med 55 in 57 m v vrtini BV-2 pri Črni vasi (Pohar 1978, 181).

Zaradi neenakomernega pogrezanja podlage se prehod med pleistocenskimi in holocenskimi sedimenti na različnih delih barja ne nahaja v isti globlini. Primerjava absolutnih višin erodirane površine gline iz poznega glaciala v Zalogu (ca. 286,38 m) z mejo med pleistocenskimi in holocenskimi sedimenti na območju jarka Hočevarica (ca. 286,10 m) pokaže minimalno razliko, medtem ko je bila v osrednjih delih barja ta meja ugotovljena precej globlje. V vrtini (BV-1) med Notranjimi Goricami in Podpečjo tako leži na okoli 13 m (Pohar, Culiberg, Pavlovec 2002, 199-200), pri Črni vasi (BV-2) pa med 15 in 11 m pod današnjo površino (ib., 196-197).

Sivi jezerski kredi sledijo v osrednjih delih barja apneno blato in različne plasti šotnih mahov, ki so v 19. stoletju ponekod presegali 5 m debeline, medtem ko na obrobju in ob strugah vodotokov prehaja neposredno v sekvenco peščenih in glinastih sedimentov. Dinamika zgodnje- in srednje holocenskih akumulacijskih in erozijskih procesov v poplavni ravnini, ki se poleg klimatskih nihanj povezuje tudi z antropogenimi dejavniki, je bila dokumentirana le v redkih sedimentoloških in pelodnih analizah zadostne ločljivosti, usmerjenih predvsem na vzhodni del Ljubljanskega barja. Stratigrafija sedimentov v sondi pri Babni Gorici priča o fazi ojezeritve (6700 ± 50 PS), ki ji je sledila kratkotrajna osušitev tal. Ponovno poplavljen teren (6290 ± 50 PS) je prekrilo zaporedje peščenih plasti iz časa med 6200 in 5900 PS, interpretirano kot pokazatelj sprememb v hidrografski mreži (Mlekuž 2001, 44, sl. 3).

O zgodnji prisotnosti človeka na biotsko raznovrstnem območju Ljubljanskega barja, ki je pred modernimi osuševalnimi deli veljalo za najjužnejše visoko barje v Evropi, pričata rogovje severnega jelena s sledovi vrezov, najdeno v barju severno oziroma vzhodno od Vrhnike (Horvat 1990, 70, sl. 14), ter musterskega (*moustérien*) strgala (?) z griča Hruševca pri Vrhniki (Snoj 1987). Več kot 20 planih najdišč kame- ne industrije, ki so jih odkrili med sistematični terenski pregledi v sedemdesetih in osemdesetih letih prejšnjega stoletja, se koncentrirajo na vznožjih barjanskih osamelcev in obrobju, medtem ko so bili v holocenskih depozitih v osrednjih delih poplavne ravnine doslej ugotovljeni le ostanki koliščarskih naselbin iz časa med poznim neolitikom in zgodnjo bronasto dobo ter posamične najdbe iz mlajših obdobij (Josipovič 1985; Frelj 1987; Mlekuž 2001). Najstarejše zanesljivo datirano najdišče na Ljubljanskem barju je Breg pri Škofljici, kjer so izkopavanja v letih 1996 in 1997 potrdila obstoj poselitvene faze iz obdobja prebore- ala, kamor sodita nad jezerskimi usedlinami ležeča naplavina s kamnitimi artefakti in na njej postavljena ploščad iz časa okoli 9180 ± 50 PS (Mlekuž 2001, 47).

of the Pleistocene, are indicated also by two layers of clay with a high carbonate content at the depths between 22 and 23 and between 55 and 57 m in the BV-2 drill hole at Črna vas (Pohar 1978, 181).

The uneven sinking caused the boundary between the Pleistocene and Holocene sediments at various parts of the Ljubljansko barje to appear at different depths. The comparison between the absolute heights of the eroded surface of the Late Glacial clay at Zalog (ca. 286.38 m) and the Pleistocene-Holocene boundary at the Hočevarica ditch area (ca. 286.10 m) shows only a minor difference, while in the central parts of the Ljubljansko barje this boundary lies considerably deeper. The BV-1 drill hole between Podpeč and Notranje Gorice, for example, revealed it to be at the depth of 13 m (Pohar, Culiberg, Pavlovec 2002, 199-200), while the drill hole near Črna vas (BV-2) revealed it to be between 15 in 11 m under the present surface (ib., 196-197).

The layers of grey lacustrine chalk are succeeded by lime mud (gyttja) and various layers of peat moss in the central parts of the Ljubljansko barje, while on the outskirts and along the beds of the waterways it is succeeded directly by sandy and clayey sediments. The dynamics of the Early and Middle Holocene processes of accumulation and erosion on the floodplain, tied to climatic shifts as well as anthropogenic factors (burning), was documented only by rare sedimentological and pollen analyses of a sufficient definition. The stratigraphy of the sediments in the trial trench at Babna Gorica, on the eastern part of the Ljubljansko barje, testifies of the phase of lake formation (6700 ± 50 BP), followed by a short period of dry soil. The re-flooded terrain (6290 ± 50 BP) was covered by a succession of clayey layers dating from 6200 and 5900 BP, interpreted as an indicator of change in the hydrographic system (Mlekuž 2001, 44, Fig. 3).

The early presence of man on a biologically varied area of the Ljubljansko barje, that was considered the southernmost bog in Europe prior to modern irrigation, is attested to by the individual finds of reindeer antler with cut marks, found at the Ljubljansko barje north or east of Vrhnika (Horvat 1990, 70, Fig. 14), and a Moustérien scraper (?) from the Hruševca hill near Vrhnika (Snoj 1987). Numerous plane sites with stone industries, discovered during the systematic field surveys in the 1970s and 1980s, are concentrated on the foothills of the isolated hills and on the outskirts of the Ljubljansko barje (Josipovič 1985; Frelj 1987; Mlekuž 2001), while the Holocene deposits in the central parts of the floodplain so far revealed only the remains of pile-dwellings from the period between the Late Neolithic and the Early Bronze Age as well as individual finds from later periods. The earliest dated site at the Ljubljansko barje is Breg near Škofljica, where the excavations in 1996 and 1997 confirmed

Že med sondiranji leta 1984 je bil na istem najdišču ugotovljen tudi kastelnovjenski horizont z ognjiščem, manjšimi deponijami kosti in rogovja ter bogatim zbirrom kamnitih in koščenih artefaktov (Frelih 1986).

3 LOKACIJA IN GEOMORFOLOŠKE ZNAČILNOSTI NAJDIŠČA ZALOG PRI VERDU

Novo odkrito najdišče Zalog pri Verdu, ki ga lahko glede na radiokarbonske datacije uvrstimo v zgodnji boreal, leži že onkraj zahodnega roba ravnine Ljubljanskega barja oz. območja šotnih tal, s katerimi je bil definiran obseg zadnje holocenske ojezeritve (*sl.1.2;1.3*). Horizont s kulturno vsebino, ki je delno

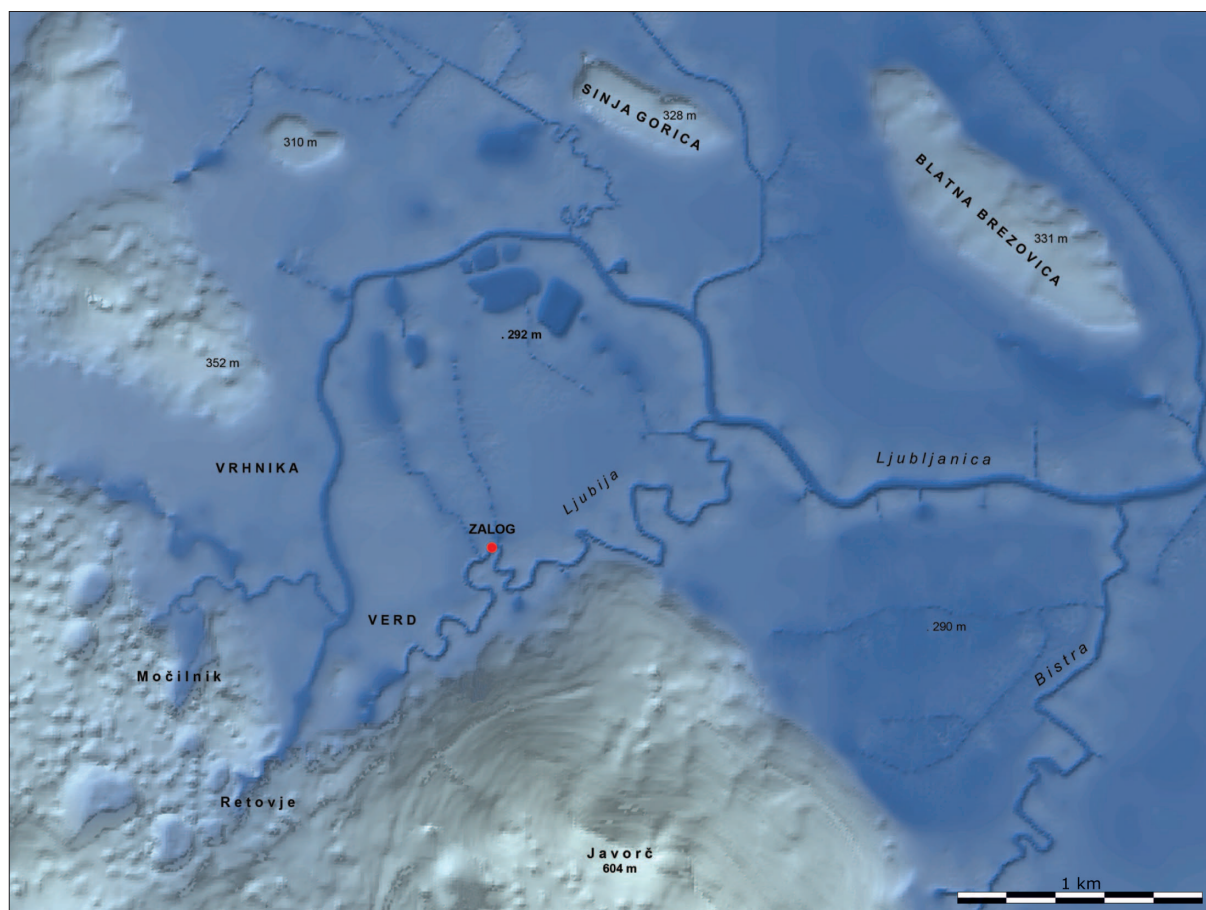
Sl. 1.2: Zahodni del Ljubljanskega barja (izvedba: Miran Erič).

Fig. 1.2: The western part of the Ljubljansko barje (production: Miran Erič).

the existence of a settlement phase from the Pre-boreal period, represented by an alluvial layer with stone artefacts lying above the lacustrine chalk and a stone platform from the period around 9180±50 BP (Mlekuž 2001, 47). But it was already the excavations in 1984 that revealed a Late Mesolithic horizon with a hearth, small refuse pits of bone and antler as well as stone and bone tools (Frelih 1986).

3 LOCATION AND GEOMORPHOLOGIC CHARACTERISTICS OF THE SITE

The newly discovered site at Zalog near Verd, dated into the Early Boreal period according to the radiocarbon dates, lies beyond the western edge of the Ljubljansko barje plain or the area of the peaty soil, with which the extent of the last Holocene lake formation was defined. The horizon with cultural content, partially uncovered in the bank of the Ljubija, the first right tributary of the Ljubljanica, is situated underneath 4 m thick sandy alluvia and roughly 300 m from the karstic outskirts of the Lower Jurassic limestones and Triassic dolomites. This rises to 604 m above sea level directly above the site with a steep forest-covered slope of Javorč. The less watery plain between the





Sl. 1.3: Pogled na širše območje najdišča iz vzhoda. Februar 2005 (foto: Arne Hodalič).

Fig. 1.3: Aerial view of a wider area of the site. February 2005 (photo: Arne Hodalič).

razkrit v brežini potoka Ljubije, prvega desnega pritoka Ljubljanice, se nahaja pod 4 m debelimi peščenimi naplavinami in je okoli 300 m oddaljen od zakraselega obrobja iz spodnjajurskih apnencev in triasnih dolomitov. To se neposredno nad najdiščem s strmim gozdnatim pobočjem Javorča vzpne na nadmorsko višino 604 m nm. v. Suhotnejšo ravnico med Ljubijo in Ljubljani (293,0-291,5 m nm. v.), ki leži izven dosega poplav (Melik 1946, 133, karta 5), tvorijo nanosi obeh vodotokov, ki pritekata na dan v več stalnih in občasnih izviri med Močilnikom in Verdom (Habič 1996; Gams 2004, 356-360, sl. 323).

Vrtine in geofizikalne meritve so pokazale, da leži skalna podlaga na območju med Vrhniko, Sinjo Gorico in Verdom na globini med 22 in 40 m oziroma 270 in 250 m nm. v. (Ravnik 1975, sl. 1,2; Mencej 1990, 526, 527, sl. 2). V pleistocenu je bil ta del udorine zasut z obsežnim vršajem iz prodra, peska in melja, medtem ko vrhnji del sekvence sestavljajo izmenjujoče plasti sivo ali svetlo rjavo obarvane peščene gline in peščenega melja ter modrikasto sivega peska (Kramer 1905, 35-42). Debelina pleistocenskih in holocenskih sedimentov nad prodnim zasipom se povečuje od 5 m v vrtini ob Ljubljani na Verdu, mimo Ljubije pri Pritiski (20 m) do 36 m ob njenem izlivu v Ljubljani

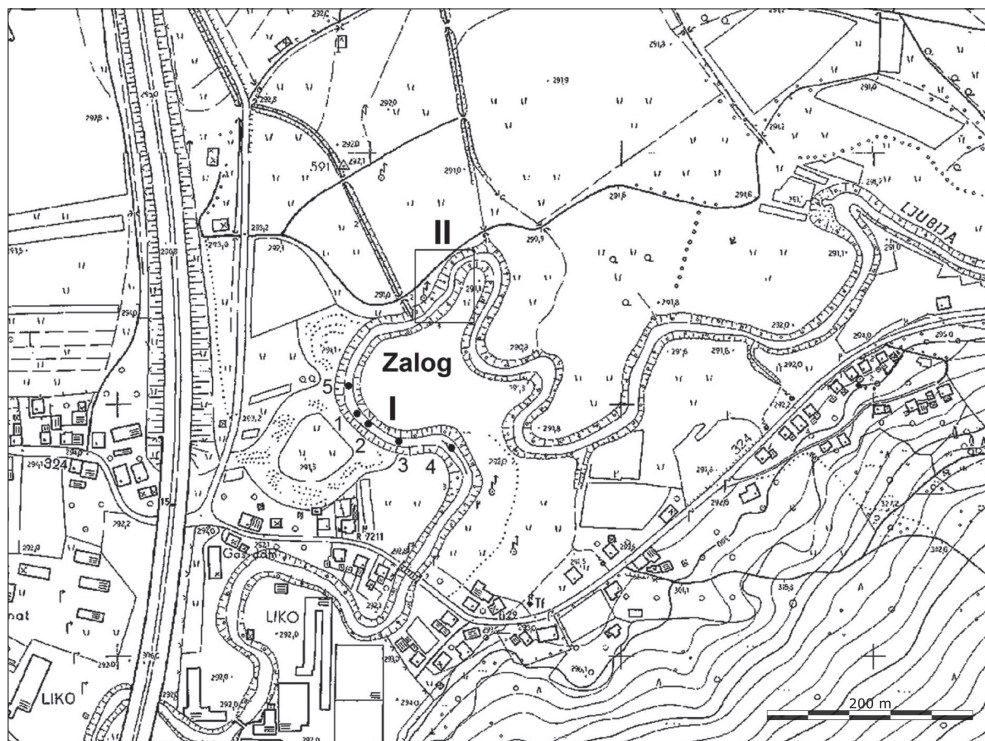
and the Ljubljanica (293.0-291.5 m above sea level) lies outside the flood's reach (Melik 1946, 133, Map 5) and consists of alluvia of both waterways that spring up in several permanent or intermittent springs between Močilnik and Verd (Habič 1996; Gams 2004, 356-360, Fig. 323).

Drill holes and geophysical measurements have shown that, in the area between Vrhnika, Sinja Gorica and Verd, the bedrock lies at the depth between 22 and 40 m or 270 and 250 m above sea level (Ravnik 1975, Fig. 1,2; Mencej 1990, 526, 527, Fig. 2). During the Pleistocene, this part of the depression was filled with an extensive fan of gravel, sand and silt, while the top part of the sequence is composed of alternating layers of grey or light brown coloured sandy clay and sandy silt as well as bluish-grey sand (Kramer 1905, 35-42). The thickness of the Pleistocene and Holocene sediments above the gravel pack increases from 5 m at the drill hole near the Ljubljanica at Verd, past the Ljubija at Pritiska (20 m), to 36 m at the outflow of the Ljubija into the Ljubljanica (Mencej 1990, 526,527, Fig. 1). The layers of peat moss and gyttja, formed at the gradual moor formation in the basin during the Holocene, were only established on the plain (288.0-290.8 m above sea level) east of the outflow of the



Sl. 1.4: Zahodni del Ljubljanskega barja pri Verdu na Jožefinskem vojaškem zemljevidu (a); območje najdišča na Franciscejskem katastru (b) (objavljeno z dovoljenjem Arhiva RS).

Fig. 1.4: The western part of the Ljubljansko barje near Verd on a military map drawn during the reign of Joseph II (a); the area of the site on the cadastre made during the reign of Francis I (b) (published with the permission of the Archives of the Republic of Slovenia).



Sl. 1.5: Položaj kamenodobnega (II) in bronastodobnega najdišča (I) na Temeljnem topografskem načrtu (a) in Digitalnem ortofoto načrtu (b). S številkami so označena območja keramičnih najdb, s puščicami pa poteki nekdanjih strug (objavljeno z dovoljenjem Geodetske uprave RS. Vir: temeljni topografski načrt merila 1 : 5000, © Geodetska uprava RS, 1981-1987; Ortofoto, © Geodetska uprava RS, 2005).

Fig. 1.5: The locations of the Mesolithic (I) and the Bronze Age (II) sites on the basic topographic map (a) and on the digital orthophoto plan. The arrows indicate the former channels (published with the permission of the Surveying and Mapping Authority of the Republic of Slovenia. Source: Basic Topographic map 1 : 5000, © Surveying and Mapping Authority of the Republic of Slovenia, 1981-1987; Orthophoto, © Surveying and Mapping Authority of the Republic of Slovenia, 2005).

(Mencej 1990, 526, 527, sl. 1). Plasti holocenskih šotnih mahov in gytte so bile ugotovljene šele v ravnini vzhodno od izliva Ljubije in osamelca Sinja Gorica (288,0-290,8 m nm. v.; Melik 1946, karta 3; Lovrenčak 1984, 40).

Struga Ljubije je na celotnem, nekaj nad 4 km dolgem poteku v osi mediteransko usmerjenega preloma (Mencej 1990, sl. 2), vrezana v glinaste in peščene sedimente, posebej globoko dol vodno od stalnega izvira pod viaduktom avtoceste. Povprečna širina korita, ki prehaja v obrežno ravnino brez izrazitega nasipa, znaša med 15 in 25 m, na zavojih pa do 30 m. Skupna globina korita, merjeno od površine obrežne ravnine (290-291 m nm. v.), niha med 5 in 8 m (283-286 m nm. v.).

Zaradi poteka v kohezivnih sedimentih in relativno majhnega strmca označujejo Ljubijo številni meandri, saj je njena struga, za razliko od nekaterih drugih pritokov Ljubljanice, ki so jih v 19. stoletju zajeli regulacijski posegi (Melik 1946, 136-158; Habič 1996, 64-66), bolj ali manj v naravnem stanju. Meandri se začnejo pojavljati že po sotočju vod iz Gradarjevega brezna in Smukovega izvira, še posebej pa so izraziti dol vodno od okoli 400 m oddaljenega stalnega izvira Ljubije, ki leži na nadmorski višini 290,60 m nm. v.

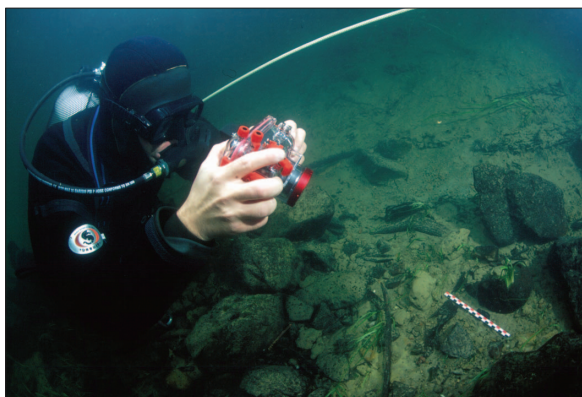
Ker Ljubija prenaša le malo talnega materiala, erodira vodni tok s sedimentom v suspenziji večinoma dno korita, erozija bregov pa je majhna. Relativno stabilnost struge povečujejo še korenine drevev in grmovja, s katerim sta skoraj na celotnem poteku obrasla oba bregova. Analiza posnetkov iz zraka in parcelnih mej iz prve polovice 19. stoletja nas vseeno opozarja na določene spremembe v poteku struge, ki jih brez dodatnih raziskav ni mogoče natančneje kronološko opredeliti. Izjemo predstavlja regulacija velikega okljuka okoli ledine Zalog ob gradnji avtoceste Ljubljana-Postojna leta 1972, ki so ga pred tem sestavljali štirje polkrožni zavoji, upodobljeni tudi na Jožefinskem vojaškem zemljevidu in Franciscejskem katastru (sl. 1.4:1.5). Migracijam meandrov lahko si-

Ljubija and the isolated hill of Sinja Gorica (Melik 1946, Map 3; Lovrenčak 1984, 40).

The Ljubija cut its bed into clayey and sandy sediments along the entire, slightly over 4 km long course of the rift running in the Mediterranean direction (Mencej 1990, Fig. 2), with the bed particularly deep downstream of the permanent spring underneath the road viaduct. The average width of the bed, which straightens into the surrounding plain without a distinctly formed levee, measures between 15 and 25 m, in bends up to 30 m. The joint depth of the bed, measured from the surface of the surrounding plain (290-291 m above sea level), fluctuates between 5 and 8 m (283-286 m above sea level).

The Ljubija flows through cohesive sediments and down a relatively gentle gradient. It is, therefore, characterized by numerous meanders with its bed in a more or less original condition, contrary to some other tributaries of the Ljubljanica that were subjected to the 19th century regulatory interventions (Melik 1946, 136-158; Habič 1996, 64-66). The meanders begin to appear already after the confluence of the waters flowing from Gradarjevo brezno (Gradar's abyss) and Smukov izvir (Smuk's spring), and become particularly sharp downstream of the permanent spring of the Ljubija some 400 m away, lying at 290.60 m above sea level.

The Ljubija carries only a small amount of large-sized bed material. The water current, therefore, erodes mostly the bottom of the bed with the sediment in suspension, while the bank erosion is gentle. The relative stability of the bed is heightened by the roots of trees and shrubbery that cover both banks almost along the entire length. However, the analysis of aerial photos and lot boundaries from the first half of the 19th century reveal certain changes in the stream course that cannot be more precisely chronologically determined without further research. The only regulated part of the stream is the large bend around the Zalog fallow, completed during the construction of



Sl. 1.6: Odkritje človeške lobanje (foto: Arne Hodalič).
Fig. 1.6: The discovery of the human cranium (photo: Arne Hodalič).



Sl. 1.7: Podvodno delo (foto: Arne Hodalič).
Fig. 1.7: The underwater work (photo: Arne Hodalič).

cer sledimo še pri dol vodno ležečih ledinah Pijalce ter Veliki in Mali kot. Naštete ledine ležijo v plitvi depresiji na območju velikih poplav, ki sežejo v ozkem pasu prav do Zaloga, z drugim krakom pa še navzgor ob Ljubljani vse do izvirov (Šifrer 1984).

3.1 Stratigrafija in distribucija resedimentiranih predmetov

Najdbe se pojavljajo na okoli 90 m dolgem odseku struge vzdolž severozahodnega dela ledine Zalog (*sl. 1.8-1.10*). V profilu desne brežine Ljubije lahko na tem mestu sledimo obsežni plasti z artefakti, živalskimi

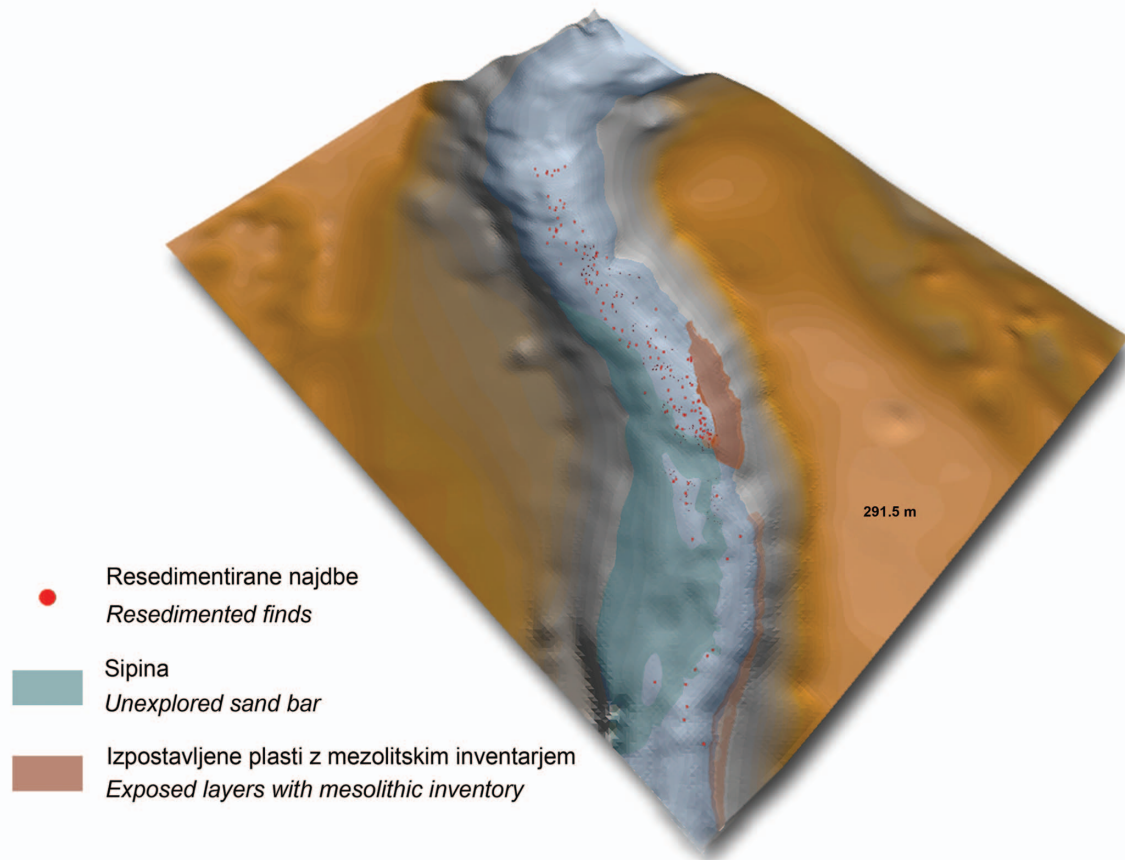
Sl. 1.8: Digitalni model reliefa struge z označenim kulturnim horizontom, položaji najdb in sipinami (izvedba: Miran Erič).

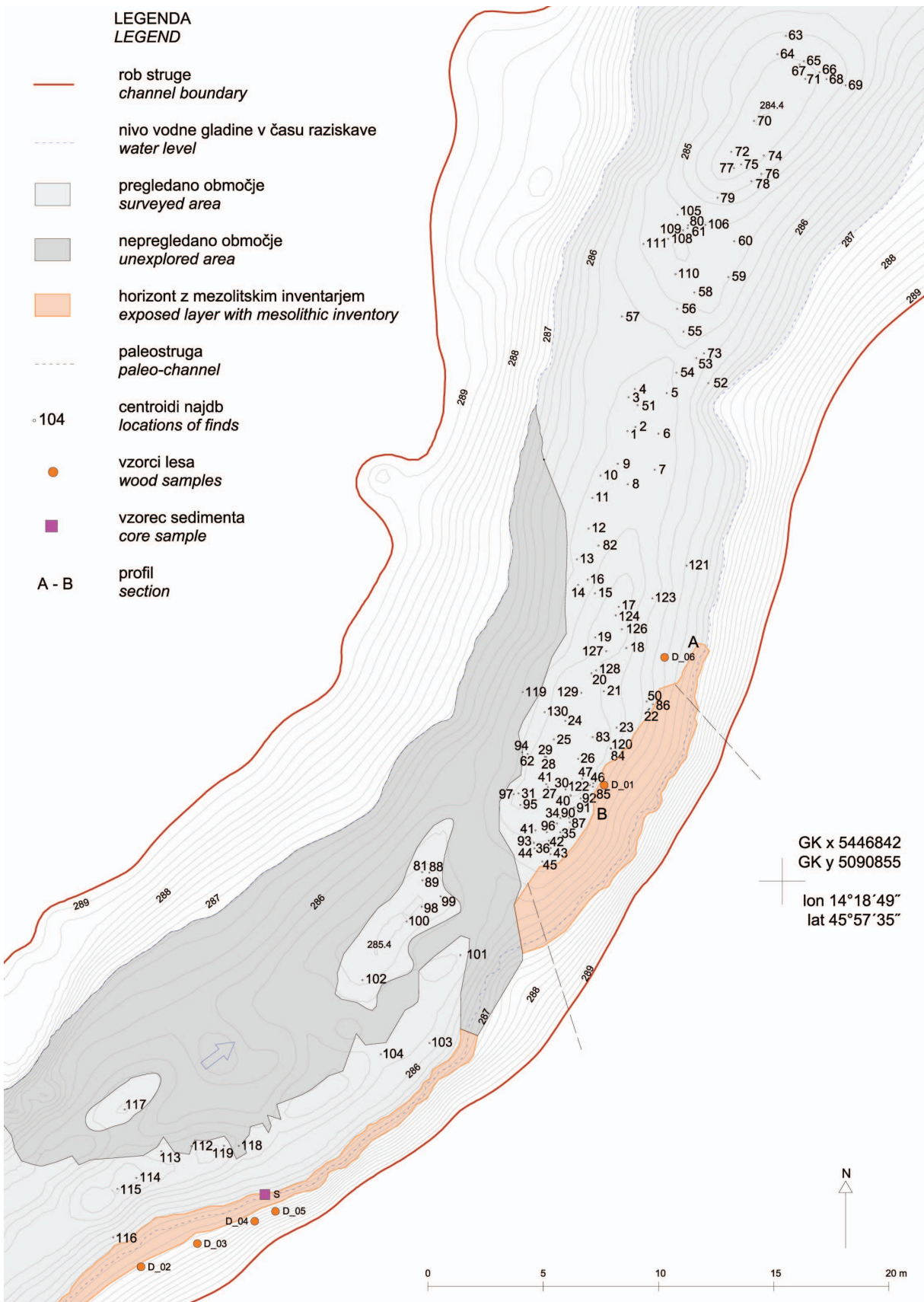
Fig. 1.8: The digital elevation model of the bed with indicated cultural horizon, locations of the finds and dunes (production: Miran Erič).

the Ljubljana - Postojna highway section in 1972. The bend had previously been made up of four semicircular bends, depicted also on the military map drawn during the reign of Joseph II and the cadastre made during the reign of Francis I (*Figs. 1.4;1.5*). Downstream from there, the shifts of the meanders can be followed at the fallows of Pijalce, Veliki kot and Mali kot, all situated in a shallow depression in the area of extensive floods that reach in a narrow strip to Zalog and, in another strip, up the Ljubljana all the way to its springs (Šifrer 1984).

3.1 Stratigraphy and distribution of the resedimented finds

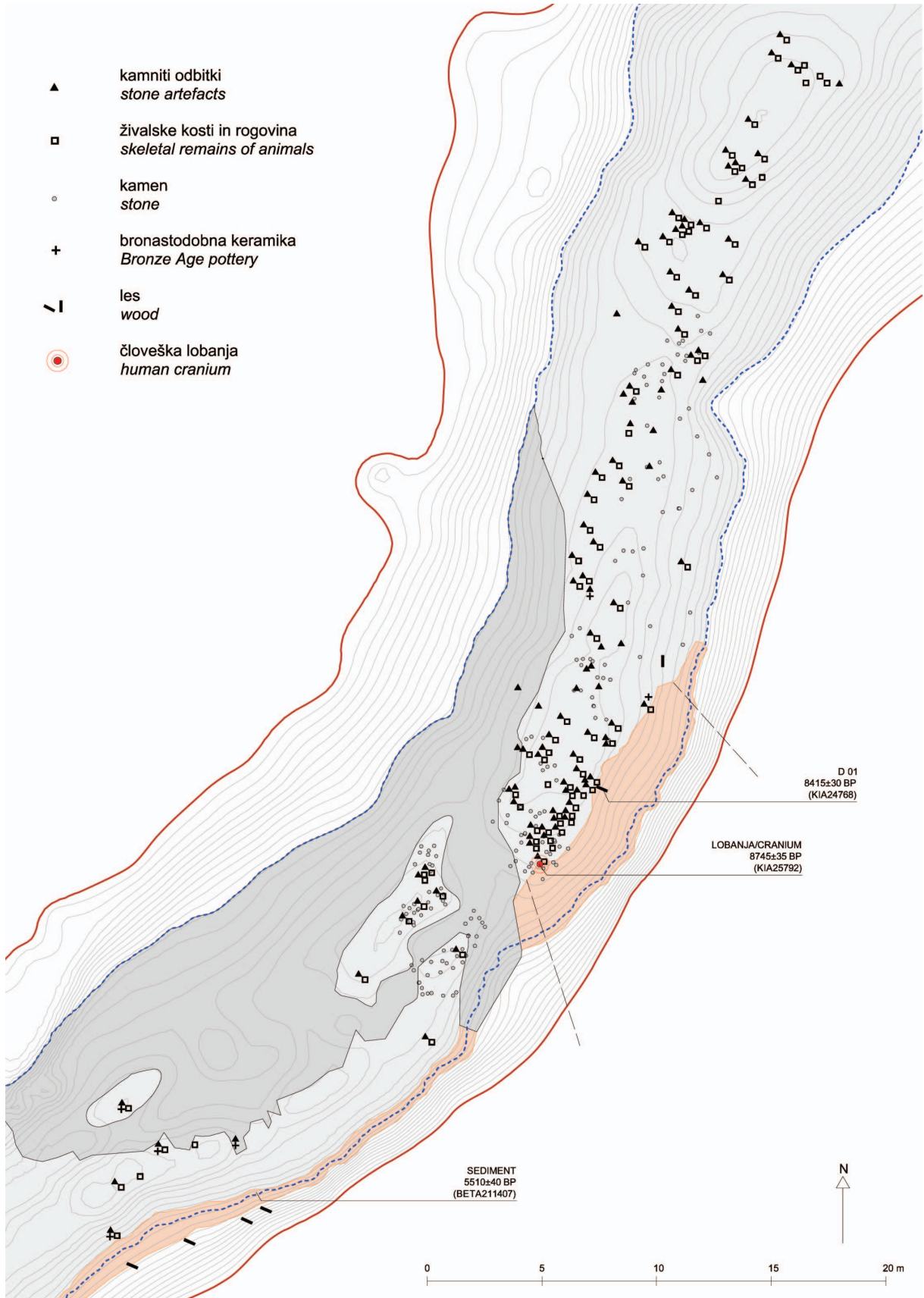
The finds appear on the approximately 90 m long section of the Ljubija bed along the north-western part of the Zalog fallow (*Figs. 1.8-1.10*). The profile on the right bank reveals an extensive layer containing artefacts, animal bones and presumably remains of structures made of wood and stone, all submerged under water for most of the year. The archaeologically interesting layer was exposed by the erosive effects of the water current which caused the right bank to be almost vertical, while the inner part of the gentle bend in the area of the site is subjected to a strong sedimentation





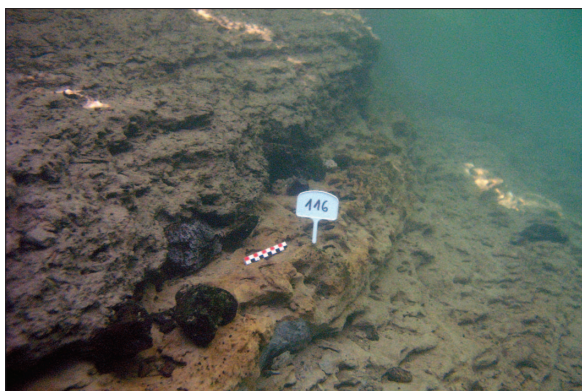
Sl. 1.9: Načrt najdišča (izvedba: Miran Erič).

Fig. 1.9: Plan of the site (production: Miran Erič).



Sl. 1.10: Distribucija najdb (izvedba: Miran Erič).

Fig. 1.10: Distribution of the finds (production: Miran Erič).



Sl. 1.11: Meja med pozno pleistocensko glineno talnino in kulturnim horizontom s kosi oolitnega apnenca, artefakti ter koščenic in rogovinastim gradivom (foto: Andrej Gaspari).

Fig. 1.11: The boundary between the Late Pleistocene clay and the cultural horizon with pieces of oolitic limestone, artefacts as well as bone and antler material (photo: Andrej Gaspari).

kostmi ter domnevnimi ostanki konstrukcij iz lesa in kamna, ki se večji del leta nahaja pod vodno gladino. Arheološko zanimivo plast je razkrilo erozijsko delovanje vodnega toka, zaradi katerega je desna brežina skoraj navpična, medtem ko je notranji del blagega zavoja na območju najdišča podvržen močni sedimentaciji in zato večinoma zasut s peščenicami nanosi in muljem.

Ljubija je talni del korita vrezala v polžarico oz. karbonatno meljasto glino svetlo sive barve, ki je po Verbiču nastajala v jezerskem okolju brez znatne rastlinske produkcije (Verbič, v tem zborniku, sl. 2.1: 488-470 cm). Plast je arheološko sterilna.

Nad polžarico leži v profilu obsežna, več kot 60 m dolga in do 95 cm debela naplavinska plast z najdbami, v kateri se izmenjujejo tanke lamine peska in peščeno glinastega melja (ib., sl. 2.1: 470-392 cm). Najdbe, ki poleg artefaktov obsegajo še manjše kamne, kosti in organski drobir, se koncentrirajo skoraj izključno v najnižjem delu plasti, tik nad površino polžarice, le posamične kosti in kosi lesa se občasno pojavljajo še nekaj decimetrov nad stikom. Stratigrafski položaj najdb je najbolje razviden na južni polovici najdišča, kjer je ob desni brežini okoli 0,5 m nad dnem korita ohranjen do 1 m širok pas polžarice, s katere je vodni tok spral sipek sediment (sl. 1.11; ib., sl. 2.3). Del najdb je bil pri tem resedimentiran v dno korita, nekaj pa jih je ležalo še bolj ali manj *in situ*.

Na večjem delu opazovanega profila je stik polžarice in rečnih sedimentov skoraj vodoraven (286,31-286,38 m nm. v.), približno na sredini najdišča pa je v podvodnem delu brežine izrazita poglobitev.

and therefore covered, for the most part, with clayey deposits and silt. The Ljubija carved its bottom into the *polžarica*, the carbonate silty clay of light grey colour, which was formed, according to Verbič, in a lacustrine environment without a substantial plant production (Verbič, in this publication, Fig. 2.1: 488-470 cm). The layer is archaeologically sterile.

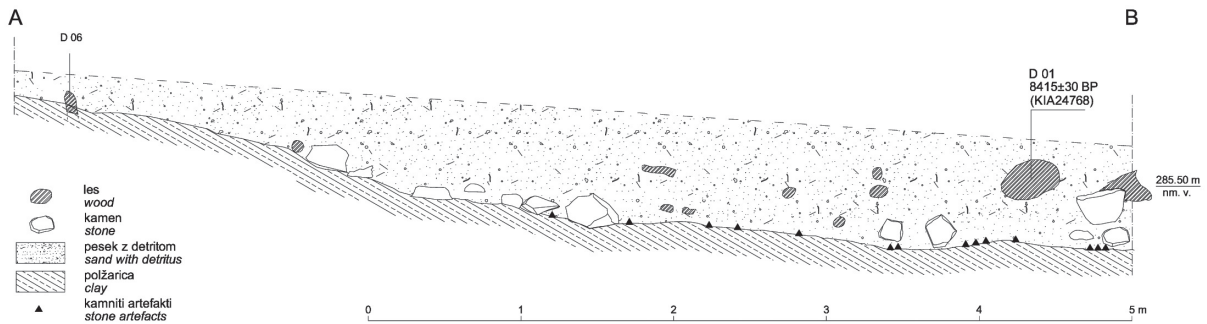
The *polžarica* is covered by an alluvial layer with Mesolithic finds. The layer appears extensive in the profile, over 60 m long and up to 95 cm thick, and exhibits successions of thin laminae of sand and sandy clayey silt (ib., Fig. 2.1: 470-392 cm). The finds, that include artefacts and also smaller stones, bones and organic detritus, are concentrated almost exclusively in the lowest part of the layer, just above the surface of the *polžarica* and only individual bones and wood fragments sporadically appear a few decimetres above the line of contact. The stratigraphic situation of the finds can best be discerned on the southern part of the site, where a strip of *polžarica* in the width of up to a metre is preserved on the right bank approximately 0.5 m above the stream bottom, from which the current washed away the sandy sediment (Fig. 1.11; ib., Fig. 2.3). The latter caused a part of the finds to be resedimented to the bottom of the bed, while some remained more or less *in situ*.

The large part of the observed profile revealed an almost horizontal contact of the *polžarica* and the river sediments (286.31-286.38 m above sea level), while the central part of the site revealed a distinct deepening. In all likelihood, this is the remains of a palaeochannel running in an approximately east-westerly direction (Figs. 1.9;1.10;1.13;1.14). The total width of the palaeochannel, cut up to 0.9 m deep into the



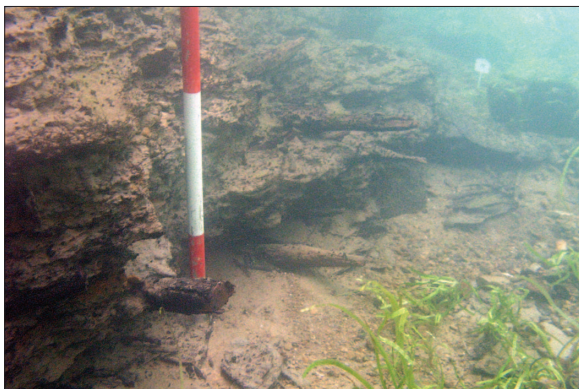
Sl. 1.12: V času raziskovalnega posega je bil nad gladino potoka izpostavljen večji del profila desne brežine na južnem delu najdišča (foto: Andrej Gaspari).

Fig. 1.12: A large part of the profile of the left bank, in the southern part of the site, was exposed above the water level of the stream during the research intervention (photo: Andrej Gaspari).



Sl. 1.13: Severni del profila paleostruge (risba: Andrej Gaspari).

Fig. 1.13: The northern part of the paleo-channel profile (drawing: Andrej Gaspari).



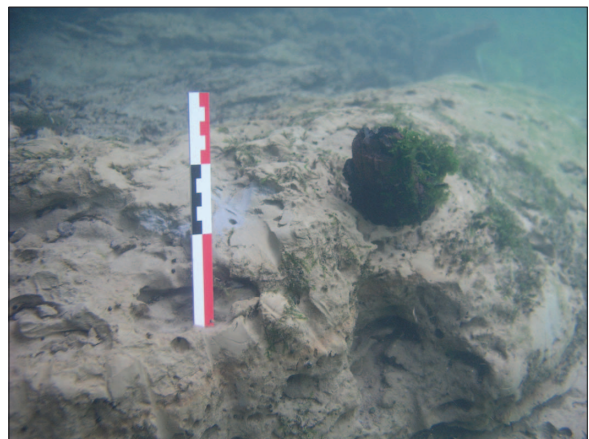
Sl. 1.14: Stranski pogled na polnilo paleostruge na južnem delu najdišča. Vidni so večji kamni, drevesne veje in debla (foto: Andrej Gaspari).

Fig. 1.14: Side view of the fill of the paleo-channel in the southern part of the site with visible large stones, tree branches and trunks (photo: Andrej Gaspari).

Najverjetneje gre za ostanek paleostruge približno v smeri vzhod - zahod (sl. 1.9;1.10;1.13;1.14). Celotna širina paleostruge, ki je vrezana do 0,9 m globoko v polžarico (dno na 285,4 m nm. v.), znaša okoli 7 m. V profilu na njenem dnu je vidnih več ostrorobnih kamnov velikostnih razredov med 20 x 20 x 10 in 60 x 30 x 30 cm ter manjših prodnikov, ki so deloma pogreznjeni v polžarico, deloma pa jih prekriva okoli 10 cm debela plast sivega peska s številnimi odbitki, kostmi in rogovino (sl. 1.18). Pesku sledijo fino plastoviti peščeni sedimenti z organskim drobirjem, iz katerih štrli več vodoravno do rahlo poševno ležečih debel in kosov lesa premera 5 do 35 cm (sl. 1.13;1.14). Proti severu, kjer se paleostruga konča, peščeno polnilo s kulturnimi ostanki in kosi lesa pa izklni, je bil v polžarici ugotovljen ostanek skoraj navpičnega kola s premerom 8 cm (sl. 1.9: D_6; 1.13: D_6;1.15). Pilot, ohranjen v dolžini 40 cm, je bil zabit s krošnjo navzdol.

polžarica (bottom at 285.4 m above sea level), measures approximately 7 m. Several sharp-edged stones of size classes between 20 x 20 x 10 and 60 x 30 x 30 cm are discernible in the profile at the bottom of the palaeochannel, as well as smaller pebbles partially sunk into the polžarica and partially covered by a 10 cm thick layer of grey sand that includes numerous flakes, bone and antler objects (Fig. 1.18). The sand is succeeded by finely layered sandy sediments with organic detritus with several tree trunks and wood fragments sticking horizontally or slightly obliquely out of it and measuring 5 to 35 cm in diameter (Figs. 1.12;1.13). The palaeochannel terminates to the north and the sandy fill with its cultural remains and wood fragments thins out. There, a fragment of a nearly vertical pile measuring 8 cm in diameter and 40 cm in length was discovered (Figs. 1.9: D_6; 1.13: D_6; 1.15), driven with its upper part into the ground.

The south-easternmost part of the palaeochannel revealed a partially preserved human skull lying surrounded by three large stones. Its calvarium was



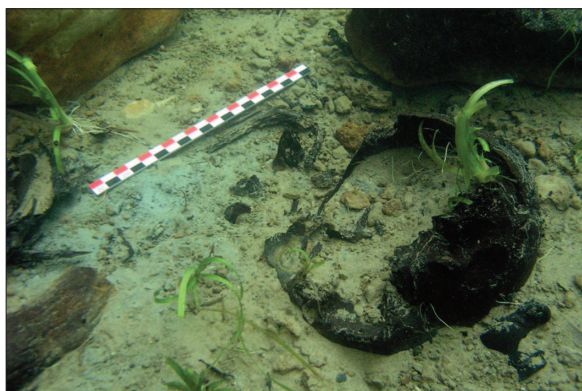
Sl. 1.15: Ostanek lesenega pilota (D_6) na južnem delu najdišča (foto: Andrej Gaspari).

Fig. 1.15: The remains of a wooden pile in the southern part of the site (photo: Andrej Gaspari).

V skrajnem jugovzhodnem delu paleostruge je med tremi velikimi kamni ležala deloma ohranjena človeška lobanja, katere svod je še v celoti tičal v peščenem sedimentu nad polžarico (sl. 1.15;1.16).

Okoli 70 cm nad polžarico štrlijo na južnem delu najdišča iz naplavinke plasti tri debelejša in eno tanjše hrastovo deblo, na katerih nismo ugotovili sledov obdelave (sl. 1.9: D_2-5; 1.12).

V sedimentih, ki ležijo nad zaporedjem peskov in peščeno glinastega melja s kamenodobnim inventarjem, ni bilo ugotovljenih nobenih arheoloških najdb. Naplavinski plasti v stratigrafskem stolpcu sledi plitev horizont pokopanih tal (ib., sl. 2.1: 365-353 cm), kar označuje prekinitev v odlaganju fluvialnih sedimentov. Ta ostanek tal je bil nato ponovno prekrit s peščenimi sedimenti sivih do rjavih odtenkov (ib., sl. 2.1: 353-324 cm). Nad njimi leži drugi horizont pokopanih tal (ib., sl. 2.1: 324-302 cm), ki mu sledijo različne plasti peskov in glin vse do današnjega površja (290,5-291,0 m nm. v.).



Sl. 1.16: Človeška lobanja in situ (foto: Andrej Gaspari).
Fig. 1.16: The human cranium in situ (photo: Andrej Gaspari).

Podobna stratigrafska situacija je bila ugotovljena tudi nad polnilom paleostruge v osrednjem delu najdišča. Nad sterilnimi, poševno odloženimi peščenimi sedimenti sive do rjave barve, ki konvergirajo v osrednjem delu poglobitve, se stratifikacija izravna in preide v pokopana tla in fluvialne sedimente.

V dnu struge na območju zahodnega dela meandra se je v polžarici oblikoval prag, ki deli najdišče na plitvejši južni in nekoliko globlji severni del. Na južnem delu je dno struge sprva razmeroma ravno in sprano, proti pragu pa se erodirana površina polžarice zmanjša. Tik pred pragom sta odložili dve večji sipini. Kljub manjši pregledani površini je mogoče reči, da med najdbami iz tega območja prevladujejo deli jelenovega rogovja in kosti, medtem ko je kamnitih odbitkov opazno manj kot v nižje ležečih delih najdišča. Koncentracija najdb se nekoliko poveča v kotanjasto razširjenem delu kanala tik pred pragom,

wedged in the sandy sediment above the *polžarica* (Figs. 1.16;1.17).

The southern part of the site revealed three thick and one thin oak tree trunk sticking out of the alluvial layer, approximately 70 cm above the *polžarica*. The trunks do not reveal tool marks (Figs. 1.9: D_2-5; 1.12).

The sediments just above the succession of sands and sandy clayey silt with the Mesolithic contents did not reveal any archaeological finds. The alluvial layer is succeeded in the stratigraphic column by a shallow horizon of buried soil (ib., Fig. 2.1: 365-353 cm) that marks a break in the deposition of fluvial sediments. These soil remains were then covered with sandy sediments of grey to brown shades (ib., Fig. 2.1: 353-324 cm). Another horizon of buried soil lies atop of it (ib., Fig. 2.1: 324-302 cm), followed by various layers of sands and clays all to the present surface (290.5-291.0 m above sea level).

A similar stratigraphic situation was established also above the fill of the palaeochannel in the central part of the site. Above the sterile, obliquely deposited sandy sediments, grey to brown in colour, that converge in the centre of the deepened part, the stratification then straightens out and is covered by the buried soil and fluvial sediments.

In the *polžarica*, on the bottom of the bed in the western part of the meander, a riffle formed, which separates the shallow southern from the somewhat deeper northern part. The stream bottom in its southern part is first relatively straight and washed out, while the eroded surface of the *polžarica* deepens towards the riffle and just before the latter two large dunes were deposited. Despite the small surface surveyed it is possible to say that the finds from this area consist predominantly of parts of deer antler and bone



Sl. 1.17: Pri odstranjevanju tanke plasti manjših kosov gline je bilo v bližini lobanje odkritih več živalskih kosti ter kamnitih jeder in odbitkov (foto: Andrej Gaspari).

Fig. 1.17: Several animal bones as well as stone cores and flakes were found during the removal of the thin layer of small pieces of clay in the vicinity of the skull (photo: Andrej Gaspari).



Sl. 1.18: Sekira iz rogovja leži na dnu sedimenta, ki zapolnjuje strugo nekdanjega vodotoka (foto: Andrej Gaspari).

Fig. 1.18: Antler axe lying in bottom part of the paleo-channel infill (foto: Andrej Gaspari).

kjer je bila najdena tudi lepo obdelana koščena konica (*sl. 1.19;6.13*). Na samem pragu je bila po celotni širini struge ugotovljena koncentracija večjih kamnov, ki jih deloma prekriva peščena sipina.

Pod pragom preide struga v kotanjasto izravnavo s plitvimi depresijami v osi omenjene paleostruge. Kamni in predmeti se na temu delu koncentrirajo po celotni širini dna. Zelo verjetno se na tem odseku plast s kulturno vsebino širi na nasprotni breg, saj so najdbe pogoste tudi na vznožju leve brežine.

Dol vodno od osi paleostruge so najdbe dokaj enakomerno zastopane po celotni površini dna, ki je najprej dokaj ravno, po 15 m pa preide v širok, do 3 m globok tolmun. V globoki kotanji ležijo številni odbitki, kosti in rogovina. Za tolmunom se struga strmo vzpne v glinen prag, za katerim Ljubija ostro zavije proti jugovzhodu. V nadaljevanju je struga polna napolavljenih debel in deloma zaraslih peščenih sipin. Na mestih z izpostavljenno glineno podlago je opaziti le posamične odbitke in kosti.

while there were less stone flakes noticed here than in the lower-lying parts of the site. The concentration of finds increases slightly in the basin-like widening of the channel just before the riffle where a finely worked bone point was found (*Figs. 1.19;6.13*). On the riffle itself, a concentration of large stones was observed along the entire width of the bed, partially covered by a sandy dune.

The bed passes, under the riffle into a basin-like straightening with shallow depressions, situated on the axis of the above-mentioned palaeochannel. Stones and finds are concentrated here along the entire width of the bottom. It is very likely that the layer with cultural contents spreads onto the opposite bank in this section, since the finds are often found also at the bottom of the left bank.

Downstream from the axis of the palaeochannel the finds are fairly evenly represented across the bottom surface, which is first fairly flat and passes, after 15 m, into a pool of up to 3 m in depth. Numerous flakes, bones and horn fragments lie in the deep basin. After the pool, the bed then rises steeply into a clayey riffle, after which the Ljubija makes a sharp turn to the southeast. The bed then continues full of floating tree trunks and partially overgrown sandy dunes. The places with an exposed sandy base reveal only individual flakes and bones.



Sl. 1.19: Koščena konica in situ (foto: Andrej Gaspari).

Sl. 1.19: Bone point in situ (foto: Andrej Gaspari).

3.2 Radiokarbonske datacije

Za določitev starosti so bili odvzeti vzorci človeške lobanje (KIA25792; *sl. 1.9*), hrastovega debla iz polnila paleostruge (KIA24768; *sl. 1.9: D_1*), lesenega pilota (OxA-15732; *sl. 1.9: D_6*) ter rastlinskega materiala iz peščenega sedimenta s kulturnim inventarjem (Beta-211407), pridobljen iz jedrnika na južnem delu najdišča (*sl. 1.9: S*). Meritve z AMS metodo so bile opravljene v Leibniz Labor für Altersbestimmung Christian-Albrechts-Universität v Kielu in Beta Analytic Inc., Miami, Florida (*Tab. 1.1*).

Tab. 1.1

| Vzorec / <i>Sample</i> | Številka vzorca / <i>Sample number</i> | Konvencionalna starost / <i>Conventional Age</i> | $\delta^{13}\text{C}$ (‰) ‡ | Kalibriran rezultat / <i>Calibrated result</i> | 2 sigma |
|--|--|--|-----------------------------|--|-----------------------|
| Hrastovo deblo / <i>Oak trunk</i> D_1 | KIA24768 | 8415 ± 30 | -26.17 ± 0.10 | 7521, 7497, 7489 cal BC | 7576 - 7353 cal BC |
| Lobanja / <i>Skull</i> Kolagen | KIA25792 | 8745 ± 35 | - 21.86 ± 0.28 | 7753 cal BC | 7957 - 7610 cal BC |
| Lobanja / <i>Skull</i> Nerasstopni ostanki kosti / <i>Insoluble bone remains</i> | | 7790 ± 80 | - 26.22 ± 0.20 | | |
| Lesen pilot / <i>Wooden pile</i> D_6 | OxA-15732 | 7964 ± 39 | - 25.5 | | 7050 - 6690 cal BC |
| Rastlinski material iz plasti s kulturnim inventarjem / <i>Plant</i> <i>material from the sediment with</i> <i>cultural inventory</i> (globina / <i>depth</i>) 452-454 cm | Beta-211407 | 5510 ± 40 | -30.7 | 4350 cal BC | 4440 - 4320 cal BC |

3.2 Radiocarbon dates

In order to obtain dates, the human skull (KIA25792; *Fig. 1.9*), one of the oak trunks from the sandy fill of the palaeochannel (KIA24768; *Fig. 1.9: D_1*), a wooden pile (OxA-15732; *Fig. 1.9: D_6*) as well as the plant material from the layer with cultural contents extracted from the core (Beta-211407; *Fig. 1.9: S*) were sampled. The measurements, using the AMS method, were conducted at the Leibniz-Laboratory for Radiometric Dating and Stable Isotope Research, Christian-Albrechts-Universität zu Kiel, and Beta Analytic Inc., Miami, Florida (*Tab. 1.1*).

3.2.1 Razlaga laboratorijskih rezultatov

Hrastovo deblo (KIA 24768; P. M. Grootes, dopis z dne 13. 12. 2004)

“Sample gave more than the 1mg of carbon recommended for a precise measurement and produced sufficient ion beam during the AMS measurement. The $\delta^{13}\text{C}$ values are in the normal range for organic material and insofar the results are reliable.”

Lobanja (KIA 25792; P. M. Grootes, dopis z dne 15. 03. 2005)

“The collagen fraction gave more than the 1 mg of carbon recommended for a precise measurement and produced sufficient ion beam. The non-soluble bone residue gave on combustion only 0.5 mg carbon but, reduced on 1 mg Fe instead of the usual 2 mg to provide a better C:Fe ratio, produced sufficient ion beam during the AMS measurement (81% of the average beam intensity of a normal 1 mg carbon sample). The $\delta^{13}\text{C}$ value of the collagen is in the normal ranges

3.2.1 Commentaries to the laboratory results

Oak trunk (KIA 24768; P. M. Grootes, letter dated December 13th, 2004)

“Sample gave more than the 1mg of carbon recommended for a precise measurement and produced sufficient ion beam during the AMS measurement. The $\delta^{13}\text{C}$ values are in the normal range for organic material and insofar the results are reliable.”

Cranium (KIA 25792; P. M. Grootes, letter dated March 15th, 2005)

“The collagen fraction gave more than the 1 mg of carbon recommended for a precise measurement and produced sufficient ion beam. The non-soluble bone residue gave on combustion only 0.5 mg carbon but, reduced on 1 mg Fe instead of the usual 2 mg to provide a better C:Fe ratio, produced sufficient ion beam during the AMS measurement (81% of the average beam intensity of a normal 1 mg carbon sample). The $\delta^{13}\text{C}$ value of the collagen is in the normal ranges

and insofar this result is reliable. The $\delta^{13}\text{C}$ value of the bone residue is more negative than usual and indicates contamination with C3 plant-derived material.

The non-soluble bone rest is significantly younger than the collagen ($\Delta:955\pm 87$ years; $\Delta:10.9$), probably caused by admixture of younger carbon into the non-soluble bone rest. This could be particulate material from surface vegetation and their rootlets and agrees with the more negative $\delta^{13}\text{C}$ value of the residue. The final cleaning of the collagen fraction by filtering as dissolved gelatin through a silver filter removes particulate contaminants $> 0.45 \mu\text{m}$ from the collagen and concentrates them in the residue. Because the amount of carbon in the non-soluble fraction is about half of that in the collagen and because the contaminants are removed from the collagen fraction and concentrated in the residue, the collagen age should still be reliable. Yet, considering the contamination, it should be interpreted with some care. The measurement places the sample, unfortunately, in a rather flat area of the calibration curve, which results in a wider range of possible calibrated ages.”

Rastlinski material iz plasti s kulturnim inventarjem (Beta-211407; Darden Wood, dopis z dne 01. 02. 2006)

“The sample of plant material provided plenty of carbon for accurate measurements.”

4 KOMENTAR

Sprememba v teksturi sedimentov, ki ji sledimo v profilu desne brežine Ljubije na območju kamenodobnega najdišča, izdaja oster prehod iz jezerskega okolja v poplavno ravnino oz. prostor z že bolj ali manj ustaljeno hidrografske mrežo. Takšno zaporedje je na barju dokaj neobičajno, saj v njem nad polžarico »manjka« plast gyttye oz. organogenih sedimentov, ki so se odlagali v fazah upadanja jezerske gladine, zamočvirjanja in razvoja barja (Tancik 1965, 62; Pohar, Culiberg, Pavlovec 2002).

Vertikalna porazdelitev najdb v profilu kaže njihovo koncentriranje v spodnjem delu plasti peščenih naplavin tik nad polžarico, kar velja tako za območje paleostruge kot severni in južni del najdišča. Pojav najdb na meji nakazuje, da je bila prvotna plast z artefakti in organskimi ostanke, ki se je odlagala v času trajanja najdišča, pozneje erodirana, težji predmeti pa so se akumulirali na dnu fluvialnega sedimenta, ki se je dokončno formiral po 5510 PS. Poleg že omenjenega Brega pri Škofljici je resedimentiranje artefaktov izpričano tudi na koliščarski naselbini Resnikov prekop, kjer je neolitska keramika ležala v plasti peščene sedimenta z organskim drobirjem, radiokarbonsko datiranega v mlajšo železno dobo. Peščen sediment je

and insofar this result is reliable. The $\delta^{13}\text{C}$ value of the bone residue is more negative than usual and indicates contamination with C3 plant-derived material.

The non-soluble bone rest is significantly younger than the collagen ($\Delta:955\pm 87$ years; $\Delta:10.9$), probably caused by admixture of younger carbon into the non-soluble bone rest. This could be particulate material from surface vegetation and their rootlets and agrees with the more negative $\delta^{13}\text{C}$ value of the residue. The final cleaning of the collagen fraction by filtering as dissolved gelatin through a silver filter removes particulate contaminants $> 0.45 \mu\text{m}$ from the collagen and concentrates them in the residue. Because the amount of carbon in the non-soluble fraction is about half of that in the collagen and because the contaminants are removed from the collagen fraction and concentrated in the residue, the collagen age should still be reliable. Yet, considering the contamination, it should be interpreted with some care. The measurement places the sample, unfortunately, in a rather flat area of the calibration curve, which results in a wider range of possible calibrated ages.”

Plant material from the layer with cultural contents (Beta-211407; Darden Wood, letter dated February 1st, 2006)

“The sample of plant material provided plenty of carbon for accurate measurements.”

4 COMMENTARY

The change in the sediment texture, that can be traced in the profile of the right bank of the Ljubija in the area of the Mesolithic site, reveals a sharp transition from a lacustrine environment into a floodplain or an area with an already more or less stable hydrographic system. Such a succession is fairly unusual at the Ljubljansko barje, since it lacks a layer of gyttya or organic sediments above the *polžarica* that were usually deposited during the phases of moor formation and development (Tancik 1965, 62; Pohar, Culiberg, Pavlovec 2002).

The vertical distribution of the finds *in situ* shows their concentration in the lower part of the layer of sandy alluvia just above the *polžarica*, observed in the area of the palaeochannel as well as in the northern and the southern parts of the site. The appearance of finds on the boundary indicates that the original layer with artefacts and organic remains, deposited during the occupation of the site, was later eroded whereby the heavy objects accumulated on the bottom of the fluvial sediment, formed after 5510 BP. Beside the above-mentioned site of Breg near Škofljica, a similar situation on the Ljubljansko barje was observed at the pile-dwelling settlement of Resnikov prekop where

ležal neposredno nad sivo karbonatno glino iz časa pred 6000 pr. n. št. (Andrič, Turk, Velušček 2004).

Pri okvirni določitvi obsega najdišča nam je v pomoč predvsem distribucija najdb v današnji strugi Ljubije, ki po toku navzdol praktično ne sežejo dlje od tolmuna, 30 m od konca dokumentirane plasti s kulturnimi ostanki. Koncentracija najdb v tolmunu z izrazito sposobnostjo zadrževanja večine frakcij materiala talnega transporta dopušča sklepanje, da gre za odplavljene predmete, ni pa izključena tudi možnost, da segajo sedimenti s kulturnimi ostanki do skrajnega severnega dela meandra, torej v bližino kotanje.

Pogled na kvantitativno zastopanost kamnitega gradiva ter živalskih kosti in rogovine izdaja enakomerno distribucijo vseh velikostnih razredov gradiva na celotnem območju najdišča. Ob upoštevanju prostorsko omejenega pojava artefaktov, večjih kamnov in živalskih kosti po toku navzdol ne more biti dvoma, da imamo opravka s transportom zelo majhne intenzivnosti. Najbolj očitno koncentriranje najdb je opazno v osi paleostruge, kjer lahko na podlagi velikega števila večjih kamnov, pilota in drugih domnevnih ostankov lesenih konstrukcij, pa tudi artefaktov in najdbe človeške lobanje sklepamo na osrednji in erozijsko najmanj prizadet del najdišča. Večje kamne moramo obravnavati kot ostanke antropogenih struktur, saj transportna moč barjanskih vodotokov niti ob večjih povodnjih ne zadošča za premikanje gradiva teh dimenzij. Distribucija najdb na temu delu najdišča hkrati izpričuje, da se plasti s kulturno vsebino najverjetneje širijo tudi na levi breg potoka.

Med gradivom iz dna struge zasledimo zanemarljivo malo najdb iz mlajših obdobj. Poleg recentnega odpada izstopa sedem odlomkov keramičnih posod, ki jih lahko prej ko ne povežemo z višje ob toku ležečim bronastodobnim najdiščem (*sl. 1.10*), ter dva kosa srednjeveških loncev. Še boljši pokazatelj časovne homogenosti najdb je sestava kostnega gradiva, med katerim izstopata le konjski sekalec in kozja petnica.

the Neolithic pottery lay in the layer of sandy sediment with organic detritus dated, with the radiocarbon method, to the Late Iron Age. The sandy sediment thus lay directly over the grey carbonate clay of 6000 cal BC (Andrič, Turk, Velušček 2004).

A rough estimate as to the extent of the site is based predominantly on the distribution of the finds in the present bed of the Ljubija that are practically not to be found further downstream from the pool, that is 30 m from the end of the documented layer with cultural remains. The concentration of finds in the pool, that retained most fractions of the material of the bottom transport, allows for the conclusion that we are dealing there with washed-away objects without excluding the possibility of the sediments with cultural remains reaching to the northernmost part of the meander, in the vicinity of the pool.

An observation of the quantitative representation of the stone material as well as animal bones and antler remains reveals an even distribution of all size classes of material across the area of the site. The spatially limited appearance of the artefacts, large stones and animal bones along the stream indicate, without a doubt, that we are dealing with a transport of poor intensity. The greatest concentration of finds can be observed in the axis of the palaeochannel. Based on the high number of large stones, piles and other supposed remains of wooden constructions as well as artefacts and the find of a human skull, that part of the site may be considered central and least afflicted by the erosion. Large stones must be seen as the remains of anthropogenic structures, since the transport power of the waterways of the Ljubljansko barje proves insufficient in moving the material of such a size even during extensive floods. At the same time, the distribution of finds on this part of the site attests to the layers with cultural contents spreading also to the left bank of the stream.

The material from the bottom of the bed includes a negligible number of finds from later periods. Beside the recent refuse material, there are seven fragments of ceramic vessels that may be tied to the Bronze Age site lying further upstream (*Fig. 1.10*) and two pot fragments that date to the Middle Ages. The chronologically otherwise homogenous character of the finds is confirmed by the composition of the bone material with only a horse's incisor and a goat's calcaneus standing out from the Mesolithic time frame.

GEOLOŠKI IN PEDOLOŠKI PREGLED SEDIMENTOV IZ JEDRNIKOV

GEOLOGICAL AND PEDOLOGICAL ANALYSIS OF SEDIMENTS FROM CORE SAMPLES

Tomaž VERBIČ

Izvleček

Prispevek obravnava litostratigrafski stolpec sedimentov iz levega boka struge Ljubije na območju kamenodobnega najdišča Zalog pri Verdu. Stik med polžarico in peščenimi sedimenti lahko interpretiramo kot enkratno, oster in jasen preskok iz jezerskega v aluvialno okolje. Ta diskordanca je najverjetneje posledica erozije sedimentov, ki so nastali na prehodu iz jezerskega v barjansko okolje in v barjanskem okolju.

Ključne besede: Slovenija, Ljubljansko barje, geologija, sedimenti, paleookolje

Abstract

The article deals with lithostratigraphic column of sediment sequence from the side of the Ljubija Stream in the area of Mesolithic site of Zalog near Verd. The contact between the *polžarica* and the sandy sediments can be interpreted as a single, sharp, and clear transition from a lacustrine to an alluvial environment. This discordance was most probably caused by erosion which might have removed the sediments formed either during the transition from the lacustrine to the boggy environment or in the boggy environment itself.

Keywords: Slovenia, Ljubljansko barje, geology, sediments, paleoenvironment

1 UVOD


Vzorci, ki so bili pregledani in so tukaj opisani, je iz boka struge Ljubije odvzel dr. A. Gaspari s pomočjo U jedrnika s stranico 10 cm (Gaspari, Erič, v tem zborniku, *sl. 1.9: S*). Odvzeti so bili štiri zaporedni jedrniki dolžine 50 cm, litostratigrafski stolpec odvzetega sedimentnega zaporedja tako obsega skupaj dva metra (*sl. 2.1; 2.2*).

Spodnji del profila pripada t.i. »jezerski kredi« oz. »polžarici« (npr. Pavlovec 1967). Zdi se, da se omenjeni avtor želi temu imenu izogniti, kot razlog pa navaja opazovanja, da je favna po teh plasteh porazdeljena zelo neenakomerno, tako po vertikalnem stratigrafskem zaporedju kot tudi glede na geografsko lokacijo. Glede na strukturo Mencej (1990) ta sediment imenuje meljasta (meljna) glina, glede na sestavo pa je pretežno karbonaten. Kljub temu menim, da je izraz *polžarica* dobro definiran in razpoznaven v geološki javnosti, zato ga bom tu uporabljal kot delovni izraz, ne glede na sicer upravičene pomisleke (Pavlovec 1967). Po podatkih Šercelja (1965) je *polžarica* nastajala v borealu, atlantiku in prvi polovici subboreala, to je v obdobju približno med 10.000 in 4.000 PS. Tedaj naj bi se jezero začelo zaraščati, nastajala je gytija in kasneje šota. Na splošno je podobno stratigrafsko zaporedje na številnih mestih ugotovil tudi Pavlovec (1967),

1 INTRODUCTION

The samples analysed and described here were taken from the side of the Ljubija Stream bed by dr. A. Gaspari, using the U core sampler with a 10 cm side (Gaspari, Erič, in this publication, *Fig. 1.9: S*). Four successive core samples in the length of 50 cm were taken. The lithostratigraphic column therefore constitutes two metres of sediment sequence in total (*Figs. 2.1; 2.2*).

The bottom part of the section is constituted by the so-called "lacustrine chalk" or "*polžarica*" (Pavlovec 1967). It seems that the cited author wishes to avoid this name. As a reason he cites his observations of fauna that is distributed very unequally through layers, in vertical stratigraphic sequence as well as geographic location. On the basis of its structure, Mencej (1990) names this sediment silty clay, predominantly carbonate in composition. In my opinion, however, the term *polžarica* is well defined and recognizable to the geologic public and I shall therefore use it here as a working term regardless of its otherwise founded reservations (Pavlovec 1967). According to the data from Šercelj (1965), *polžarica* formed during the Boreal, Atlantic, and first half of the Sub-Boreal periods, that is approximately between 10,000 and 4,000 years BP. At that time, the lake supposedly began overgrowing, the



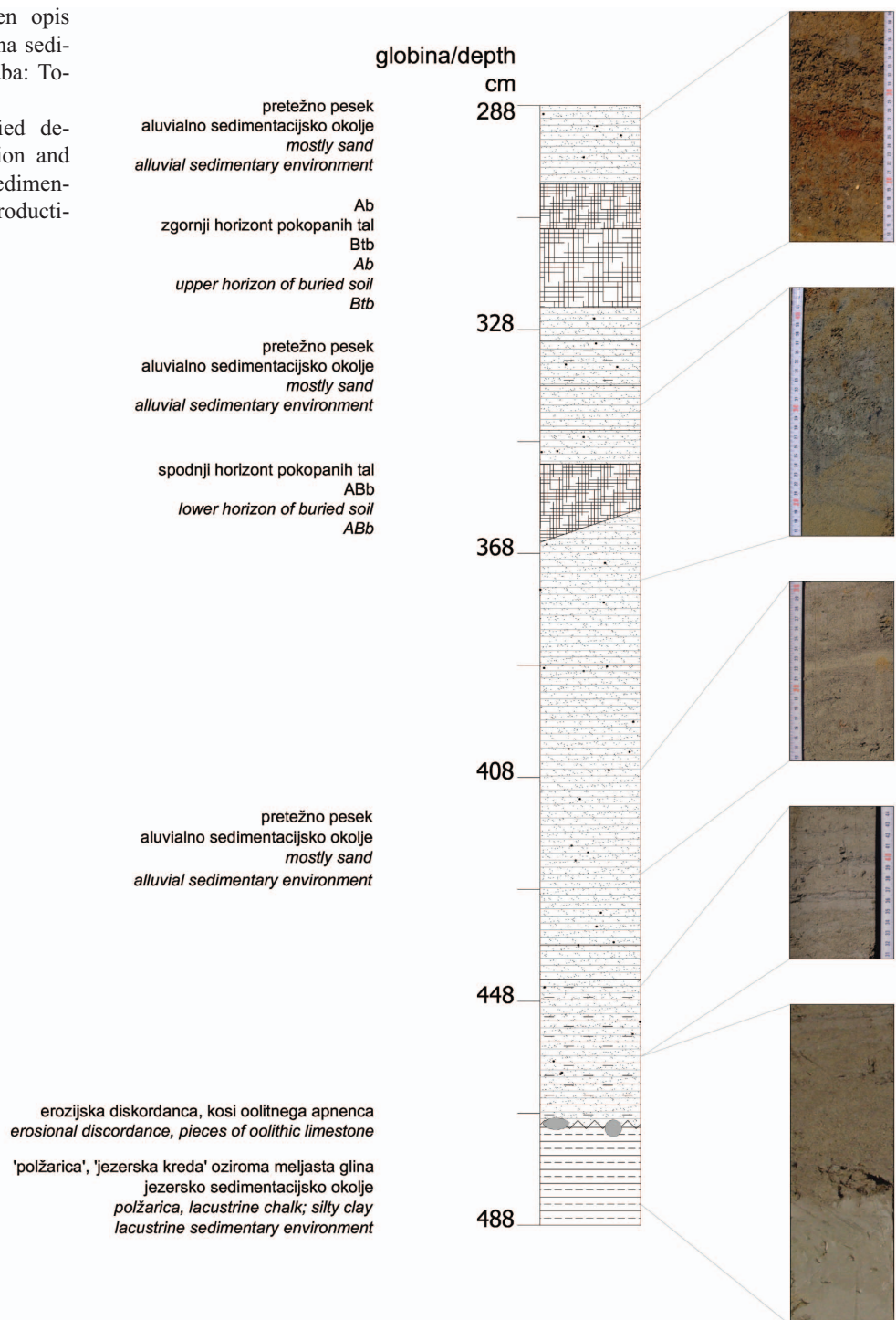
| | |
|--------------------|---|
| 302 - 288 cm | Pesek, srednjezrnat, prisotnost manjše količine glin, oksidiran, 10YR3/4. <i>Sand, medium-grained, presence of a small amount of clay, oxidized, 10YR3/4.</i> |
| | Pokopana tla: (302-316 cm) Bb horizont, meja navzdol jasna, navzgor postopna. Sekundarna pigmentacija (5YR3/4) zaradi (verjetno) akumulacije Fe hidroksidov. Zdi se, da ta nivo nakazuje (oz. je nakazoval) na nivo vode. Pigmentacija nima veze s pedogenezo pokopanih tal! - je rezultat kasnejših procesov. Zdi se, da gre tudi za povečano količino iluvialne glin, torej bi lahko horizont opredelili kot Btb. 316-324 cm Ab horizont, mrvičast, brez skeleta, 10YR3/2. Kontakt navzgor jasen, brez vidne erozije. <i>Buried soil: (302-316 cm) Bb horizon, clearly delimited downwards, upwards gradually. Secondary pigmentation (5YR3/4) due to (probable) accumulation of Fe hydroxides. It seems that the level indicates (or indicated) the water level. Pigmentation unrelated to pedogenesis of buried soil! - is the result of subsequent processes. There also seems to be an increased amount of illuvial clay, the horizon could therefore be determined as Btb. 178-186 cm (316-324 cm) Ab horizon, granulate, no fabric, 10YR3/2. Contact upwards clear, without visible erosion.</i> |
| 330 - 324 cm | Srednjezrnat pesek, opazno več karbonata kot v spodnji plasti, 10YR4/3. <i>Medium-grained sand, visibly more carbonate than in the layer below, 10YR4/3.</i> |
| 338 - 330 cm | Nekoliko bolj čist in bolj debelozrnat pesek, skoraj brez karbonata (?), primerljiv kot vrhnja plast (302-288 cm). <i>Slightly cleaner and more coarse-grained sand, almost without carbonate (?), comparable to the top layer (302-288 cm).</i> |
| 346 - 338 cm | Pesek, srednje-debelozrnat, nekoliko zaglinjen, brez karbonata (?) ali je le ta v sledovih - makroskopsko izgleda kot kremenov pesek, oksidiran. <i>Sand, medium to coarse-grained, slightly clayey, no carbonate (?) or only in traces - macroscopically it appears as flint sand, oxidized.</i> |
| 353 - 346 cm | Pesek, srednjezrnat, podoben kot na odseku 96-123(128) cm, predvsem (?) karbonaten. Zgornja meja ne izgleda ostra, zdi pa se, da je razlika navzgor v mineralni sestavi (količina karbonata). <i>Sand, medium-grained, similar as in the section 96-123(128) cm, mostly (?) carbonate. Upper limit does not appear sharp though it seems that the difference upwards is in the mineral composition (the amount of carbonate).</i> |
| 365 (360) - 353 cm | Pokopana tla, slabo razvit ABb horizont, brez skeleta, muljast, več oglja, na izgled 'pretlačen' horizont. <i>Buried soil, poorly developed ABb horizon, no fabric, silty, more charcoal, looks as a 'pressed' horizon.</i> |
| 392 - 365 (360) cm | Pesek, brez sedimentnih tekstur, delno ali pretežno oksidiran, listni odpad je redek. <i>Sand, without sediment textures, partially or predominantly oxidized, leaf litter is rare.</i> |
| 392 - 438 cm | Srednjezrnat pesek. Količina glinaste komponente je nizka, vendar se spreminja (kvalitativno ocenjeno v obsegu 0-10%). Listnat odpad pogost, vendar je tu sediment preveč debelo zrnat, da bi označeval tudi drobno laminiranost - energija tekom sedimentacije povečana. Brez znakov pedogenih sprememb. <i>Medium-grained sand. The amount of clayey component is low but changeable (qualitatively estimated in the range of 0-10%). Leaf litter is frequent though here the sediment is too coarsely-grained to indicate fine lamination as well - the energy throughout the sedimentation is heightened. No signs of pedogenic changes.</i> |
| 438 - 443 cm | Pesek, laminiran <i>Sand, laminated.</i> |
| 443 - 470 cm | Menjavanje peska in peščeno glinastega melja, sledovi laminacije, tla niso nikjer razvita niti v sledovih, izključno sedimenti; 5Y3/1. 35 do 42 cm pretežno peščeno muljast laminiran sediment. Lamine tudi posledica listnega (organskega) odpada <i>Alternating sand and sandy-clayey silt, traces of lamination, floor not developed anywhere, not even in traces, sediments only; 5Y3/1. 35 to 42 cm predominantly sandy-silty laminated sediment. The laminae also a consequence of leaf (organic) litter.</i> |
| 470 - 488 cm | Polžarica, jezerska kreda. Glede na strukturo melj in glina (kvalitativno ocenjena na 40%), drobnozrnat pesek v izraziti manjšini, pretežno (?) karbonatna (zašumi z zakasnitvijo), 10Y4/1. <i>Polžarica, lacustrine chalk. Based on structure it is made up of silt and clay (qualitatively estimated at 40%), fine-grained sand in substantial minority, predominately (?) carbonate (fizzes with delay), 10Y4/1.</i> |

Sl. 2.1: Profil oziroma stratigrafski stolpec, sestavljen iz zaporednih jedrnikov, in makroskopski geološko-sedimentološki ter pedološki opis (izvedba: Tomaž Verbič).

Fig. 2.1: Stratigraphic column composed of successive core samples, and a macroscopic geologic and sedimentologic as well as pedologic description (production: Tomaž Verbič).

Sl. 2.2: Poenostavljen opis profila in interpretirana sedimentna okolja (izvedba: Tomaž Verbič).

Fig. 2.2: A simplified description of the section and an interpretation of sedimentary environments (production: Tomaž Verbič).



vendar je na posameznih mestih v krovlini polžarice evidencialni tudi prod, ilovico in pesek. Zdi se, da ti litološki različki pripadajo aluvialnim sedimentnim okoljem, ki so bočni ekvivalenti pretežno barjanskega okolja, kjer je nastajala gytija, šotna glina in šota.

Profil vzdolž desnega brega Ljubije na obravnani lokaciji kaže, da so peščene plasti nad polžarico odložene v morfološki obliki plitvega korita. Zdi se, da ima os tega korita približno prečno smer glede na današnjo strugo. Geometrija plasti na obeh straneh

gytija began forming and later peat. Pavlovec (1967) discovered a generally similar stratigraphic sequence in many places, though evidencing gravel, loam, and sand in certain places atop of the *polžarica*. It seems that all these lithologic varieties belong to alluvial sedimentary environments that are lateral equivalents of a predominantly boggy environment where the gytija, peaty clay, and peat were forming.

korita, še posebno na desni, nakazuje, da se je sedimentacija vršila v stabilnem in mirnem okolju po principu vertikalne akrecije brez večjih erozijskih dogodkov. To nakazuje relativno enakomerna debelina plasti, lahko sledljive in zvezne plastnice na straneh korita ter enakomerna in zmerna (10-20°) nagnjenost plasti proti dnu korita.

2 KOMENTAR

Tu obravnavana lokacija je danes geografsko povezana z aluvialnim dotokom (Ljubija) z obrobja Ljubljanskega barja proti Ljubljani. Zato se zdi, da je peščene sedimente v krovni polžarice nasul prav ta potok, čeprav hkrati brez opravljenih dodatnih petroloških in geokemičnih analiz nikakor ne moremo izključiti sedimentacijskega vpliva Ljubljane.

Pretežno peščeno sedimentno zaporedje nad polžarico (470-365/360 cm) je nastajalo na aluvialni ravnini, in sicer neposredno ob plitvem koritu. Tako interpretacijo, razen prostorske lege glede na korito, nakazuje tanka laminiranost sedimenta, ki jo spremlja tudi v laminah odložen listni odpad. Na odseku profila med 365(360) in 353 cm je ohranjen neenakomerno debel pokopan horizont ABb brez notranje stratifikacije. Zdi se, da nakazuje kratek zastoj v sicer že prej opisanih stabilnih pogojih sedimentacije na poplavni ravnini.

Navzgor, do višine 324 cm, spet sledijo pretežno peščene plasti, ki pa glede na makroskopska opazovanja nakazujejo bolj spremenljivo sedimentacijsko okolje. Opazovanja glede spremenljive količine karbonatnih zrn v posameznih plasteh lahko interpretiramo na različne načine. Brez dodatnih petroloških in geokemičnih analiz o njih niti nima smisla govoriti. Navzgor sledijo vrhnja pokopana tla (324-302 cm), ki so, za razliko od spodnjih, notranje stratificirana. Sestavlja jih mrvičast pokopan Ab horizont in pokopan Btb horizont s povečano količino iluvialne gline. Na vrhu stratigrafskega stolpca (302-288 cm) spet sledi peščen sediment.

Stik med polžarico in peščenimi sedimenti lahko interpretiramo kot enkratni, oster in jasen preskok iz jezerskega v aluvialno okolje. Hkrati pa se moramo zavedati, da ta stik ni samoumevno konkordanten in je celo verjetno, da ga označuje erozijska diskordanca. Ta erozija bi utegnila odstraniti sedimente, ki bi lahko nastali na prehodu iz jezerskega v barjansko okolje in v barjanskem okolju in so razviti po večji površini Ljubljanskega barja (Pavlovec 1967). Zdi se, da bi arheološke najdbe s te lokacije lahko bile vezane prav na te sedimente, ki pa jih v opisanem profilu ni. Ker ne poznamo situacije v neposredni okolici lokacije (recimo v krogu s premerom 100 m), ta domneva ostaja na nivoju hipoteze, ki pa je podprta s posrednimi

2 COMMENTARY

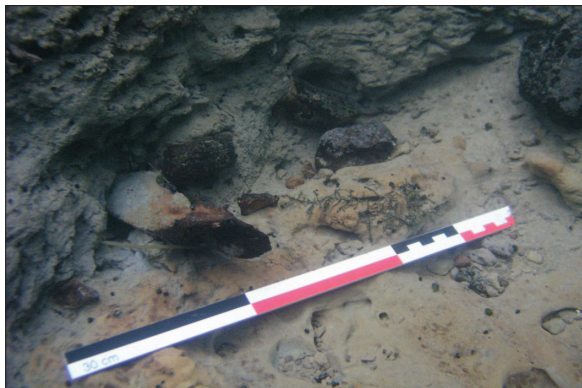
The section along the right bank of the Ljubija Stream, on the location treated here, shows that above the *polžarica* sandy layers were deposited in a shallow alluvial channel. It seems that the axis of this channel has an approximately transverse direction to the current Ljubija Stream bed. The geometry of the layers on both sides of the former alluvial channel, particularly on the right, indicates that the sedimentation occurred in a stable and calm environment according to the principle of vertical accretion without major erosional events. This is indicated by a relatively constant thickness of the layers, the easily traceable and continuous strata on the sides of the bed, as well as the regular and gentle inclination (10-20°) of the layers towards the bottom of the bed.

At present, the site treated here is geographically connected to the alluvial influent (the Ljubija Stream) from the edges of the Ljubljansko Barje towards the Ljubljana River. It seems, therefore, that the sandy sediments atop of the *polžarica* were deposited by precisely this stream. Without additional petrologic and geochemical analyses, however, the sedimentary influence of the Ljubljana River cannot be excluded.

The predominantly sandy sediment sequence above the *polžarica* (470-365/360 cm) formed on an alluvial plain, though directly at the shallow channel. This interpretation, beside the spatial position in relation to the bed, is indicated also by a thin lamination of the sediment, accompanied by laminae of leaf litter. From 365/360 to 353 cm, the section revealed an unequally thick and internally not stratified buried ABb horizon. It seems to indicate a short pause in the otherwise stable conditions of sedimentation on the floodplain, already mentioned above.

Upwards, to the height of 324 cm, sandy layers again predominate. According to macroscopic observations, they indicate a more varying sedimentary environment. The observed varying quantity of carbonate grains in particular layers can be interpreted in different ways. Without additional petrologic and geochemical analyses, however, it is meaningless to discuss them. The sandy layers are succeeded by the upper buried soil (324-302 cm) which is, contrary to the layers beneath, internally stratified. It is composed of a granular buried Ab horizon and a buried Btb horizon with an increased amount of illuvial clay. The stratigraphic column is topped by another sandy sediment (302-288 cm).

The contact between the *polžarica* and the sandy sediments can be interpreted as a single, sharp, and clear transition from a lacustrine to an alluvial environment. At the same time, we should be aware of the fact that this contact is not self-evidently concordant, it is possibly even marked by erosional discordance.



Sl. 2.3: Na stiku med polžarico in aluvialnimi peščenimi sedimenti so pogosti kosi apnenca, veliki tudi več kot 10 cm (foto: Andrej Gaspari).

Fig. 2.3: Pieces of limestone, some larger than 10 cm, can be found at the contact between the polžarica and the alluvial sandy sediments (photo: Andrej Gaspari).

evidencami. Razen že naštetih opazovanj tako hipotezo podpira oziroma dovoljuje tudi pojav številnih kosov in odlomkov oolitnega apnenca prav na stiku med polžarico in peščenimi sedimenti (sl. 2.3). Pojav teh kosov na tej lokaciji ni naraven in je verjetno povezan z nam neznanimi antropogenimi strukturami. Sama najdba teh kosov na tem mestu pa vendar kaže, da bi utegnili biti resedimentirani na kratko razdaljo. Torej lahko tudi iz tega zornega kota slutimo nam neznan antropogeno strukturo v (neposredni) bližini raziskane lokacije, ki bi utegnila biti povezana s sedimenti med polžarico in pretežno peščenim aluvijem, ki pa so na tej lokaciji erodirani.

Starost lobanje in artefaktov na najdišču postavlja v novo luč tudi dosedanje mnenje o holocenski starosti polžarice oziroma jezerske karbonatne meljaste gline (npr. Šercelj 1965). Zdi se, da je polžarica na tem mestu starejša kot 10.000 let in da je, gledano strogo kronostratigrafsko, pleistocenska. Ocena, da se je podnebje šele v borealu otoplilo do te mere, da je bilo omogočeno izločanje kalcijevega karbonata iz jezerske vode (Šercelj 1965), utegne biti napačna. Vprašanje starosti peščenih plasti v krovnini polžarice je povsem odprto, hkrati pa tudi dolžina kronostratigrafske vrzeli med polžarico in aluvialnimi peščenimi sedimenti. Ta vprašanja pa so s sodobnimi datacijskimi metodami danes rešljiva (npr. Lang, Nolte 1999).

This erosion might have removed the sediments formed either during the transition from the lacustrine to the boggy environment or in the boggy environment itself; these sediments are otherwise present on a large surface of the Ljubljansko Barje (Pavlovec 1967). It seems that the archaeological finds from the location treated here could be related to precisely these sediments, absent in the section described above. Since the situation in the immediate vicinity (in the radius of 100 m, for example) is not known to us, this assumption remains on the level of a hypothesis, which is, nevertheless, supported by indirect evidence. Beside the already mentioned observations, the hypothesis is also supported or allowed for by numerous pieces and fragments of the oolitic limestone. These appear exactly at the contact between the *polžarica* and the sandy sediments (Fig. 2.3). Their appearance on the location treated here is not natural and is probably related to anthropogenic structures unknown to us. However, the discovery of these pieces in itself shows that they might be resedimented on a short distance. From this point of view also, an anthropogenic structure can be anticipated in the (immediate) vicinity of the investigated location, possibly related to the sediments between the *polžarica* and the predominantly sandy alluvium, here eroded.

The age of the skull and the artefacts found on the site sheds a different light onto the previous opinion of the Holocene date of the *polžarica* or the lacustrine carbonate silty clay (Šercelj 1965). It seems that the *polžarica* is over 10,000 years old and is, from a strictly chronostratigraphic point of view, dated to the Pleistocene. The estimate that the climate warmed to the point of causing the precipitation of calcium carbonate from lacustrine water as late as the Boreal (Šercelj 1965) might prove to be erroneous. The question of the age of sandy layers atop of the *polžarica* is entirely open as is the length of the chronostratigraphic hiatus between the *polžarica* and the alluvial sandy sediments. With the modern methods of dating (Lang, Nolte 1999), however, these questions are nowadays solvable.

PALEOBOTANIČNE RAZISKAVE SEDIMENTOV

PALAEOBOTANIC RESEARCH OF THE SEDIMENTS

Metka CULIBERG

Izvleček

Prispevek predstavlja rezultate palinoloških raziskav sedimentov s kamenodobnega najdišča Zalog pri Verdu. V razmeroma kratkem segmentu profila smo zajeli spremembo v vegetaciji, kar kaže na dve različni geokronološki fazi: pozni glacial in zgodnji holocen. Tipično hladnodobno vegetacijo, v kateri je dominiral bor, brez postopnega prehoda že takoj zamenja generično pester listnati gozd. Manjkajo torej primarne gozdne faze, kar nedvomno kaže na obsežen vegetacijski hiatus, ki je najverjetneje posledica prekinitve v sedimentaciji.

Ključne besede: Slovenija, Ljubljansko barje, mezolitik, palinologija

Abstract

The article presents the results of palynological research of sediments from the Stone Age site of Zalog near Verd. The relatively short segment of the profile covered the change in vegetation that indicates two different geochronological phases: the Late Glacial and the Early Holocene. The typical cold-period vegetation with the dominating pine is succeeded immediately and without a gradual transition by a generically varied deciduous forest. Primary forest phases are thus missing. This undoubtedly indicates an extensive vegetational hiatus, probably the consequence of a disturbance during sedimentation.

Key words: Slovenia, the Ljubljansko barje, Mesolithic, palynology

1 UVOD

Iz brežine struge Ljubije, desnega pritoka Ljubljanice na skrajnem zahodnem delu Ljubljanskega barja, je bilo za pedološke in sedimentološke preiskave odvzeto 2 m dolgo jedro sedimenta (Gaspari, Erič, v tem zborniku, *sl. 1.8: S*). Od tega je bil palinološko raziskan le spodnji segment tega jedra, to je 45 cm sedimenta iz globine 441 do 486 cm pod površjem z namenom, da se ugotovi paleoekološke razmere obdobja, v katerem se je ta sediment odlagal, kajti iz teh plasti naj bi glede na opažanja arheologov izvirale tudi osteološke in lito-loške najdbe obravnavane kamenodobne kulture.

2 METODE

Sediment je bil odvzet z U jedrnikom s stranicami 10 cm. Pelodno je bilo analiziranih 22 vzorcev v razmiku 2 cm, kar pri obsežnejših profilih ni običajno. Tako lahko v tem primeru podrobno spremljamo spremembe v vegetaciji.

Vsi vzorci so bili karbonatni. Za mikroskopsko

1 INTRODUCTION

Pedologic and sedimentological analyses, conducted for the site of Zalog near Verd, were based on a 2 m long sedimentary core taken from the side of the Ljubija bed (Gaspari, Erič, in this publication, *Fig. 1.8: S*), the right tributary of the Ljubljanica River at the westernmost part of the Ljubljansko barje. Of the core, archaeological observation determined only the lower layers as the origin of the osteological and lithological finds of the Stone Age culture under investigation. It is this zone, more precisely 45 cm of the sediment from the depth of 441 to 486 cm underneath the surface that was palynologically analysed with the aim of identifying the palaeoecological conditions of the period in which the sediment was deposited.

2 METHODS

The sediment was sampled in the interval of 2 cm, producing 22 U core samples with a 10 cm side which were then subjected to pollen analysis. The short sampling interval is not usual with more extensive profiles but does allow for a more detailed observation of the changes in vegetation.

analizo smo jih pripravili tako, da smo 15 g sedimenta najprej raztapljali v solni kislini (HCl), s flotacijsko metodo, v kateri smo uporabili cinkov klorid (ZnCl₂), pa smo pelod in organski drobir ločili od ostale mineralne komponente. Uporabili smo tudi postopek acetolize po Erdtman-u (1969). Pri tem se eksina pelodnih zrn obarva rumeno rjavo in tako postane njena struktura bolj razločna, kar omogoča zanesljivejšo determinacijo peloda. Ostanek sedimenta od vsakega vzorca smo raztopili v vodi in ekstrahirali tudi nekaj rastlinskih in živalskih makroskopskih ostankov.

3 PELODNI DIAGRAM

Vsi vzorci so vsebovali zadostno količino peloda, zato so rezultati pomembni tako s paleoflorističnega, kot tudi iz geološkega vidika. V razmeroma kratkem segmentu profila smo zajeli spremembo v vegetaciji, kar kaže na dve različni geokronološki fazi: pozni glacial in zgodnji holocen. Glede na to smo pelodni diagram razdelili v dva odseka:

3.1 Odsek A (od 486-470 cm)

Tu vidimo, da je v drevesni vegetaciji skoraj popolnoma prevladoval bor (*Pinus*), medtem ko sta bili breza (*Betula*) in smreka (*Picea*) komajda prisotni. Krivulja zeliščne vegetacije (NAP), v kateri so zastopane predvsem trave (Gramineae), pelini (*Artemisia* sp.) in metlikovke (Chenopodiaceae) je nizka, kar bi lahko kazalo že na bolj ali manj strnjene borove sestoje. Takšen tip vegetacije, v kateri najdemo tudi drobno praprotnico alpsko drežico (*Selaginella selaginoides*) in heliofilni grmič metlinko (*Ephedra*), zanesljivo kaže še na izrazito hladne podnebne razmere in ga kronološko, tudi glede na vegetacijo v odseku B, z veliko verjetnostjo lahko opredelimo v konec poznega glaciala.

Karbonatno, sivo rjavo meljasto glino ali jezersko kreda, v kateri je bila ugotovljena zgoraj opisana vegetacija, prekinja na globini 470 cm plast apnenčaste kamenja. V sedimentnem jedru smo prav v tem stratumu našli tudi en primerek sileksa. Od globine 470 cm navzgor je sediment peščeno glinast, prekinja jo pa ga plasti, bogate z makroskopskimi rastlinskimi ostanki.

3.2 Odsek B (od 470-441 cm)

Vegetacija je že izrazito toplodobna, kar nedvomno pomeni tudi ugodnejše holocenske klimatske razmere. Pelodna krivulja bora (*Pinus*) namreč strmo upade, na

All samples were carbonate. In preparation for microscopic analysis, 15 g of sediment was first dissolved in hydrochloric acid (HCl). The flotation method, in which zinc chloride (ZnCl₂) was used, enabled the extraction of pollen and small organic detritus from other mineral components. Also used was the acetolysis procedure after Erdtman (1969), which makes the exines of the pollen grains turn brown, rendering thereby its structure clearer and pollen determination more reliable. The sediment remains of each sample were then dissolved in water whereby also some macroscopic plant and animal remains were extracted.

3 POLLEN DIAGRAM

All samples contained a sufficient amount of pollen, which makes the analyses results important from both the palaeofloristic as well as from the geological perspective. The relatively short segment of the profile covered the change in vegetation that indicates two different geochronological phases: the Late Glacial and the Early Holocene. According to this, the pollen diagram was divided into two zones:

3.1 Zone A (from 486 to 470 cm)

The tree vegetation shows an almost complete predominance of pine (*Pinus*), while birch (*Betula*) and spruce (*Picea*) hardly appear. The pollen curve of herbaceous vegetation (NAP), represented predominantly by Gramineae, *Artemisia* sp. and Chenopodiaceae, is low and might indicate the already more or less dense pine forests. In addition to that, the vegetation type, which includes *Selaginella selaginoides* and *Ephedra*, definitely indicates also an extremely cold climate that can, also in comparison to the vegetation of the B zone, with high probability be chronologically determined as that of the end of the Late Glacial.

The carbonate grey-brown silty clay or lacustrine chalk, in which the above-described vegetation was observed, is interrupted by a layer of limestone stones at the depth of 470 cm. It was in this layer that a silex was found within the core sample. From the depth of 470 cm upwards the sediment is sandy-clayey, interrupted by layers rich in macroscopic plant remains.

3.2 Zone B (from 470 to 441 cm)

An already distinctly warm-period vegetation was observed here, which undoubtedly also signifies better climatic conditions of the Holocene. The pollen curve

mestu pa so že vsi glavni predstavniki listnatega gozda, vključno z bukvijo. Najvišje pelodne vrednosti dosega jelša (*Alnus*) in leska (*Corylus*), nekoliko nižje pa bukev (*Fagus*). Združba mešanega hrastovega gozda (*Quercetum mixtum*) je bila zastopana z vsemi svojimi predstavniki, med katerimi je bilo največ lipe (*Tilia*), redkejši pa so bili hrast (*Quercus*), brest (*Ulmus*), jesen (*Fraxinus*) in javor (*Acer*). Tudi jelka (*Abies*) je bila že precej razširjena. V pelodnem diagramu vidimo, da sta bila bor in smreka (*Picea*) še vedno tu, vendar z zelo nizkimi vrednostmi. Pelodna krivulja zeliščne vegetacije (NAP) ostaja nizka (okoli 20 %) in tudi v njeni generični sestavi ni opaziti večjih sprememb.

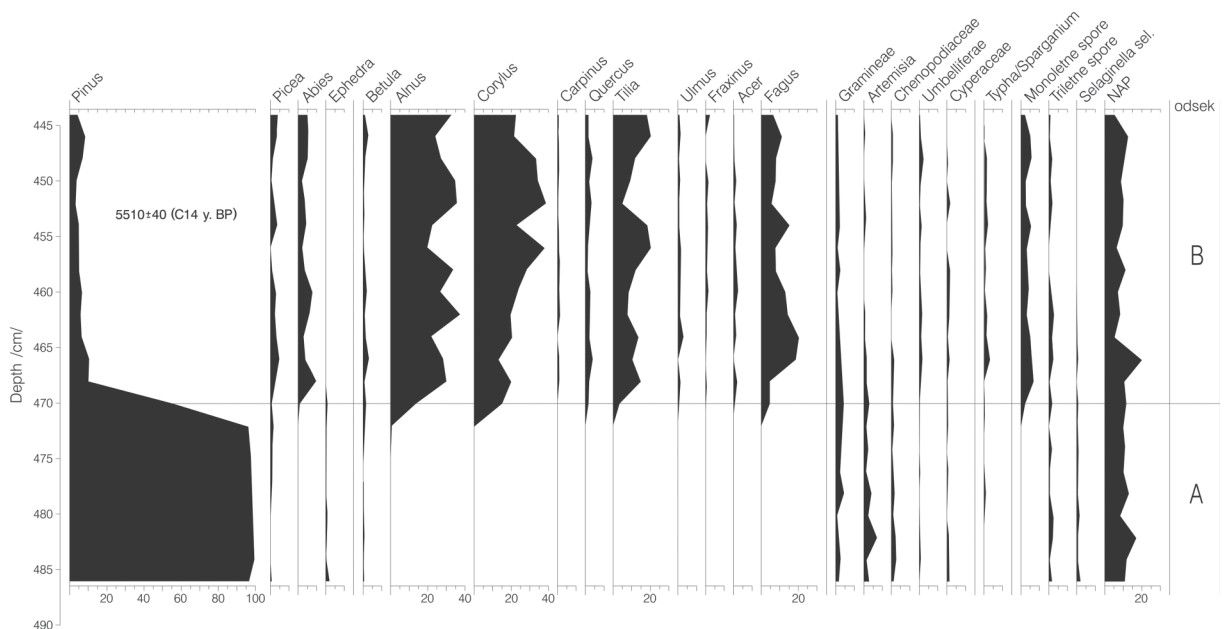
4 RAZPRAVA

Iz številnih pelodno analiziranih sedimentnih vrtn, tako z Ljubljanskega barja, kot tudi z drugih lokalitet po Sloveniji lahko sledimo razvoju gozdne vegetacije, ki je v zgodnjem holocenu potekal po sukcesiji primarnih gozdnih faz in se zaključil z vrhunsko združbo jelke in bukve (*Abieti-Fagetum*) nekako pred 7000 leti. Šercelj (1996, 13) je na podlagi večinoma lastnih palinoloških raziskav strnil razvoj holocenske gozdne vegetacije v tabeli, iz katere je razvidno, da je ob koncu pleistocena še popolnoma dominiral bor (*Pinus*), ob njem pa sta bili še breza (*Betula*) in smreka (*Picea*). Toplo podnebje je v holocenu omogočilo razvoj listnatih gozdov. Začetni fazi mešanega hrastovega gozda (*Quercetum mixtum*), ki so ga sestavljali hrast (*Quercus*), lipa (*Tilia*) in brest (*Ulmus*) ter jesen (*Fraxinus*)

for pine (*Pinus*) falls rapidly, while all the main representatives of the deciduous forest are already present, including the beech. The highest pollen values are attained by alder (*Alnus*) and hazel (*Corylus*), those for beech (*Fagus*) are somewhat lower. The mixed oak forest (*Quercetum mixtum*) was represented by all its representatives, most of all lime (*Tilia*). Less frequent were oak (*Quercus*), elm (*Ulmus*), ash (*Fraxinus*) and maple (*Acer*). Fir (*Abies*) was also quite widespread. The pollen diagram shows that pine and spruce (*Picea*) are still present though with low values. Pollen curve for herbaceous vegetation remains low (approx. 20%) and its generic composition does not show significant changes.

4 DISCUSSION

The pollen analyses of numerous sedimentary cores from the Ljubljansko barje as well as other sites across Slovenia enable us to follow the development of forest vegetation there. The forest developed from a succession of primary forest phases during the Early Holocene and terminated in the climax association of fir and beech (*Abieti-Fagetum*) about 7000 years ago. Based mostly on his own palynological research, Šercelj summed up the development of Holocene forest vegetation in a chart (1996, 13), which shows the complete predominance of pine (*Pinus*) at the end of the Pleistocene, accompanied by birch (*Betula*) and spruce (*Picea*). Gradual warming of the climate during the Holocene then allowed deciduous forests to develop. The initial phases of a mixed oak forest



Sl. 3.1: Pelodni diagram Zalog pri Verdu.

Fig. 3.1: The Zalog near Verd pollen diagram.

in javor (*Acer*), je sledila krajša faza leske (*Corylus*), v borealu pa se je že močno razširila bukev (*Fagus*), kateri se je nekoliko kasneje pridružila še jelka (*Abies*). Od neolitika naprej pa je zaradi antropozoogenega vpliva ali drugih naravnih pojavov že prihajalo do različne stopnje degradacije gozdov. Od tedaj ni več mogoče govoriti o enotnem razvoju gozda, saj so glede na stopnjo degradacije prvotnega gozda lahko sočasno nastopale različne gozdne faze.

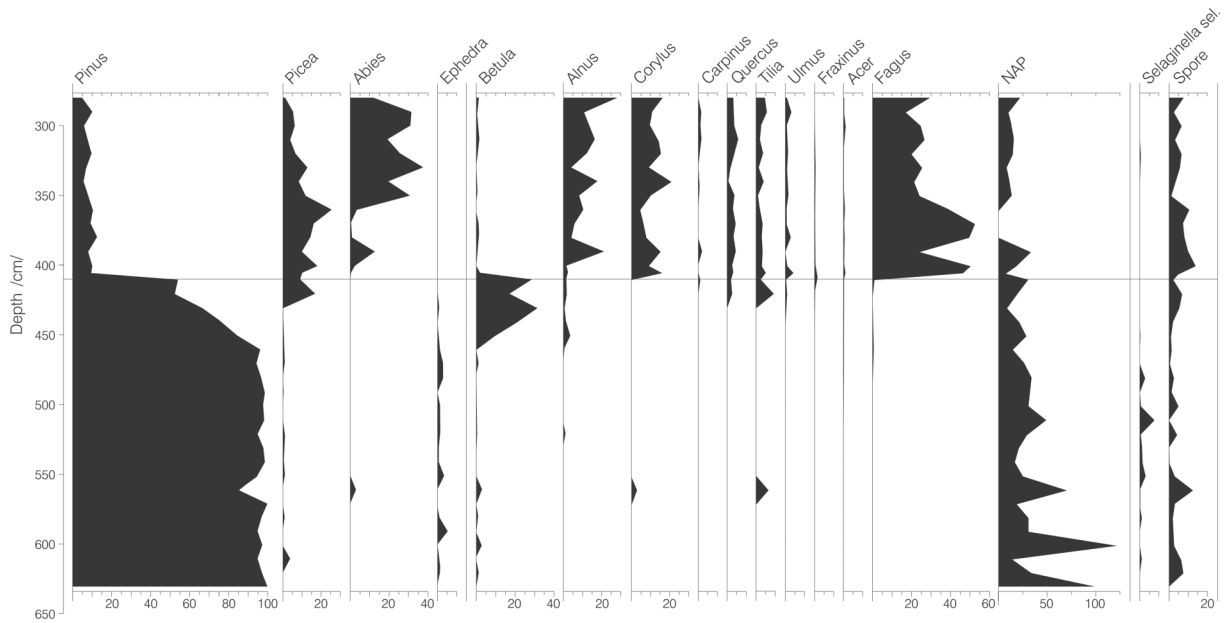
Z arheološkega najdišča Zalog pri Verdu smo pelodno analizirali le krajši segment sedimenta iz globine 441-486 cm. V pelodnem diagramu (sl. 3.1) opazimo dve pomembni posebnosti. Prva je ta, da se na globini 470 cm (286,38 m nm. v.) zgodi izrazita sprememba v vegetaciji, in druga, da korelacija z zgoraj opisano shemo sukcesije gozdnih faz tu ni mogoča. Tipično hladnodobno vegetacijo, v kateri je dominiral bor (odsek A), namreč brez postopnega prehoda že takoj zamenja generično pester listnati gozd (odsek B). Manjkajo torej primarne gozdne faze, kar nedvomno kaže na obsežen vegetacijski hiatus, ki je najverjetneje posledica prekinitve v sedimentaciji. Bodisi, da je bil sediment erodiran, izključena pa tudi ni predpostavka, da je bilo določen čas tu kopno in se je sedimentacija močno upočasnila. Radiokarbonsko ugotovljena starost rastlinskega materiala iz globine 452-454 cm je 5510 ± 40 PS (Beta-211407), kar uvršča ta stratum v drugo polovico atlantika, zelo verjetno pa lahko v to obdobje umestimo tudi celoten odsek B (ca 30 cm), saj v kratki sedimentacijski sekvenci ni opaziti bistvenih sprememb v sestavi vegetacije. Zagotovo pa manjkajo sedimenti iz boreala in zgodnjega atlantika in delno verjetno tudi iz preboreala.

Podobno situacijo v vegetaciji kot tu v Zalogu, smo že pred časom ugotovili tudi v 630 cm globoki vrtini, ki je bila izvrtana ob eneolitiskem najdišču Hočevarica in še ni v celoti pelodno analizirana (sl. 3.2). Za primerjavo je bil narejen delni diagram, ki pa kljub vsemu zajema precej obsežnejši spekter vegetacije kot diagram z Zaloga. Na Ljubljanskem barju je sicer zaradi nenehne tektonike v preteklosti in posledično zaradi neenakomerne sedimentacije mnogokrat težko korelirati sedimente s sočasno vegetacijo, ker se ti lahko nahajajo v povsem različnih globinah ali v različno debelih plasteh. V tem primeru ni tako, saj sta najdišči med seboj oddaljeni le slaba 2 km zračne razdalje in obe locirani na obrobju barja, kjer je bila tektonika morda manj izrazita. Tako lahko predpostavljamo, da sta bili v preteklosti podvrženi tudi bolj ali manj istim geološkim dogajanjem. Kljub temu pa v pelodnem diagramu Hočevarica, kjer je meja med pleistocensko in holocensko vegetacijo na globini 410 cm (286,13 m nm. v.), le opazimo neko pomembno razliko v vegetaciji. Tu se namreč boru ob koncu njegove faze znatno pridruži še breza (*Betula*). Borovo-brezovi sestoji so značilni za konec pleistocena, kar lahko vidimo v

(*Quercetum mixtum*), composed of oak (*Quercus*), lime (*Tilia*) and elm (*Ulmus*) as well as ash (*Fraxinus*) and maple (*Acer*), were followed by a short phase of hazel (*Corylus*), while the Boreal saw a strong expansion of beech (*Fagus*) that was joined, somewhat later, by fir (*Abies*). From the Neolithic period onwards, however, the anthropozoogenic influence and other natural phenomena caused various degrees of forest degradation. We can, therefore, no longer speak of a uniform forest development, since the degree of primary forest degradation could cause different forest phases to appear concurrently.

As mentioned above, only a short sediment zone of the archaeological site of Zalog near Verd were pollen analysed, from 441 to 486 cm in depth. Pollen diagram (Fig. 3.1) shows two important distinctive features: the first is a marked change in vegetation at the depth of 470 cm (286.3 m above sea level) and the second is that the correlation with the above-described succession of forest phases is not possible. The typical cold-period vegetation, with the dominating pine (A zone), is succeeded immediately and without a gradual transition by a generically variegated deciduous forest (B zone). Primary forest phases are thus missing. This undoubtedly indicates an extensive vegetational hiatus, probably the consequence of a disturbance during the sedimentation. It is feasible that the sediment was eroded though we cannot exclude the possibility that the site was located on dry land, whereby the sedimentation slowed down considerably. The age of the plant material from the depth of 452-454 cm, provided by a radiocarbon analysis, is 5510 ± 40 BP (Beta-211407), which dates the stratum into the second half of the Atlantic. In fact, the entire section B (ca 30 cm) could most probably also be dated to this period, since the short sedimentation sequence does not reveal fundamental changes in the composition of the vegetation. Certainly missing are the sediments from the Boreal and Early Atlantic, partially also those from the Pre-Boreal.

A similar situation in vegetation as at Zalog has been established at the Eneolithic site of Hočevarica, where a 630 cm deep sedimentary core had been taken and not yet fully analysed (Fig. 3.2). For comparison reasons, a partial diagram for Hočevarica is given here that reveals a much more extensive spectrum of vegetation than that at Zalog. Sediments with contemporaneous vegetation on the Ljubljansko barje are often very difficult to correlate due to the constant tectonic activity in the past and, consequentially, due to the uneven sedimentation, since the sediments can appear at completely different depths or in variously thick layers. This is not the case here, since the two sites lie less than 2 km of air distance apart and are both located at the outskirts of the moor where the tectonic activity may have been less pronounced. Based



Sl. 3.2: Pelodni diagram Hočevarica.

Fig. 3.2: The Hočevarica pollen diagram.

številnih pelodnih diagramih z različnih lokalitet po Sloveniji, od Alp in Dinarskega Krasa, do Prekmurja. Tudi v pelodnih diagramih z Ljubljanskega barja (npr. Zamedvejca (Culiberg 1991), šotišče pri Igu, Resnikov kanal ali šotišče pri Bevkah (Šercelj 1963)) pelodne vrednosti breze ob koncu pleistocena porastejo in se približajo pelodnim vrednostim bora. Vzroka zakaj breze v diagramu z Zaloga ni, ne moremo iskati v drugačni vegetaciji okolja, bolj verjetno je, da manjka tudi sediment s konca pleistocena. Prav plast proda na pleistocenskem sedimentu bi morda lahko kazala na močno rečno erozijo.

Geološka dogajanja, ki so po vsej verjetnosti povzročila sedimentacijski hiatus na prehodu pleistocena v holocen, so se sčasoma umirila in zopet se je tu vzpostavilo vodno okolje. V posameznih plasteh sedimenta se namreč pojavlja obilica rastlinskega materiala, med katerim smo našli žir bukve, seme lipe in še številna drobna semena kopenskega rastlinja, listje drevja in pa tudi semena dveh vodnih rastlin, ježka (*Sparganium*) in streluške (*Sagittaria*), ki sta značilni za stoječe ali počasi tekoče plitvejšje vode. V podobnem biotopu uspeva tudi drobna zelena alga *Pediastrum* sp. (Vrhovšek *et al.* 1985, 69), ki smo jo ugotovili v mikroskopskih preparatih. Našli smo tudi nekaj 3–4 mm velikih poklopcev (operculov) nedeterminiranih vodnih polžkov.

on this it is assumed that both sites were subjected to a more or less similar geological activity in the past.

In spite of the similarities, the Hočevarica pollen diagram shows an important difference in vegetation at the border between the Pleistocene and the Holocene vegetation in the depth of 410 cm (286,13 m above sea level). This is the point where pine, at the end of its phase, is joined by a significant amount of birch (*Betula*). The pine-birch forests are characteristic for the end of the Pleistocene, which can be observed on numerous pollen diagrams from various locations across Slovenia, from the Alps to the Dinaric Kras and the Prekmurje region. The pollen diagrams of the Ljubljansko barje sites (for example Zamedvejca (Culiberg 1991), peat bog near Ig, Resnikov kanal or peat bog near Bevke (Šercelj 1963)) show pollen values for birch at the end of the Pleistocene to increase and approach those of pine. The reason for the absence of birch in the Zalog diagram cannot be sought in different environmental vegetation. A more likely explanation is that also the sediment from the end of the Pleistocene is missing at Zalog. In that respect, strong river erosion might be indicated by a layer of gravel above the Pleistocene sediment.

Geologic activities that very probably caused the hiatus in sedimentation at the transition from the Pleistocene to the Holocene, gradually calmed and a water environment was re-established. This is indicated by a large amount of plant material in individual layers of the sediment, among which beech nut, lime seeds, numerous tiny seeds of dry-land plants, tree

5 ZAKLJUČEK

V pelodnem diagramu profila z Zaloga pri Verdu (*sl. 3.1*) smo glede na vegetacijo zajeli dve geološki fazi: konec pleistocena in del zgodnjega holocena, med katerima pa je daljša časovna vrzel. Manjkajo sedimenti zgodnjega atlantika in boreala ter delno tudi preboreala, obdobja, ko se je pričelo podnebje postopoma ogrevati. In prav v ta čas bi lahko glede na radiokarbonsko ugotovljeno starost kosti lobanje 8745±35 PS (KIA25792) uvrstili tudi obravnavano arheološko kulturo. V sedimentnem jedru smo v plasti s kamenjem na globini 470 cm našli tudi sileks. Četudi so bile nekatere pomembnejše kulturne ostaline najdene na rečnem dnu, bi različno locirane najdbe morda kljub vsemu lahko sinhronizirali, saj plast z kamenjem in kulturnim inventarjem leži prav na meji med pleistocenskimi in holocenskimi sedimenti.

leaves as well as seeds of two water plants, *Sparganium* and *Sagittaria*, the latter characteristic of still or slowly flowing shallow waters. A similar biotope is also home to *Pediatrum* sp. (Vrhovšek *et al.* 1985, 69) which was recognized in microscopic slides. Several 3-4 mm large opercula of undetermined water snails were also found.

5 CONCLUSION

The pollen diagram of the profile from Zalog near Verd (*Fig. 3.1*) includes two geological phases: the end of the Pleistocene and a part of the Early Holocene between which a time hiatus is observed.

The missing sediments are those from the Early Atlantic and the Boreal, partially also from the Pre-Boreal period, the time when the climate slowly began to warm up.

It is exactly the latter period to which the archaeological culture under investigation would be classified, according to the radiocarbon date, 8745±35 BP (KIA25792) of the cranium bone. The sedimentary core also yielded a silex, found in the gravel layer at the depth of 470 cm. Although some of the more important remains were found on the river floor, the finds discovered on different locations might nevertheless be synchronized, since the gravel layer lies exactly at the border between the Pleistocene and Holocene sediments.

KAMNITA ORODJA

STONE TOOLS

Boris KAVUR

Izvleček

Najdišče ob Ljubiji sodi v širši okvir zgodnjeholocenskih najdišč balkansko-podonavskega kompleksa. Zaradi velike logistične in rezidenčne mobilnosti so skupnosti iz tega obdobja zapustile za sabo cel spekter najdišč, ki so na osnovi tipoloških analiz kamenih orodij dokaj različna. Gre za prostore različnih dejavnosti znotraj cikla primarne ekonomije. Na eno izmed takih najdišč smo naleteli v primeru Ljubije – gre za najdišče, kjer so minimalno zastopani »tipični« orodni tipi tega obdobja, ki jih povezujemo z lovom. Večino odkritih orodij predstavljajo generalna orodja, ki so služila drugim dejavnostim. Orodja so bila narejena na kraju uporabe iz manj kvalitetnih surovin, le malo uporabljana in hitro zavržena, v primeru intenzivnejše uporabe pa popravljana drugje.

Ključne besede: Slovenija, Ljubljansko barje, mezolitik, kamnita orodja

Abstract

The site in the Ljubija belongs in a wider frame of the Early Holocene sites of the Balkan-Danubian complex. The high logistic and residential mobility of the communities of the period left behind a large spectre of sites that the typological analyses of stone tools reveal quite different from one another. They represent areas of different activities within the cycle of subsistence. One such site was uncovered in the Ljubija. It is a site where the "typical" tool types of the period connected with hunting are minimally represented; most of the uncovered tools are general and were used in activities other than hunting. The tools were made where they were used from raw materials of poorer quality; they were little used and soon discarded. When used more intensely, they were repaired elsewhere.

Key words: Slovenia, the Ljubljansko barje, Mesolithic, stone tools

1 UVOD

V besedilu so predstavljena kamnita orodja z najdišča Zalog v potoku Ljubija na jugozahodnem delu Ljubljanskega barja. Pričujoči artefaktni skupek predstavlja v številnih pogledih izjemno odkritje. Čeprav so na širšem območju prazgodovinska arheološka najdišča, na katerih prevladujejo najdbe kamenih orodij, znana že od začetka osemdesetih let, jih je bilo delno raziskanih zgolj manjše število. Na večini najdišč so se izvajala zgolj zbiranja površinskih najdb, medtem ko so bila sondiranja toliko redkejša. Arheološko in paleontološko objavo je dočakalo zgolj izkopavanje najdišča Breg pri Škofljici, kjer so bile objavljene začetne raziskave. Posledično je poznavanje starejše in srednje kamenodobnih arheoloških najdb na širšem področju dokaj površno - dolgotrajna nesistematična zbiranja so sicer ustvarila obsežne zbirke kamnitih artefaktov, vendar njihov natančnejši kulturni in ekonomski vidik ni bil pojasnjen. Usmeritev, ki je bila posledica tipološkega determinizma pri površinskem zbiranju artefaktov, pa je podatke o različnih dejavnostih, ki se odražajo v artefaktnih zbirih, zlila v ekonomsko nevtraln

1 INTRODUCTION

The text presents stone tools from the site of Zalog near Verd, found in the Ljubija Stream in the southwestern part of the Ljubljansko barje. The artefact assemblage from the site is, in many ways, an exceptional discovery. Though prehistoric sites with prevailing finds of stone tools are known in the area since the early eighties, only a few were, even partially, investigated; most saw the collection of surface finds, while trial trenches were rarely excavated. Only the excavations of Breg near Škofljica site were followed by a publication of the archaeological and palaeontological material, where the preliminary research has been presented. As a consequence of the above, the knowledge of the Palaeolithic and Mesolithic finds in the area is rather superficial. It is true that the continuing unsystematic collection of finds produced vast collections of stone artefacts, but their exact cultural and economic significance remained unexplained. This practice was the consequence of typological determinism in the surface collection of artefacts, merging the information on various factors reflected in the assemblages into an

ter na domnevno tipološki osnovi kulturno določeno podobo mezolitske poselitve Ljubljanskega barja. V okvirih slovenske arheologije pa ostaja mezolitik ujet v prostoru med dvema svetovoma - paleolitska arheologija se je bolj ukvarjala s sedimentologijo in paleontologijo ter je arheološke analize najdb in kulturne interpretacije puščala v nemar, neolitska arheologija pa se je ukvarjala s preučevanjem dejavnikov pridelovalnih gospodarstev in keramične tehnologije, ter je kulturno paradigmo popolnoma zamenjala s procesno pojasnitvijo ekonomskih procesov.

Prav zato je pomembna obdelava najdb z najdišča Zalog pri Verdu, kjer je že zaradi najdiščnih okoliščin situacija drugačna od večine najdišč. Sicer se moramo zavedati, da pri večini najdišč na področju Ljubljanskega barja artefakti niso bili odkriti v primarnem kontekstu, da bi njihovo prostorsko distribucijo lahko razlagali s prostorsko distribucijo aktivnosti na področju najdišča, vendar pa smo lahko v primeru najdišča Zalog prepričani, da vsi artefakti izvirajo iz edine kulturne plasti na najdišču. Čeprav obstaja možnost, da so v skupku zbrani artefakti, ki so nastali kot posledica različnih dejavnosti na istem prostoru, domnevamo, da gre za artefakte, ki so bili odloženi na najdišču v enem, domnevno celo kratkotrajnem obdobju.

V primeru arheološkega posega pa so pri zaščitnih arheoloških raziskavah, ki so prvič potekale v okviru podvodnih arheoloških raziskav, bile uporabljene raziskovalne metode, ki obravnavano kamenodobno najdišče in uporabljeno metodologijo terenskega dela predstavljajo kot novost v slovenski arheološki stroki. Pri delu sta bili uporabljeni dve različni metodologiji zbiranja arheoloških najdb - ročno zbiranje arheoloških najdb in kontrolno preverjanje količine in velikostnih deležev odkritih arheoloških najdb s sesalko. Primerjalna analiza pridobljenih odstotnih deležev s kombinacijo rezultatov omogoča natančnejšo rekonstrukcijo količine arheoloških najdb na podobnih najdiščih ter oceno kvalitete pridobljenih arheoloških podatkov. Na drugi strani pa je najdišče pomembno predvsem zaradi svojih kulturnih in kronoloških implikacij. Količina odkritega gradiva - predvsem kamnitih orodij - sodi med večje sistematično zbrane skupke artefaktov in ekofaktov na področju Ljubljanskega barja in enega največjih v kamenodobni arheologiji Slovenije, kar posledično omogoča kljub relativnim stratigrafskim podatkom individualnih najdb visok interpretativni potencial in posledično vrednost analize arheoloških najdb. Hkrati pa predstavlja s svojo kronološko pozicijo prvo analizirano arheološko najdišče iz tega obdobja v Sloveniji, s svojo tehnološko in tipološko specifično orodij pa tudi kulturno oziroma funkcionalno posebnost v širšem prostoru med severno Italijo, Istro, jugovzhodnimi Alpami, severozahodnim Balkanom in osrednjim Podonavjem.

economically neutral and a culturally determined, the latter on a presumably typological base, view of the Mesolithic settlement of the Ljubljansko barje. Within the framework of the Slovene archaeology, the Mesolithic remains trapped between two worlds – the Palaeolithic archaeology, on the one hand, which was more concerned with sedimentology and palaeontology and neglected the archaeological analyses of finds as well as their cultural interpretations, and the Neolithic archaeology, on the other, which studied the elements of farming economies and ceramic technology and completely substituted the cultural paradigm with the processual explanation of the economic processes.

Having said the above, the analysis of the finds from Zalog near Verd, where the circumstances of the discovery differ from most other sites, is all the more important. A relevant fact is that artefacts on most sites at the Ljubljansko barje were not found in their primary contexts; therefore their spatial distribution could not be explained as the spatial distribution of the activity on the area of the site. For the Zalog site, on the other hand, we are certain that all the artefacts originate from a single cultural layer of the site. Though it is possible that the collected artefacts represent various activities, it is rather assumed that they were deposited at the site in a single, presumably even short period.

The Stone Age site of Zalog near Verd and the methodology of rescue field work used there, that for the first time took the form of underwater research, present a novelty in the Slovene archaeology. Two different methodologies of collecting archaeological finds were included – hand collection and test surveillance of the quantity and size shares of the uncovered archaeological finds with the aid of a water-dredge. The comparative analysis of the obtained percentages with a combination of results enables a more precise reconstruction of the quantity of the archaeological finds at similar sites as well as an estimate of the quality of the acquired archaeological data. The site is important mostly for its cultural and chronological implications. In its quantity, the uncovered material – especially the stone tools ranks among the large systematically obtained assemblages of artefacts and ecofacts in the Ljubljansko barje area and one of the largest of the Stone Age sites in Slovenia. Consequently, it offers a high interpretative potential and renders the find analyses of a great value in spite of the relative stratigraphical data of individual finds. It also represents, through its chronological position, the first analyzed archaeological site of the period in Slovenia and, through the technological and typological specifics of the tools, a cultural and functional particularity in a wider area between Northern Italy, Istria, south-eastern Alps, north-western Balkans and the central Danube basin.

Na najdišču je bilo odkrito 2.242 odbitkov, od tega 302 retuširani orodja (13,4 %) in 102 jedri (4,5 %). V besedilu se bomo posvetili posebej posameznim kategorijam arheoloških najdb v vrstnem redu, ki bo omogočal logično strukturiranje pripovedi ter končno izpeljavo sklepov iz tipoloških in tehnoloških značilnostih kamnitih orodij ter ekonomsko in kulturno interpretacijo najdišča. V prvem delu bodo prikazana jedra, sledila bo predstavitev problematike surovin in obravnava odbitkov, na koncu pa bo podan pregled in interpretacija retuširanih kamenih orodij.

2 JEDRA

Na najdišču sta bili odkriti 102 jedri - predstavljajo zgoj 4,5 % vseh kamenih artefaktov, vendar kljub temu enega izmed največjih skupkov jeder s kameno-dobnih najdišč odkritih v Sloveniji. Prisotni so primerki iz skoraj vseh oblik in stopenj izkoriščanja surovin, vendar pa manjkajo pripravljene in testirane prodniki (predjedra), prav tako pa so redka močno izrabljena oziroma okrcana jedra. V katalogu smo opisali njihovo morfologijo glede na smer odbijanja odbitkov, opisali barvo površine, velikost jedra in obliko priprave udarne površine za odbijanje odbitkov. Pri obdelavi smo jih razdelili v tri skupine glede na smeri odbijanja odbitkov oziroma glede na število zastavljenih udarnih platform za izrabo jeder (unipolarna (t. 20: 333; 22: 360, 365; 23: 394), bipolarna (t. 20: 311,330,334; 21: 335,340,351; 22: 356,370,371,373,376,378,385; 23: 386,388,391; 24: 402) in polipolarna (t. 20: 306,334; 22: 380; 23: 392; 24: 403) ter dodali še specifično četrto kategorijo - diskasta jedra (t. 20: 304; 21: 337,339; 23: 391,395; 24: 397). Ta predstavljajo posebno morfološko obliko bi- in polipolarnih jeder ki so bila izrabljena na drugačen način kot ostala jedra na najdišču.

Pokazalo se je (tab. 4.1), da predstavljajo unipolarna jedra skoraj 20 % vseh odkritih jeder, bipolarna 45 %, polipolarna skoraj 25 % in diskasta jedra malo več kot 10 % vzorca.

Tab. 4.1: Količina in odstotna zastopanost različnih oblik jeder.

Tab. 4.1: Quantity and percentage of the various core forms.

| Oblika jedra / <i>Form of the core</i> | Število jeder / <i>No. of cores</i> | Odstotek / <i>Percentage</i> |
|---|--|---------------------------------|
| Unipolarno / <i>Unipolar</i> | 20 | 19,6 % |
| Bipolarno / <i>Bipolar</i> | 46 | 45,0 % |
| Polipolarno / <i>Polypolar</i> | 25 | 24,5 % |
| Diskasto / <i>Dyscoid</i> | 11 | 10,7 % |
| SKUPAJ / <i>TOTAL</i> | 102 | |

The site yielded 2.242 flakes, of which 302 retouched tools (13.4%) and 102 cores (4.5%). The analysis of these will concentrate particularly on individual categories of archaeological finds, arranged so as to give a logical structure to the text and to enable the final conclusions based on the typological and technological characteristics of the stone tools as well as an economic and cultural interpretation of the site. The first part will take a look at cores, this will be followed by a presentation of the problems tied to the raw material and the analysis of flakes and concluded by an overview and an interpretation of the retouched stone tools.

2 CORES

The site yielded 102 cores. This represents only 4.5% of all stone artefacts at the site but, on the other hand, one of the largest collections of cores on the Stone Age sites in Slovenia. The uncovered examples include almost all shapes and stages of raw material exploitation, while the heavily reduced or splintered cores are rare and the tested pebbles (precores) are missing completely. The catalogue gives their morphology as to the direction of percussion as well as surface colour, core size and form of preparing the striking platform for flake production. The cores were categorized into three groups based on the directions of percussion or on the number of the prepared striking platforms (unipolar (Pl. 20: 333; 22: 360, 365; 23: 394) bipolar (Pl. 20: 311,330, 334; 21: 335,340,351; 22: 356,370,371,373,376,378,385; 23: 386,388,391; 24: 402) and polypolar (Pl. 20: 306,334; 22: 380; 23: 392; 24: 403). A specific fourth category was added - discoid cores (Pl. 20: 304; 21: 337,339; 23: 391,395; 24: 397). The latter represent a specific morphological shape of the bi- and polypolar cores that were exploited differently to the other cores of the site. The analysis revealed (Tab. 4.1) that the unipolar cores represent almost 20% of all the uncovered cores of the sample, the bipolar 45%, the polypolar almost 25% and the discoid cores slightly over 10%.

Despite the suppositions of the unipolar cores representing the initial phase of core reduction, it was revealed that these are not typical precores but, in most cases, heavily exploited cores. The high number of unipolar cores did not include the otherwise typical pyramidal cores. It rather revealed the wedge-shaped cores that show a more intense reduction of flat pebbles, which were, due to the occasional working of the dorsal side of the core or the more intense preparation and renewal of the striking platform, in fact bipolar or even polypolar (Pl. 22: 377; 23: 388). The bi- and polypolar cores do not represent technologically very homogenous groups, since both predominantly include

Kljub domnevam, da bi unipolarna jedra lahko predstavljala začetne faze redukcije jeder, se je pokazalo, da ne gre za tipična predjedra, ampak v številnih primerih že intenzivno izrabljena jedra. Kljub večjemu številu unipolarnih jeder, tipična piramidalna jedra niso bila odkrita, odkrita pa so bila klinasta jedra, ki kažejo intenzivnejšo izrabo ploščatih prodnikov. In še ta jedra so bila zaradi občasne obdelave dorzalne strani jedra oziroma intenzivnejše priprave ter obnovitve udarne površine v bistvu bipolarna oziroma celo polipolarna (t. 22: 377; 23: 388). Skupini bipolarnih in polipolarnih jeder ne predstavljata tehnološko zelo homogenih skupin, saj gre v obeh predvsem za nepravilna jedra, pri katerih se zdi, da so izdelovalci namesto načrtne priprave oblike jedra, svojo tehnologijo izrabe prilagajali predvsem obliki prodnika oziroma lastnostim lomljenja posameznih jeder. Specifično skupino predstavljajo prizmatična jedra z dvema nasprotnima udarnima površinama (t. 20: 311,333; 21: 340; 22: 356,370), ki pa so v posameznih primerih močno izrabljena - na tej točki postane nejasna njihova tipološka opredelitev, saj bi jih prav tako lahko opisovali kot okrcane odbitke oziroma kot poliedrična oziroma prizmatična vbadala (t. 22: 378; 23: 394) (Brezillon 1968, 187,188).

V skladu s hipotezo o redukciji jeder, ki pravi, da so v primeru izkoriščanja standardnega vira surovin z minimalno izhodiščno variacijo velikosti izbranih surovin unipolarna jedra najmanj reducirana in zato največja ter polipolarna najbolj reducirana in posledično najmanjša, smo primerjali trende povprečnih merskih vrednosti jeder (tab. 4.2). Pri obdelavi velikosti unipolarnih jeder smo izpustili jedro št. 322, ker je le fragment pri katerem se je dalo določiti obliko jedra. Rezultati primerjave merskih vrednosti so pokazali trende, ki ne ustrezajo hipotezam (sl. 4.1). Unipolarna, bipolarna in polipolarna jedra so skoraj večinoma podobnih velikosti, še najbolj pa so pri vseh oblikah podobne povprečne vrednosti debelin. Diskasta jedra po povprečnih merskih vrednostih dolžine in širine izstopajo nad povprečje drugih skupin, vendar imajo debeline, ki so podobne kot pri ostalih jedrih. Tako lahko na osnovi primerjave merskih vrednosti jeder

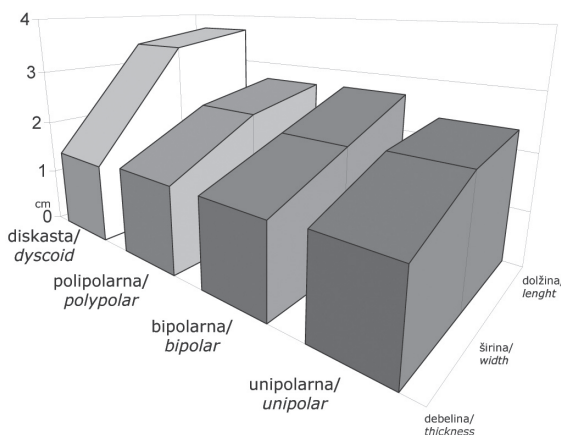
Tab. 4.2: Povprečne merske vrednosti jeder v centimetrih.
Tab. 4.2: Average size values of cores in cm.

| Oblika jeder / <i>Form of the core</i> | Dolžina / <i>Length</i> | Širina / <i>Width</i> | Debelina / <i>Thickness</i> | Št. jeder / <i>No. of cores</i> |
|---|----------------------------|--------------------------|--------------------------------|------------------------------------|
| Unipolarna / <i>Unipolar</i> | 2,33 | 2,18 | 1,64 | 19 |
| Bipolarna / <i>Bipolar</i> | 2,65 | 2,35 | 1,55 | 46 |
| Polipolarna / <i>Polypolar</i> | 2,67 | 2,12 | 1,56 | 25 |
| Diskasta / <i>Dyscoid</i> | 3,69 | 3,43 | 1,44 | 11 |

irregular cores for which it seems that the maker adapted his reduction technology mostly to the form of the pebble or to the breaking characteristics of individual cores rather than prepared the core form in advance. A specific group is represented by prismatic cores with two opposite striking platforms (Pl. 20: 311,333; 21: 340; 22: 356,370), which are heavily reduced in some cases - here their typological determination becomes unclear, since they could easily be described also as splintered pieces or as polyhedral / prismatic burins (Pl. 22: 378; 23: 394) (Brezillon 1968, 187,188).

The hypothesis of core reduction says that when exploiting a standard source of raw material with the minimal initial variation of its size, the unipolar cores are least reduced and therefore largest, while the polypolar are most reduced and smallest. With this hypothesis in mind, the trends of the average size values of cores were compared (Tab. 4.2). The analysis of the sizes of the unipolar cores did not include core no. 322, since it is only a fragment for which the core form could be determined.

The comparison of size values has shown trends that do not correspond with the above-mentioned hypothesis (Fig. 4.1). The uni-, bi- and polypolar cores are mostly of comparable sizes, with the most similar for all forms being the average thickness values. The discoid cores stand out from the other groups in their average values of length and width, while their thickness is similar. It may therefore be asserted that core size and core form are not the consequence of the degree of reduction that would originate from the duration of reduction, but rather that the manner of reduction and core working was dictated by the choice of the initial size of the raw material. Cores of all shapes - uni-, bi-, polypolar and discoid - were apparently discarded when reduced to a size that could no longer provide flakes morphologically fit either for use



Sl. 4.1: Grafičen prikaz povprečnih merskih vrednosti jeder.

Fig. 4.1: Graphic representation of the average size values of cores.

trdimo, da njihova velikost in oblika nista posledica stopnje reduciranosti, ki bi izvirala iz trajanja izkoriščanja, ampak je način izkoriščanja in obdelave jeder posledica izbire izhodiščne velikosti surovine. Očitno so bile jedra vseh oblik - unipolarna, bipolarna in polipolarna ter diskasta, zavržena, ko so bila zreducirana na določeno velikost, ki ni več omogočala odbijanje odbitkov, ki bi morfološko ustrezali za uporabo oziroma nadaljnjo obdelavo. Glede na velikost jeder lahko domnevamo, da je bila ta morfološka meja postavljena pri velikosti približno 2,5 centimetra.

Poskus primerjave trendov povprečnih merskih vrednosti dolžine, širine in debeline posameznih oblik jeder je pokazal, da pri unipolarnih, bipolarnih in polipolarnih jedrih ne obstajajo oziroma niso opazni trendi, ki bi omogočali povezovanje velikosti in specifične oblike jeder. V skladu s pričakovanji in posledično izhajajoč z njihove specifične oblike, kjer sta dolžina in širina v izhodišču skoraj enaki, pa se je pokazal pri diskastih jedrih trend ujemanja sinhronega povečanja merskih vrednosti širine in dolžine, debelina jeder pa je ostala ne glede na variacije velikosti dokaj nespremenjena (sl. 4.2). Posledično lahko domnevamo, da je pri teh jedrih predvsem debelina bila tista vrednost, ki je določala tehnološko stopnjo po kateri se ni več dalo z jedra uspešno objati uporabnih odbitkov.

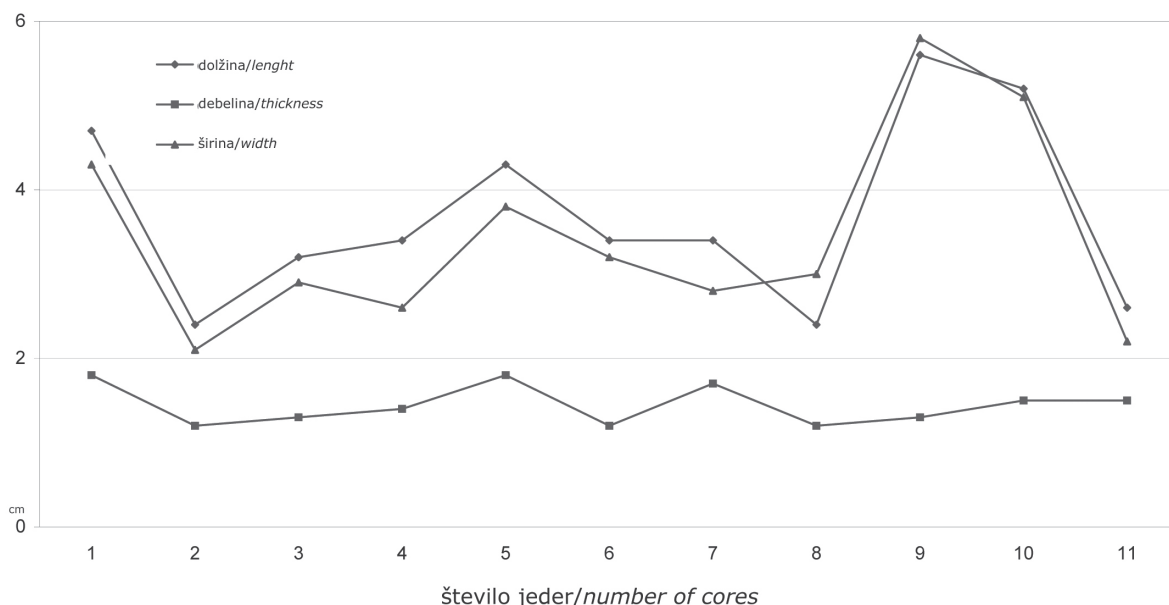
Na podlagi pomanjkanja trendov, ki bi prikazovali naraščanja med merskimi vrednostmi jeder, predvsem dolžine in širine lahko domnevamo, da so jedra postala neuporabna za nadaljnje izkoriščanje v trenutku, ko je vsaj ena od merskih vrednosti dolžine ali širine padla pod mejo 2,5 centimetra. Tako lahko podamo dve hipotezi o vlogi korelacije potencialne funkcije in velikosti odbitkov - ekonomsko in tehnološko. Obstaja možnost, da so vsi odbitki na najdišču večji od 2,5 centimetra potencialni polizdelki za nadaljnjo izdelavo

or for further working. The observed core size leads to the supposition that this morphological limit was set at approximately 2.5 cm. The comparison of the average size values of length, width and thickness of individual core forms revealed that the uni-, bi- and polypolar cores do not show or seem to show trends that would allow the core size to be connected to a specific core form. On the other hand, as expected that the discoid cores, as a result of their specific form where the length and the width are initially almost equal, revealed a trend of a corresponding increase of size values of width and length, while the thickness remained fairly constant throughout (Fig. 4.2). This in turn leads to the supposition that, of the sizes, it was mostly the thickness that determined the technological degree beyond which useful flakes could no longer be detached from the core.

The absence of the trend indicating an increase of the size values of cores, length and width in particular, leads to the supposition that cores became unsuitable for further reduction when at least one of the size values, either length or width, fell under the limit of 2.5 cm. Having said that, two hypotheses can be put forward as to the correlation of the potential function and flake size - an economic and a technological one. There is the possibility that all flakes at the site larger than 2.5 cm are potential semi-products for further tool production, while all flakes smaller than 2.5 cm are technological waste produced during the preparation of cores or during working or maintenance of

Sl. 4.2: Merske vrednosti diskastih jeder - primerjava dolžine, širine in debeline.

Fig. 4.2: Size values of the discoid cores - a comparison of length, width and thickness.



orodij, vsi odbitki manjši od 2,5 cm pa so tehnološki odpadki nastali pri pripravi jeder oziroma pri obdelavi in vzdrževanju orodij. Oziroma obstaja možnost, da izdelava odbitkov manjših od 2,5 cm ni bila tehnološko izvedljiva. Najboljšo potrditev prve hipoteze bi lahko nudila analiza makroskopskih in mikroskopskih sledi uporabe neretuširanih odbitkov, vendar zaradi specifičnih okoliščin odkritja v vodi ter organske prevleke na odbitkih, uporaba metode ni možna.

Na drugi strani pa lahko glede na rezultate povprečnih merskih vrednosti debeline jeder pri vseh štirih kategorijah domnevamo, da tehnika izrabe jeder očitno ni omogočala izkoriščanja jeder, ki so bila tanjša od 1,5 centimetra. Glede na že tako majhne merske vrednosti jeder in talonov odbitkov moramo domnevati, da so odbitke izdelovali z indirektnim odbijanjem, pri čemer so jedro morali jedro vpeti v neke vrste konstrukcijo, ki je omogočala njegovo stabilnost. Tako lahko domnevamo, da je bila minimalna debelina, ki so jo še lahko vpeli, ne glede na oblikovanje jedra okoli centimetra in pol.

Posebnost med obravnavanimi jedri predstavljajo diskasta jedra. V prvi fazi obdelave so radialno na ventralni strani pripravili udarne površine za dekorifikacijo dorzalne površine, v drugi fazi so radialno odstranili korteks z dorzalne površine in s tem pripravili obliko dorzalne strani bodočega odbitka, v tretji fazi so izdelali na ventralni strani udarno površino za odbijanje pripravljene odbitka in v četrti fazi so z dorzalne strani odbili večji tanek odbitek pripravljene oblike. Že v arheološki teoriji o ekonomiji srednjega paleolitika se *levallois* jedra opisujejo kot ekonomsko drag način izdelovanja odbitkov z vnaprej določeno morfološko obliko, saj pri pripravi in oblikovanju jedra večino surovine spremenijo v odpadke - posledično je bila tudi njihova meja uporabnosti oziroma velikost, ko niso bila več uporabna za nadaljnjo uporabo, višja kot pri ostalih oblikah jeder. Pri pregledu odkritih jeder na najdišču ugotovimo, da pri nekaterih osrednjih odbitek ni bil odstranjen.

Podobni jedri sta bili na prostoru Slovenije do sedaj odkriti na najdiščih Breg pri Škofljici (neobjavljena izkopavanja Oddelka za arheologijo Filozofske fakultete Univerze v Ljubljani) in Viktorjev spodmol (Turk 2004, t. 1: 3,4). Jedro na Bregu je bilo izdelano iz močno preperlega tufa in velika količina odbitkov iz podobne surovine v plasti lahko interpretiramo kot znak za izdelavo in redukcijo jeder na najdišču. Jedra odkrita v Zalogu sicer niso izdelana iz tufa, vendar so kar 3 od 11 močno preperela, eno pa je celo bilo izpostavljeno visokim temperaturam (jedro št. 362) - edino na najdišču. Tako lahko domnevamo, da so za tehniko obdelave, ki je na koncu ustvarila diskasta jedra, izbirali mehkejša kamnine (tufe, preperle rožence), ki so hitreje preperemale. Vendar pa ostaja pomen teh jeder še vedno nepojasnen - kljub domnevno ekonomsko dragi

tools. The other possibility is that the production of useful flakes smaller than 2.5 cm was technologically not possible. The first hypothesis could best be confirmed by an analysis of the macro- and microscopic usewear traces on the unretouched flakes. Unfortunately, this method cannot be used due to the specific circumstances of the finds being uncovered in water as well as an organic coating on the flakes. On the other hand, the results of the average size values of core thickness in all four categories allows us to suppose that the technique of core reduction apparently did not enable cores thinner than 1.5 cm to be used. Considering the already very small size values of cores and striking platforms of flakes, it is supposed that the flakes were produced by indirect percussion, whereby the core had to be inserted into some sort of a structure that gave it stability. The minimal thickness that still allowed the insertion must therefore have measured approximately 1.5 cm. The discoid cores represent a particularity among the cores of the Zalog site. Their production had four phases; in the first phase the striking platforms on the ventral side were radially prepared for the decortication of the dorsal side, in the second phase the cortex was radially removed from the dorsal side and thereby the form of the dorsal side of the future flake was prepared, in the third phase a striking platform on the dorsal side was made so as to knap off the prepared flake and in the fourth phase a large thin flake of a prepared form was knapped off the dorsal side. Already the archaeological theory on the economy of the Middle Palaeolithic describes the *Levallois* cores as an economically expensive manner of producing flakes with a predetermined form, since during the preparation and forming of the core most of the raw material is discarded. Consequentially, also their limit of usefulness, that is the size below which they were no longer of use, was higher than in other core forms. The overview of the cores at the Zalog site revealed that some cores did not have the central flake removed.

In the Slovene area, two similar cores were so far discovered, at the site of Breg near Škofljica (unpublished excavations of the Department of Archaeology, Faculty of Arts, University of Ljubljana) and at the rock shelter of Viktorjev spodmol (Turk 2004, Pl. 1: 3,4). The core from Breg was made of heavily weathered tuff and the high amount of flakes of similar raw material in the same layer can be interpreted as a sign of core production and reduction at the site. The cores found at Zalog are not made of tuff, but 3 of 11 cores are heavily weathered, one was even exposed to high temperatures (core no. 362). It can therefore be supposed that softer rocks (tuffs, weathered cherts) that weathered quickly were chosen when using the working technique that produced discoid cores. The significance of these cores remains unexplained. Despite their supposedly economically costly production and

ter tehnološko zapleteni tehnologiji priprave, obdelave in izrabe jedra, odbitki s teh jeder niso igrali nobenih pomembnejših vlog pri kasnejši uporabi in obdelavi.

2.1 Surovine

Zaradi stanja ohranjenosti surovin oziroma razmer, v katerih so bila odkrita, natančnejši opis surovin in njihova makroskopska določitev nista možna. Barva večine odbitkov in jeder je močno spremenjena, posamezne primerke pa pokriva debela organska obloga, ki je z minimalnimi posegi, ki ne bi poškodovali strukture in oblike preperelih orodij iz mehkejših kamnin, ni bilo mogoče odstraniti.

Izjemo predstavljajo odbitki iz kristalnega kremenca in iz kalcedona, katerih barva je bila sicer nekoliko spremenjena, vendar se na njihovo površino organske obloge očitno niso prijela. Prav tako so prepoznavni odbitki iz površinsko močno preperelega tufa. Posledično so bile surovine opisane zgolj glede na barvo površine odbitka in ti opisi ne morejo predstavljati analitičnih kategorij.

Potrebno je izpostaviti, da kljub številnim odbitkom in orodjem niso bila odkrita jedra iz tufa in iz kalcedona. Številna jedra iz tufa in kalcedona ter odbitki in orodja, ki nakazujejo na obdelavo jeder na teh najdiščih, so bili na področju Ljubljanskega Barja odkriti na Bregu pri Škofljici (najdbe hrani Oddelek za arheologijo). Glede na dejstvo, da so v Ljubiji bili odkriti zgolj redki odbitki in orodja iz obeh surovin, lahko domnevamo v skladu s teorijami o redukciji velikosti surovine v sorazmerju z oddaljenostjo od vira (Close 1999), da so se viri obeh surovin nahajali bližje prej omenjenemu najdišču. Horvat omenja vire v pasu od Sostrega proti Rašici in v okolici Cerknice (Horvat, v tem zborniku).

Bližina je v tem primeru tako prostorski kot socialni dejavnik. Prostorski dejavnik lahko pomeni, da je skupnost imela direkten dostop do vira in da se je v okviru procesov logistične mobilnosti v pokrajini surovine prinašalo z vira na najdišče, kjer so se obdelovale, socialno pa lahko pomeni, da so imeli intenzivne stike z nekom, ki je imel dostop do surovine in jim jo je posredoval. V primeru Zaloga se zaplete z interpretacijo odsotnosti jeder in večjega števila odbitkov iz tufa in kalcedona, saj bi lahko ta bila posledica neobstoja teh tehnoloških skupin na najdišču ali pa posledica obdelovanja obeh surovin na drugem, neodkritem, delu najdišča. Menimo, da bo razlaga tega možna šele v trenutku, ko bomo poznali in obdelali še vsaj eno, po možnosti prostorsko bližnje, najdišče iz istega obdobja.

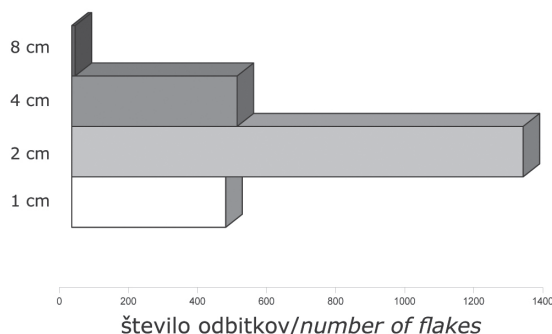
the technologically complicated technique of preparation, working and reduction, the flakes from these cores did not play a significant role in later use and working.

2.1 Raw material

The state of preservation and the conditions in which the finds were uncovered prevent us from giving a more precise description of the raw materials and their macroscopic determination. The colour of most flakes and cores is significantly altered, while some examples are covered by a thick organic coating that could not be removed without minimal interventions that would damage the structure and form of the weathered tools made of softer rocks. An exception is the flakes made of rock crystal and chalcedony where the colour did alter slightly, but the organic coating could apparently not stick to the surface. Also recognizable are the flakes made of tuff with a highly weathered surface. The different raw materials were described purely based on the surface colour of the flake, which cannot represent analytical categories. It needs to be emphasized that, despite the numerous flakes and tools, there were no cores made of tuff or chalcedony found at the site. In the Ljubljansko barje area, numerous cores made of these two materials as well as flakes and tools that indicate the working of cores were found at Breg near Škofljica (the finds are kept at the Department of Archaeology, University of Ljubljana). Considering the fact that the Zalog yielded only rare flakes and tools of the two materials, it may be supposed, in accordance with theories on the reduction of the raw material size in relation to the distance from the source of the raw material (Close 1999), that the sources of both materials were situated closer to the site of Breg near Škofljica. Horvat mentions sources in a band from Sostro towards Rašica and in the surroundings of Cerknica (Horvat, in this publication). Vicinity was, in this case, a spatial as well as a social factor. The spatial factor can indicate that the community had direct access to the source and that the raw material was brought from the source to the site within the processes of logistic mobility. The social factor can, on the other hand, indicate that the community had intense contacts with a party that had access to the raw material and that provided the supply. In the case of Zalog, the interpretation of the absence of cores and large number of flakes made of tuff and chalcedony is complicated, since the absence could be either the consequence of an inexistence of these technological groups at the site or of working of the said materials at another, undiscovered part of the site. We believe that it will be possible to resolve this problem only when at least one other site, possibly not very distant and from the same period, will be known and analyzed.

3 ODBITKI

Skupaj je bilo odkritih 2.242 odbitkov in z retuširanjem obdelanih orodij. Vse odbitke nastale v procesu izdelave retuširanih kamnitih orodij smo razdelili v štiri velikostne razrede (8 centimetrov (vsi odbitki večji od 6 cm), 4 centimetre (3 do 6 centimetrov), 2 centimetra (1,5 do 3 centimetre) in 1 centimeter (1,5 centimetra in manjši)), v tri razrede ohranjenosti (celi odbitki, fragmentirani odbitki, fragmenti odbitkov) in v dve obliki (klina, odbitek). Tako smo odkrili 10 kosov iz velikostnega razreda 8 cm, 479 iz razreda 4 cm, 1.307 iz razreda 2 cm in 446 odbitkov iz velikostnega razreda 1 cm (sl. 4.3). Ročno je bilo v strugi potoka zbranih 130 enot najdb, pri čemer so bile zbiralne enote 119, 120, 122 in 130 testno zbrane s sesalko.



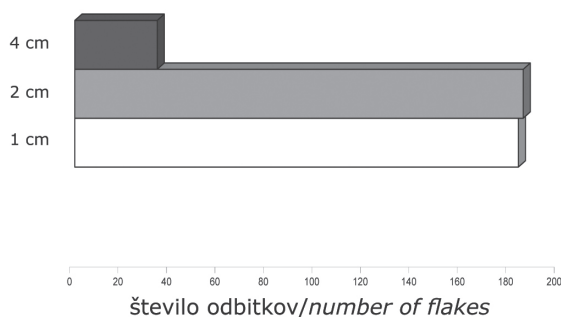
Sl. 4.3: Grafičen prikaz količine odkritih odbitkov po merskih kategorijah.

Fig. 4.3: Graphic representation of the quantity of uncovered flakes in individual size classes.

Graf zastopanosti posameznih velikostnih skupin je pokazal naraščanje števila odbitkov od velikostne skupine 8 cm proti skupini 2 cm ter radikalen upad velikostne skupine 1 cm. Domnevamo, da je vzrok tega pojava ročno zbiranje najdb v potoku in ne erozijsko delovanje rečnega toka. Hipotezo smo preverili s primerjavo z grafom odbitkov v štirih testnih zbiralnih enotah, kjer so bili odbitki zbrani s sesalko (sl. 4.4). Graf je pokazal enako količino odbitkov iz velikostnih razredov 2 in 1 cm. Na osnovi rezultatov lahko domnevamo, da je pomanjkanje odbitkov velikostnega razreda 1 cm na najdišču predvsem posledica ročnega zbiranja najdb. Še vedno pa bi pričakovali, da bi bilo odbitkov velikostnega razreda 1 cm več od odbitkov velikostnega razreda 2 cm. Eksperimenti avtorja prispevka so pokazali, da pri eksperimentalnem izdelovanju in ponovnem retuširanju srednjepaleolitskih orodnih tipov (strgal s stopnjevito školjkovito retušo) nastane večina odbitkov velikostnega razreda 1 cm in manj. Njihovo pomanjkanje na najdišču bi lahko razložili z dvema dejavnikoma, pri čemer ni nujno, da se ta izključujeta:

3 FLAKES

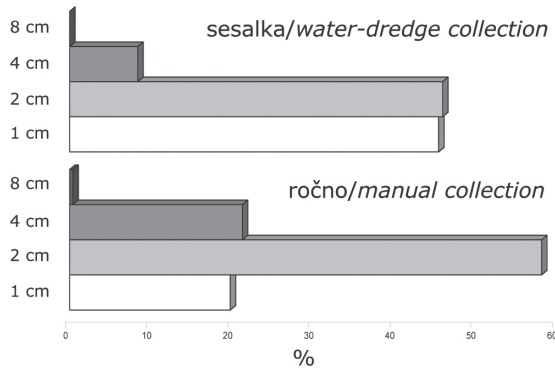
There were 2,242 flakes and retouched tools uncovered in total. The flakes that were produced during the process of making retouched stone tools were divided into four size classes (8 cm (all flakes larger than 6 cm), 4 cm (3 to 6 cm), 2 cm (1.5 to 3 cm) in 1 cm (1.5 cm and smaller)), into three classes of preservation (complete flakes, fragmented flakes, flake fragments) and into two forms (blade, flake). There were ten pieces of the 8 cm size class discovered, 479 of the 4 cm size class, 1.307 of the 2 cm size class and 446 flakes of the 1 cm size class (Fig. 4.3). There were 130 find units manually collected in the stream bed, whereby the collection units 119, 120, 122 and 130 were test-collected with a water dredge.



Sl. 4.4: Grafičen prikaz količine odbitkov zbranih s sesalko po merskih kategorijah.

Fig. 4.4: Graphic representation of the quantity of water-dredge-collected flakes in individual size classes.

The graph of the representation of individual size classes showed an increase in the number of flakes from the class of 8 cm towards the class of 2 cm as well as a sharp drop in the class of 1 cm. We believe that the cause of this lies in the hand-collection of finds from the stream bed rather than the erosive activity of the water current. This hypothesis was verified by comparing the results with a graph of flakes from the four test units collected with a water dredge (Fig. 4.4). The graph showed equal quantities of flakes from the size classes of 2 and 1 cm. The results allow us to suppose that the lack of flakes of the 1 cm size class on the site is mostly the consequence of hand-collecting the finds. Nevertheless, we would still expect there to be more flakes of the 1 cm size class than those of 2 cm. Experiments of the author have shown that the experimental production and repeated retouching of the Middle Palaeolithic tool types (side scrapers with scaliform conchoidal retouch) mostly produce flakes of the 1 cm size class or less. The lack of these at the site could be explained with the aid of two sets of factors that do not necessarily exclude each other:



Sl. 4.5: Grafičen prikaz odstotnih deležev odbitkov po merskih kategorijah.

Fig. 4.5: Graphic representation of the percentages of flakes in individual size classes.

- Naravni dejavniki oziroma podepozicijski procesi. Delovanje vodnega toka je odplavilo lažje odbitke manjše od 1 cm nižje po toku - posledično bi moralo obstajati obratno sorazmerje med velikostnima razredoma odbitkov 1 in 4 cm. Odbitki večjega velikostnega razreda bi se morali povprečno nahajati v večjih deležih v zbiralnih enotah bližje viru najdb (erodirani kulturni plasti) kot odbitki manjšega velikostnega razreda.

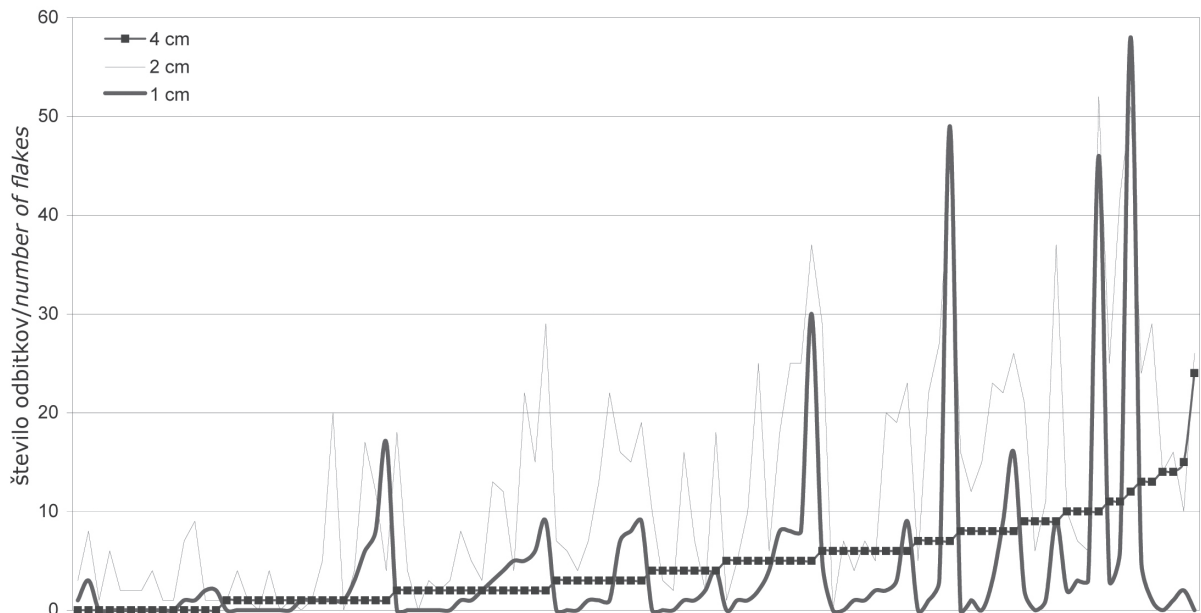
- Človeški dejavniki oziroma depozicijski procesi. Obdelava jeder, izdelava orodij in obdelava orodij, ki ustvarita največje število manjših odbitkov, sta

- Natural factors or post-depositional processes. The action of the water current washed away flakes smaller than 1 cm downstream - consequentially the size classes of 1 and 4 cm would have to be in inverse proportion. The flakes of the higher size class would on average have to appear in larger shares in the collection units closer to the source of the finds (the eroded cultural layer) than the flakes of the smaller size class.

- Human factors or depositional processes. Working of cores, production and working of tools that produce most small flakes took place elsewhere and the remains of these processes are not represented in the uncovered tool collection. Only the reduction of the already prepared cores and the use of the already produced tools that create more of large and little of small flakes, took place at the site.

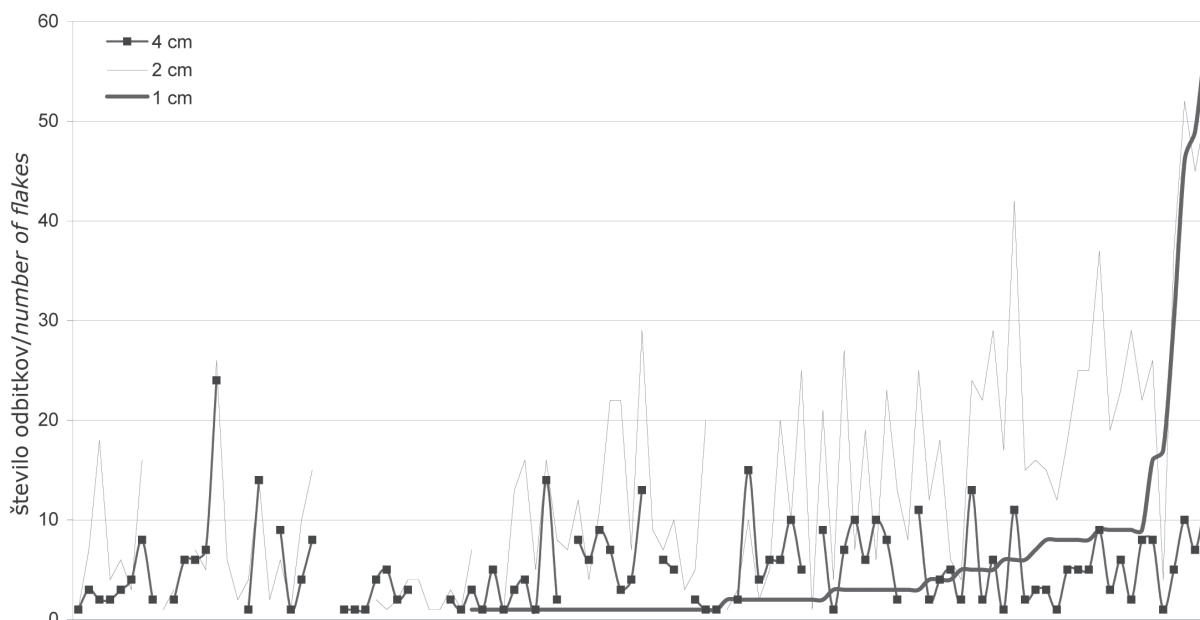
In order to make an estimate of the representation of flakes on the site, the percentage graphs of individual size classes of hand- and dredge-collected flakes were compared (Fig. 4.5). The comparison showed that hand-collection yielded less flakes of the 1 cm size class and that, considering the correction with the data on the dredge-collected flakes, their quantity is equal to the quantity of flakes of the 2 cm size class. In other words, the site probably lacks small flakes made during the production and maintenance of tools.

One of the key difficulties in interpreting the site is also the problem of the deposition of the uncovered finds, that is interpreting the uncovered concentrations of flakes. Considering the fact that water undermined



Sl. 4.6: Grafičen prikaz naraščanja količin odbitkov v zbiralnih enotah v primeru, ko je osnova, ki linearno narašča število odbitkov iz velikostnega razreda 4 cm.

Fig. 4.6: Graphic representation of the increase in flake quantity in collection units when the linearly increasing basis is the number of flakes of the 4 cm size class.



Sl. 4.7: Grafičen prikaz naraščanja količin odbitkov v zbiralnih enotah v primeru, ko je osnova, ki linearno narašča število odbitkov iz velikostnega razreda 1 cm.

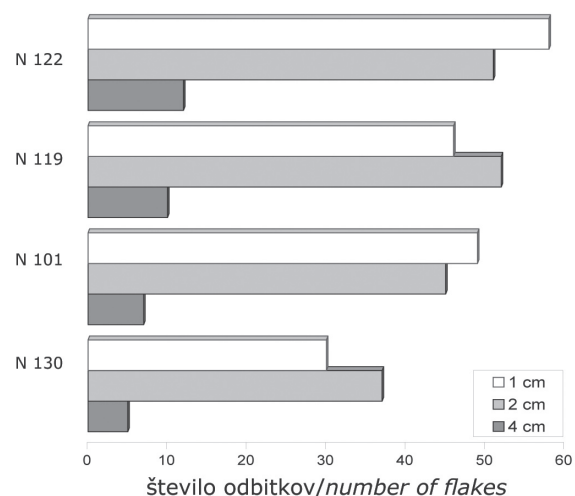
Fig. 4.7: Graphic representation of the increase in flake quantity in collection units when the linearly increasing basis is the number of flakes of the 1 cm size class.

potekali na drugem kraju in ostanki teh procesov niso zastopani v odkritem orodnem zbiru. Na najdišču je potekala zgolj redukcija že pripravljenih jeder in uporaba že izdelanih orodij, ki ustvarjata več velikih in malo majhnih odbitkov.

Da bi ustvarili oceno zastopanosti odbitkov na najdišču smo primerjali grafične ponazoritve odstotnih deležev posamičnih velikostnih skupin odbitkov zbranih ročno in zbranih s sesalko (sl. 4.5). Pokazalo se je, da se je pri ročnem zbiranju zbralo manj odbitkov iz velikostne skupine 1 cm, ter da je glede na korekcijo z podatki o odbitkih zbranih s sesalko, njihova količina enaka količini odbitkov velikostnega razreda 2 cm. Z drugimi besedami - na najdišču smo verjetno pričla pomanjkanju majhnih odbitkov, ki bi nastali pri izdelavi in vzdrževanju orodij.

Ključni problem interpretacije najdišča je tudi problematika depozicije odkritih najdb, oziroma interpretacija odkritih koncentracij odbitkov. Glede na dejstvo, da je voda spodjedla potočni breg ter premaknila arheološke najdbe, smo pričakovali normalno distribucijo v primeru, da bi za osnovo vzeli količino 4 centimetre velikih odbitkov - količina majhnih odbitkov bi morala biti obratno sorazmerna s količino večjih odbitkov. Vodni tok naj bi najmanj premaknil 4 centimetre velike odbitke, malo več 2 centimetra velike odbitke in največ 1 centimeter velike odbitke. Seveda je problem, ki se ga moramo zavedati pod-

the stream bank and moved the archaeological finds, normal distribution would be expected if the quantity of 4 cm flakes were taken as the basis; the quantity of small flakes would then have to be inversely proportioned with the quantity of large flakes. The water current should have moved the 4 cm flakes least, slightly more those of 2 cm and most those of 1 cm. Having said this, the problem of an underrepresentation of the 1 cm size class flakes needs to be kept in mind, since the collection in water was conducted manually. The continuous increase of the quantity of 4 cm flakes



Sl. 4.8: Grafičen prikaz odstotnih zastopanosti odbitkov pri zbiranju s sesalko v primeru, ko so osnova, ki linearno narašča, odbitki iz velikostnega razreda 4 cm.

Fig. 4.8: Graphic representation of the percentages of flakes obtained by water-dredge-collection when the linearly increasing basis is the flakes of the 4 cm size class.

zastopanost odbitkov velikostnega razreda 1 cm, ker je bilo zbiranje v vodi opravljeno ročno. V graf smo vnesli kot osnovo zvezno naraščanje števila odbitkov velikosti 4 cm. V primeru, da je vodni tok prizadel in oblikoval vzorec depozicije majhnih odbitkov, bi morala njihova koncentracija težiti proti delu z manjšim deležem večjih odbitkov.

Rezultati grafične primerjave velikostnih skupin so pokazali nasprotno (sl. 4.6). V primeru ko smo za osnovo vzeli količino odbitkov velikosti 4 cm, ki naj bi bili najmanj premaknjeni, se je pokazalo, da se je s povečevanjem števila sorazmerno povečevalo tudi število odbitkov velikostnih razredov 2 in 1 cm - vendar ni šlo za zvezno naraščanje, kar nas vodi v domnevo, da je trend bil opazovan zgolj v posameznih zbiralnih enotah, ki so s svojimi klinami vizualno oblikovale podobo grafa. Da bi preverili situacijo smo proces ponovili, pri tem da smo za osnovo vzeli količino odbitkov velikosti 1 cm (sl. 4.7). Tudi tokrat ujemanje naraščanja števila odbitkov s prisotnostjo odbitkov velikostnega razreda 4 cm ni bilo izrazito, je pa kljub vsemu pokazalo boljši rezultat kot prikaz naraščanja najmanjših odkritih odbitkov. Lahko bi kljub vsemu lahko domnevali šibko ujemanje z velikostnim razredom 2 cm, ki pa se močno poveča v zadnjem delu krivulje. Zadnji del krivulje predstavljajo štirje kontrolni vzorci, ki so bili zbrani s sesalko ter vsebujejo višjo koncentracijo manjših odbitkov. Zaradi objektivnejše metode vzorčenja lahko domnevamo, da ti vzorci predstavljajo realnejši odraz distribucije najdb odbitkov.

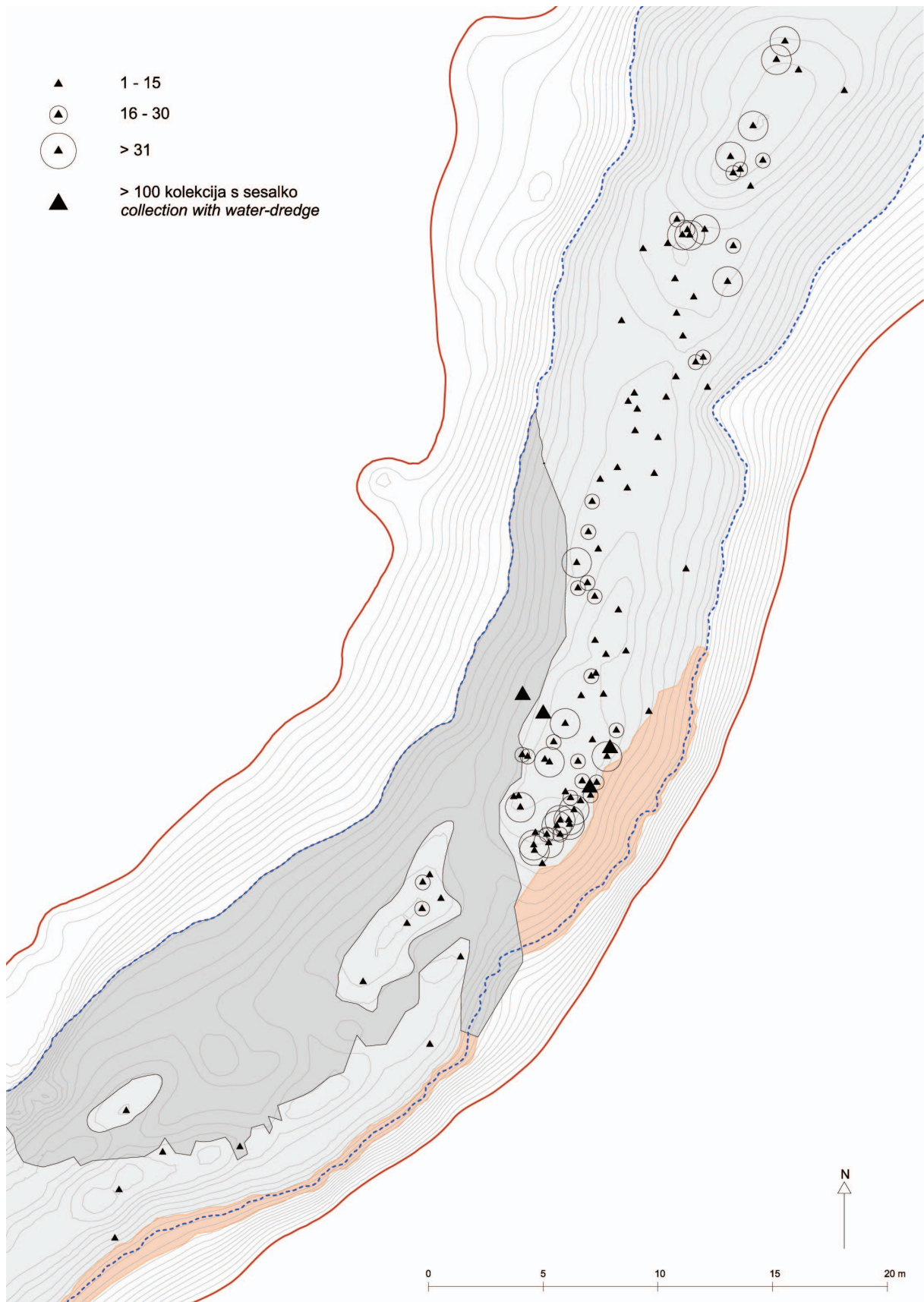
Na podlagi teh štirih vzorcev smo ponovno preverili ujemanje naraščanja števila odbitkov, pri modelu, kjer je za osnovo vzeto naraščanje odbitkov iz velikostnega razreda 4 cm (sl. 4.8).

Rezultati primerjav količinskih zastopanosti odbitkov so pokazali sorazmerno naraščanje vseh treh velikostnih skupin odbitkov. Kljub dejstvu, da so se s sesalko pobrane zbiralne enote nahajale dokaj blizu erodirane kulturne plasti ter da so se nahajale relativno blizu skupaj, lahko domnevamo, da so bili odbitki v Ljubiji zaradi delovanja vodnega toka zgolj minimalno premaknjeni, hkrati pa lahko ugotovimo, da je ročno zbiranje najdb, kljub manjšemu številu najmanjših najdb, ustvarilo primerljiv vzorec kot zbiranje s sesalko. Za preverbo trditev bi lahko opazovali še količine odbitkov v posameznih zbiralnih enotah ter njihovo distribucijo v koritu potoka (sl. 4.9). Vendar so bile največje koncentracije najdb odkrite neposredno pod erodirano kulturno plastjo, kar sicer govori v prid majhni premaknitvi, hkrati pa lahko opazimo, da je na tem mestu korito najgloblje. Druga večja koncentracija se pojavlja nizvodno prav tako v poglobitvi. Posledično lahko sklepamo, da minimalna premaknjenost najdb ni zgolj posledica jakosti vodnega toka, ampak tudi reliefa potočnega korita.

was taken as the basis for the graph. When the water current influenced and formed the sample of the deposition of small flakes, their concentration should have a tendency towards the part with a small share of large flakes.

The results of the comparison have shown the opposite (Fig. 4.6). When the quantity of the supposedly moved 4 cm flakes was taken as the basis, the comparative graph revealed that by increasing their number also the number of flakes of the 1 and 2 cm size classes proportionally increased. The increase, however, was not continuous, which leads to the supposition that the trend was being observed only in individual collection units that visually shaped the graph with their peaks. In order to verify the result the process was repeated, taking as the basis the quantity of 1 cm flakes (Fig. 4.7). In this case as well the corresponding increase in the number of flakes with the presence of flakes of the 4 cm size class is not exact, but it nevertheless gave a better result than the graph of the increase in the smallest uncovered flakes. A slight agreement with the 2 cm size class, which greatly increases in the last part of the curve, could nevertheless be supposed. The last part of the curve is represented by four control samples, dredge-collected and containing a high concentration of smaller flakes. Due to the more objective sampling method it may be supposed that these samples represent a more accurate picture of the distribution of flakes. Based on these four samples, the corresponding increase of flake quantity was verified again on a model where the increase in the quantity of flakes from the 4 cm size class was taken as the basis (Fig. 4.8).

The comparison of the quantitative representations of flakes has shown a proportionate increase of all three size classes of flakes. Despite the fact that the dredge-collected units were situated fairly close to the eroded cultural layer and relatively close to one another, it may be supposed that the flakes in the Ljubija were only minimally moved by the water current. It may also be observed that hand-collection of finds created a comparable sample to dredge-collection in spite of the smaller number of the smallest finds. In order to verify these assertions, the quantity of flakes in individual collection units and their distribution in the stream bed could also be observed (Fig. 4.11). However, the largest concentrations of finds were uncovered directly underneath the eroded cultural layer, which speaks for the finds being slightly moved, but it can at the same time be observed that the channel is at its deepest at this point. The second large concentration appears downstream, also in a deepening. It may therefore be supposed that the minimal move of the finds is not merely a consequence of the force of the water current, but also of the relief in the stream bed.



Sl. 4.9: Kvantitativna zastopanost najdb odbitkov v strugi (izvedba: Miran Erič).

Fig. 4.9: Quantitative representation of flakes in the stream bed (made by: Miran Erič).

3.1 Retuširana orodja

Na najdišču sta bili odkriti 302 orodji, kar predstavlja 13,4 % vseh odkritih odbitkov. Pri retuširanih orodjih smo opisali vrsto retuše in njeno pozicijo na odbitku ter na koncu določili orodni tip. Kljub velikemu številu retuširanih orodij je število na najdišču odkritih orodnih tipov dokaj omejeno - določenih je bilo zgolj 23 različnih tipov orodij oziroma zgolj 16 orodnih tipov (orodje z drobtinčasto retušo, retuširano orodje, orodje z izjedo, nazobčano orodje, praskalo, odbitek s strmo retušo, okrcan odbitek, retuširano jedro, strgalo, strgalce, oblič, klinica s hrptom, sveder, vbadalo in trikotnik), ki so bili izdelani na dveh različnih oblikah

| | | | |
|----|---|-----|--------|
| 1 | Odbitek z drobtinčasto retušo / <i>Flake with nibbling retouch</i> | 52 | 17,2 % |
| 2 | Klina z drobtinčasto retušo / <i>Blade with nibbling retouch</i> | 18 | 5,9 % |
| 3 | Retuširan odbitek / <i>Retouched flake</i> | 66 | 21,8 % |
| 4 | Retuširana klina / <i>Retouched blade</i> | 26 | 8,6 % |
| 5 | Odbitek z izjedo / <i>Notched flake</i> | 20 | 6,6 % |
| 6 | Klina z izjedo / <i>Notched blade</i> | 3 | 0,9 % |
| 7 | Nazobčan odbitek / <i>Denticulated flake</i> | 11 | 3,6 % |
| 8 | Nazobčana klina / <i>Denticulated blade</i> | 2 | 0,6 % |
| 9 | Praskalo / <i>Endscraper</i> | 14 | 4,6 % |
| 10 | Atipično praskalo / <i>Atypical endscraper</i> | 15 | 4,9 % |
| 11 | Praskalo na klini / <i>Endscraper on a blade</i> | 5 | 1,6 % |
| 12 | Krožno praskalo / <i>Circular endscraper</i> | 3 | 0,9 % |
| 13 | Strgalo / <i>Side scraper</i> | 31 | 10,2 % |
| 14 | Strgalce / <i>Raclette</i> | 11 | 3,6 % |
| 15 | Oblič / <i>Rabot</i> | 5 | 1,6 % |
| 16 | Vbadalo / <i>Burin</i> | 2 | 0,6 % |
| 17 | Sveder / <i>Borer</i> | 2 | 0,6 % |
| 18 | Klinica s hrptom / <i>Backed bladelet</i> | 8 | 2,6 % |
| 19 | Odbitek s strmo retušo / <i>Flake with steep retouch</i> | 1 | 0,3 % |
| 20 | Klina s prečno retušo / <i>Truncated blade</i> | 2 | 0,6 % |
| 21 | Trikotnik / <i>Triangle</i> | 2 | 0,6 % |
| 22 | Okrcan odbitek / <i>Splintered flake</i> | 3 | 0,9 % |
| 23 | Retuširano jedro / <i>Retouched core</i> | 1 | 0,3 % |
| | SKUPAJ / TOTAL | 302 | |

3.1 Retouched tools

The site yielded 302 tools, which represents as much as 13.4% of all uncovered flakes. The description of retouched tools includes the type of retouch and its position on the flake as well as a determination of the tool type. In spite of the large number of retouched tools, the number of tool types uncovered at the site is fairly limited - there were only twenty-three different types of tools and only sixteen tool types (tool with nibbling retouch, retouched tool, notched tool, denticulated tool, end scraper, flake with steep retouch, splintered piece, retouched core, side scraper, raclette, rabot, backed bladelet, borer, burin, triangle). They are made on two different forms of semi-products (blade or flake). Although there were almost no unretouched blades found at the site, the overview of tool types revealed that 21.4% of all retouched tools were made on blades (Tab. 4.3).

Stone tools were divided into two groups. The first group is constituted by general tool forms, that is forms where the shape is supposed to be largely determined by its use and does not express the stylistic tendencies of the maker for an intentional shaping that would be important for the determination of their cultural appurtenance. Put simply, the group is constituted by functional tools and the supposedly multi-purpose tools. The second group of special forms is constituted by the tools, for the production of which greater skill was needed as well as an investment of time on the part of the maker. They are supposed to be produced so as to carry out certain activities and their presence plays a more important role in the cultural interpretation of the site.

The overview of percentages showed that the six most numerous groups include retouched flakes (21.8% - Pl. 1: 4,6,9,11,12; 2: 34,37; 3: 40,41,50,51,52,53; 4: 57; 5: 80; 6: 85,87; 6: 90; 7: 101,105; 8: 109,115,118; 9: 132,133; 10: 138,144,148; 11: 154; 12: 169,175; 13: 186; 14: 202,212,219; 15: 228; 16: 237,242,247; 17: 256,263; 18: 276,277; 19: 300,301), flakes with nibbling retouch (17.2% - Pl. 1: 15; 2: 24; 3: 46; 4: 60,64; 5: 74,75,82,84; 6: 89,92; 7: 103; 8: 120; 9: 128; 10: 130,145,147; 11: 149,151,152,158,161; 12: 167,173,174; 13: 185,189; 14: 200,203,217; 15: 235; 17: 257,259,262,265,273; 18: 266,267,274,283), retouched blades (8.6% - Pl. 2: 33; 3: 47,51; 4: 58,59,62,71; 5: 76,79,81; 6: 91; 7: 96; 10: 150; 11: 156,157; 12: 184; 13: 197; 15: 229; 16: 234,239; 17: 264,270; 19: 288,296) and blades with nibbling

Tab. 4.3: Lista tipov kamenih orodij, število orodij in njihov odstotni delež v skupku.

Tab. 4.3: List of the types of stone tools, the number of tools and their percentage in the assemblage.

polizdelkov (klini ali odbitku). Čeprav na najdišču skoraj ni bilo odkritih nobenih neretuširanih klin, je pregled orodnih tipov pokazal, da je bilo 21,4 % vseh retuširanih orodij narejenih na klinah (*tab. 4.3*).

V obravnavi smo kamnita orodja razdelili v dve skupini. V prvo smo uvrstili generalne oblike orodij, to je tiste oblike, za katere se domneva, da je njihova oblika v večji meri določena z njihovo funkcijo in po svoji oblikovanosti ne izražajo stilnih tendenc izdelovalca za namensko oblikovanje, ki bi pri interpretaciji imelo pomen pri določanju kulturne pripadnosti. Eno-stavneje povedano, v to skupino smo uvrstili funkcionalna orodja in domnevno večnamenska orodja. V drugo skupino posebnih oblik orodij pa smo uvrstili tista orodja, za izdelavo katerih je bila potrebna večja spretnost ter časovna investicija izdelovalca ter za katera se domneva, da so bila namenjena za izvajanje določenih dejavnosti. Gre za tista orodja, katerih prisotnost igra pomembnejšo vlogo pri kulturni interpretaciji najdišča.

Pri pregledu odstotnih vrednosti se je pokazalo, da se med šestimi najštevilčnejšimi skupinami nahajajo retuširani odbitki (21,8 % - *t. 1*: 4,6,9,11,12; 2: 34,37; 3: 40,41,50,51,52,53; 4: 57; 5: 80; 6: 85,87; 6: 90; 7: 101,105; 8: 109,115,118; 9: 132,133; 10: 138,144,148; 11: 154; 12: 169,175; 13: 186; 14: 202,212,219; 15: 228; 16: 237,242,247; 17: 256,263; 18: 276,277; 19: 300,301), odbitki z drobtinčasto retušo (17,2 % - *t. 1*: 15; 2: 24; 3: 46; 4: 60,64; 5: 74,75,82,84; 6: 89,92; 7: 103; 8: 120; 9: 128; 10: 130,145,147; 11: 149,151,152,158,161; 12: 167,173,174; 13: 185,189; 14: 200,203,217; 15: 235; 17: 257,259,262,265,273; 18: 266,267,274,283), retuširane kline (8,6 % - *t. 2*: 33; 3: 47,51; 4: 58,59,62,71; 5: 76,79,81; 6: 91; 7: 96; 10: 150; 11: 156,157; 12: 184; 13: 197; 15: 229; 16: 234,239; 17: 264,270; 19: 288,296) in kline z drobtinčasto retušo (5,9 % - *t. 2*: 18,26,30; 3: 38; 4: 61; 5: 78; 7: 97,99,104; 8: 110; 12: 178,183; 13: 192,198; 14: 209; 19: 281). Podrobneje smo se posvetili tem orodnim skupinam, pri čemer smo poskušali preveriti trditve dinamičnih konceptov tipologij kamenih orodij, ki predvidevajo, da so neretuširani uporabljeni odbitki, odbitki z drobtinčasto retušo in retuširani odbitki z golj stopnje v kontinuumu uporabe odbitkov in ne mentalne kategorije izdelovalcev. Izdelovalci naj bi retuše uporabljali kot ponovne naostritve z uporabo otopelih delovnih robov. Izrabljenosti posameznih orodij žal nismo mogli preveriti saj zaradi specifičnih okoliščin ohranitve sledi uporabe niso določljive, zato smo poskušali ovrednotiti odbitke in

retouch (5,9% - *Pl. 2*: 18,26,30; 3: 38; 4: 61; 5: 78; 7: 97,99,104; 8: 110; 12: 178,183; 13: 192,198; 14: 209; 19: 281). These tool groups were given special attention. For that the assertions of the dynamic concepts of stone tool typologies were put to the test, which suggest that the used unretouched flakes, flakes with nibbling retouch and retouched flakes represent only phases in the continuous use of flakes rather than mental templates of the maker. The latter supposedly used retouches to resharpen blunt working edges. The usewear of individual tools could, unfortunately, not be verified, since the specific circumstances did not allow for the preservation of the usewear traces. The evaluation of flakes and blades with nibbling retouch as well as retouched flakes and blades could, on the other hand, still be carried out. The supposition was that the degree of working was in proportion to the usefulness of the flake, which means:

- that larger flakes were theoretically in use longer and were therefore more heavily retouched;
- that long-term use caused them to be damaged more often.

The comparison of the average size values could support the first hypothesis (*Tab. 4.4*), since retouched flakes were observed to be, on average, larger than flakes with nibbling retouch and retouched blades to be, on average, larger (widths excepted) than blades with nibbling retouch. In order to test the second hypothesis, the table was added the average size values for complete and fragmented tools as well as tool fragments (*Tab. 4.5*).

Despite the poor reliability, brought about by small groups of used tools, the fragmentation pattern nevertheless produced three interesting results:

- that a trend exists for the retouched tools to be broken more often than the tools with nibbling retouch. Large and more intensely worked and maintained tools are therefore broken more often than the small ones;
- that an existence may be supposed of a connection between the fragmentation pattern and the working of flakes and not their shape (the same pattern for retouched flakes and blades as well as flakes and blades with nibbling retouch) – tools that were worked and maintained more were also broken more;

Tab. 4.4: Primerjava povprečnih merskih vrednosti.

Tab. 4.4: Comparison of the average size values.

| | Dolžina / <i>Length</i> | Širina / <i>Width</i> | Debelina / <i>Thickness</i> | Število orodij / <i>No. of tools</i> |
|--|----------------------------|--------------------------|--------------------------------|---|
| Odbitek z drobtinčasto retušo / <i>Flake with nibbling retouch</i> | 2,55 | 2,12 | 0,58 | 53 |
| Retuširan odbitek / <i>Retouched flake</i> | 2,77 | 2,18 | 0,73 | 61 |
| Klina z drobtinčasto retušo / <i>Blade with nibbling retouch</i> | 3,07 | 1,39 | 0,45 | 18 |
| Retuširana klina / <i>Retouched blade</i> | 3,4 | 1,33 | 0,55 | 25 |

kline z drobtinčasto retušo ter retuširane odbitke in kline. Domnevali smo, da je stopnja obdelave v sorazmerju z uporabnostjo odbitka - to pomeni:

- da so večji odbitki teoretično dlje časa uporabni in so zato močnejše retuširani;
- da so posledično zaradi dolgotrajnejše uporabe večkrat poškodovani.

Primerjave povprečnih merskih vrednosti bi lahko prvo hipotezo potrdile (tab. 4.4), saj se je pokazalo, da so retuširani odbitki povprečno večji od odbitkov z drobtinčasto retušo ter da so retuširane kline povprečno večje (z izjemo širine) od klin z drobtinčasto retušo. Za preverbo druge hipoteze smo v tabelo vnesli povprečne merske vrednosti za cela in fragmentirana orodja ter za fragmente orodij (tab. 4.5).

Kljub manjši zanesljivosti zaradi manjših skupin uporabljenih orodij je vzorec fragmentacije nakazal tri zanimive rezultate:

- da obstaja trend, da so retuširana orodja večkrat polomljena od orodij z drobtinčasto retušo - torej so večja in intenzivneje obdelana in vzdrževana orodja večkrat polomljena od manjših;
- da lahko domnevamo, da obstaja povezava vzorca fragmentacije med obdelavo odbitka in ne njegovo obliko (enak vzorec za retuširane odbitke in kline ter odbitke in kline z drobtinčasto retušo) - torej so bolj obdelana in vzdrževana orodja bolj polomljena;
- da je na najdišču ohranjenih več fragmentov orodij, kot fragmentiranih orodij - torej lahko domnevamo, da so polomljene dele orodij popravljali in zamenjevali drugje.

Hkrati se je pokazalo, da vse kategorije orodij težijo k temu, da bi bile večje od 2,5 centimetra, to je tiste velikosti, za katero smo na podlagi analiz jeder predpostavljali, da predstavlja mejo med uporabnimi in neuporabnimi odbitki. Posledično lahko trdimo, da so prebivalci naselbine ob Ljubiji za uporabo izbirali odbitke, ki so bili večji od vsaj 2 cm (povprečno večji od 2,5 cm), da so manjše uporabljali manj časa ter jih le malo retuširali in malo polomili ter da so večje intenzivneje retuširali in večkrat polomili - očitno so jih uporabljali za bolj stresna opravila ter jih vzdrževali dlje. V skladu s to predpostavko, bi se morali zaradi poznejšega intenzivnejšega retuširanja retuširani odbitki spremeniti v intenzivneje vzdrževane

- that the site yielded more fragments of tools than fragmented tools. It may therefore be supposed that the broken parts of tools were repaired and replaced elsewhere.

The analysis also showed that all tool categories tend to be larger than 2.5 cm, the size that the core analysis suggested as the limit between the useful and the useless flakes. Consequentially, it may be asserted that the inhabitants of the settlement along the Ljubija chose to use the flakes that were larger than 2 cm (on average they were larger than 2.5 cm), that the smaller ones were used for a shorter period, were less retouched and not often broken and that the large flakes were subjected to a more intensive retouching and were broken more often – apparently they were used for more heavy-duty tasks and were maintained longer. In accordance with this supposition and due to the subsequent more intensive retouching, the retouched flakes should have been reshaped into more intensely maintained tool types - side scrapers (Pl. 1: 3, 10; 2: 32; 3: 48; 6: 77; 7: 94,95,106,107; 8: 114,121; 9: 122,123,125,129; 10: 142; 11: 153; 12: 177; 13: 196; 14: 207; 15: 224,225; 17: 261; 18: 271,279) or raclettes (Pl. 3: 55; 4: 56; 5: 73; 7: 102; 9: 124,134,137; 10: 140,145; 12: 170). In order to test this, their average size values were first compared (Tab. 4.6).

The comparison revealed that raclettes are smaller than the retouched flakes and could theoretically represent the final phase of maintained tools. The average size values of side scrapers indicated that they largely exceeded the average values of the other three categories and represent, probably from the very beginning, a different tool type. In other words, in order to make side scrapers large flakes were chosen at the very beginning. This is also an example of a circular argument - tools determined as side scrapers were those where the working edge was made with large conchoidal or even scaliform retouch, a production technique only suitable when working large flakes. Keeping in mind the high fragmentation of raclettes, the second comparison used the average size values of complete tools (Tab. 4.7), whereby the tool number decreased and average values increased. This means that the reliability of the assertion is reduced.

In spite of the smaller sample, the distribution pattern of size values remained the same. This led to the interpretation that the raclettes represent the next phase in the maintenance of the retouched flakes, when the average size of tools decreases due to a more

Tab. 4.5: Primerjava vzorcev fragmentacije.

Tab. 4.5: Comparison of the fragmentation patterns.

| | Celi / <i>Whole</i> | % | Fragmentirani / <i>Fragmented</i> | % | Fragmenti / <i>Fragments</i> | % |
|--|------------------------|------|--------------------------------------|------|---------------------------------|------|
| Odbitek z drobtinčasto retušo / <i>Flake with nibbling retouch</i> | 41 | 77,3 | 4 | 7,5 | 8 | 15 |
| Retuširan odbitek / <i>Retouched flake</i> | 29 | 47,5 | 8 | 13,1 | 24 | 39,3 |
| Klin z drobtinčasto retušo / <i>Blade with nibbling retouch</i> | 14 | 77,7 | 1 | 5,5 | 3 | 15,6 |
| Retuširna klina / <i>Retouched blade</i> | 15 | 60 | 2 | 8 | 8 | 32 |

orodne tipe - strgala (*t. 1:* 3,10; *2:* 32; *3:* 48; *6:* 77; *7:* 94,95,106,107; *8:* 114,121; *9:* 122,123,125,129; *10:* 142; *11:* 153; *12:* 177; *13:* 196; *14:* 207; *15:* 224,225; *17:* 261; *18:* 271,279) ali strgalca (*t. 3:* 55; *4:* 56; *5:* 73; *7:* 102; *9:* 124,134,137; *10:* 140,145; *12:* 170). Za preverbo smo najprej primerjali povprečne merske vrednosti (*tab. 4.6*).

intensive retouching. In addition to that, complete raclettes (if the small number of examples in the statistical analysis is accepted) are shown to be made on larger and thicker flakes than the flakes with nibbling

Tab. 4.6: Primerjava povprečnih merskih vrednosti.

Tab. 4.6: Comparison of the average size values.

| | Dolžina / <i>Lenght</i> | Širina / <i>Width</i> | Debelina / <i>Thickness</i> | Število / <i>Number</i> |
|--|----------------------------|--------------------------|--------------------------------|----------------------------|
| Odbitek z drobtinčasto retušo / <i>Flake with nibbling retouch</i> | 2,55 | 2,12 | 0,58 | 53 |
| Retuširan odbitek / <i>Retouched flake</i> | 2,77 | 2,18 | 0,73 | 61 |
| Strgalce / <i>Raclette</i> | 2,1 | 1,72 | 0,53 | 11 |
| Strgalo / <i>Side scraper</i> | 3,18 | 2,73 | 1,26 | 31 |

Pokazalo se je, da so strgalca manjša od retuširanih odbitkov in bi teoretično lahko bila končna faza vzdrževanega orodja. Pri povprečnih merskih vrednostih strgal se je pokazalo, da veliko presegajo povprečne vrednosti drugih treh kategorij in verjetno že iz samega izhodišča predstavljajo drugi orodni tip oziroma so bili za izdelavo strgal že izhodiščno izbrani večji odbitki. Kar pa je tudi krožna argumentacija - kot strgala so bila določena orodja, kjer je bil delovni rob izdelan z večjo školjkovito oziroma celo stopnjevito retušo - načinom obdelave, ki je možen zgolj na večjih odbitkih. Zavedajoč se visoke stopnje fragmentacije strgalc smo drugič uporabili povprečne merske vrednosti celih orodij (*tab. 4.7*), pri čemer se je število orodij zmanjšalo in povprečne vrednosti povečale, kar pa tudi pomeni, da se je zanesljivost trditve zmanjšala.

Kljub zmanjšanju vzorca se je še vedno ohranil vzorec distribucije merskih vrednosti, ki bi omogočal interpretacijo, da so strgalca naslednja stopnja vzdrževanja retuširanih odbitkov, ko se je zaradi večje intenzivnosti retuširanja zmanjšala povprečna velikost orodij. Pokazalo pa se je tudi, da so cela strgalca (v kolikor upoštevamo majhno število primerkov v statistični analizi) izdelana na večjih in debelejših

retouch and are smaller than the retouched flakes at the end of the working and maintenance processes. Again, it may be supposed that large flakes were used and maintained more intensely. However, we need to be aware that this assertion, due to the small sample of analyzed tools, cannot serve to other purpose than to formulate a hypothesis, which could then be either confirmed or rejected by a higher number of found and analyzed finds. This supposition may be tested by comparing the fragmentation patterns. The comparison between flakes with nibbling retouch and retouched flakes showed that the tools that were worked and maintained more intensely were also more fragmented (*Tab. 4.8*).

The patterns showed a proportionate increase in tool fragmentation as a consequence of a more intensive working, a more heavy-duty use and tool maintenance. In other words, a more intensive and long-term use of tools demanded a more intensive maintenance

Tab. 4.7: Primerjava povprečnih merskih vrednosti.

Tab. 4.7: Comparison of the average size values.

| | Dolžina / <i>Lenght</i> | Širina / <i>Width</i> | Debelina / <i>Thickness</i> | Število / <i>Number</i> |
|--|----------------------------|--------------------------|--------------------------------|----------------------------|
| Odbitek z drobtinčasto retušo / <i>Flake with nibbling retouch</i> | 2,48 | 2,97 | 0,57 | 41 |
| Retuširan odbitek / <i>Retouched flake</i> | 2,93 | 2,49 | 0,85 | 29 |
| Strgalce / <i>Raclette</i> | 2,55 | 1,85 | 0,7 | 2 |
| Strgalo / <i>Side scraper</i> | 3,79 | 3,04 | 1,5 | 15 |

odbitkih kot odbitki z drobtinčasto retušo ter da so na koncu obdelave in vzdrževanja manjša od retuširanih odbitkov. Spet lahko domnevamo, da so večje odbitke intenzivneje uporabljali in vzdrževali. Zavedati pa se moramo, da ta trditev zaradi majhnega vzorca analiziranih orodij ne more služiti drugače kot zgolj za formuliranje hipoteze, ki bi jo bilo mogoče potrditi oziroma ovreči z večjim številom odkritih in analiziranih najdb. To domnevo lahko preverimo s primerjavo vzorcev fragmentacije. Pri primerjavi med

of tools which, with a more intensive retouching, decreased the size of the tool. The more intensely used tools then broke several times due to stress. This is a logical supposition, since larger tools were used for more heavy-duty tasks. In order to be certain that the heavily fragmented tools determined as raclettes really are more heavily retouched flakes rather than smaller side scraper fragments, the average size values of complete raclettes and side scraper fragments were compared (*Tab. 4.9*).

odbitki z drobtinčasto retušo in retuširanimi odbitki se je pokazalo, da so intenzivneje obdelana in vzdrževana orodja bolj fragmentirana (tab. 4.8).

Vzorec je pokazal sorazmerno večanje fragmentacije orodij kot funkcije intenzivnejše obdelave, stresnejše uporabe oziroma vzdrževanja orodja ali z drugimi besedami - intenzivnejša in dolgotrajnejša uporaba orodij je zahtevala intenzivnejše vzdrževanje orodij, ki je z intenzivnejšim retuširanjem zmanjšalo velikost orodja. Intenzivneje uporabljana orodja pa so se zaradi stresnosti večkrat lomila - logično, saj so za stresnejša opravila uporabljali večja orodja. Da

Tab. 4.8: Primerjava vzorcev fragmentacije.

Tab. 4.8: Comparison of the fragmentation patterns.

| | Celi / <i>Whole</i> | Fragmentirani / <i>Fragmented</i> | Fragmenti / <i>Fragments</i> |
|---|------------------------|--------------------------------------|---------------------------------|
| Odbitki z drobtinčasto retušo / <i>Flakes with nibbling retouch</i> | 77,3 % | 7,5 % | 15 % |
| Retuširani odbitki / <i>Retouched flakes</i> | 47,5 % | 13,1 % | 39,3 % |
| Strgalca / <i>Raclettes</i> | 18,1 % | 9,0 % | 72,7 % |

bi lahko bili prepričani, da so močno fragmentirana orodja, ki smo jih opredelili kot strgalca, res močnejše retuširani odbitki in ne manjši odlomki strgal smo primerjali povprečne merske vrednosti celih strgalc in fragmentov strgal (tab. 4.9).

Kljub majhnemu številu strgalc lahko domnevamo, da so še največja strgalca povprečno enako velika, vendar ožja in tanjša od fragmentov strgal. Podobno trditev lahko izpeljemo tudi iz opazovanja obdelave - strgalca so v našem primeru močno retuširana orodja, katerih delovni rob navadno ni obdelan s stopnjevito retušo. Na podlagi preverjenega lahko domnevamo, da gre za dva ločena orodna tipa, hkrati pa lahko strgalca vpnemo v shemo retuširanih odbitkov - z intenzivno

Tab. 4.9: Primerjava povprečnih merskih vrednosti.

Tab. 4.9: Comparison of the average size values.

| | Dolžina / <i>Length</i> | Širina / <i>Width</i> | Debelina / <i>Thickness</i> | Število / <i>Number</i> |
|--|----------------------------|--------------------------|--------------------------------|----------------------------|
| Cela strgalca / <i>Whole raclettes</i> | 2,55 | 1,85 | 0,7 | 2 |
| Fragmenti strgal / <i>Fragments of side scrapers</i> | 2,5 | 2,4 | 1,04 | 15 |

uporabo in vzdrževanjem se retuširani odbitki spremenijo v strgalca. Če strnemo:

- Primerjava merskih vrednosti retuširanih odbitkov in klin ter odbitkov in klin z drobtinčasto retušo je pokazala, da so za intenzivnejše vzdrževanje izbirali večje kline in odbitke ter da so deleži fragmentacije odvisni od stopnje vzdrževanja in ne oblike odbitka.
- Primerjava deležev fragmentacije odbitkov z drobtinčasto retušo, retuširanih odbitkov in strgalc je

In spite of the small number of raclettes, it may be supposed that even the largest raclettes are of equal sizes, only narrower and thinner, than side scraper fragments. A similar statement can be made on the basis of working - the raclettes are, in this case, heavily retouched tools with working edges usually not worked with scaliform retouch. Based on the tests above, it is supposed that we are dealing with two different tool types. Raclettes may, at the same time, be included into the scheme of retouched flakes, since the retouched flakes are transformed into raclettes through intensive use and maintenance. To sum up:

- The comparison of size values of retouched flakes and blades as well as flakes and blades with nibbling retouch showed that large blades and flakes

were selected for the more intensive maintenance and that the shares of fragmentation depend on the degree of maintenance rather than the form of the flake.

- The comparison of the fragmentation shares of flakes with nibbling retouch, retouched flakes and raclettes showed that the more intensely maintained tools are more heavily fragmented, which is most probably the consequence of a more intensive and longer use.
- The comparison of the size values of cores, flakes with nibbling retouch and retouched flakes showed that, for the maintained tools, flakes were used that were initially larger than 2.5 cm.
- The comparison of the size values and shares of fragmentation of retouched flakes and raclettes showed that raclettes were probably the next phase in the working and maintenance of retouched flakes.

- The comparison of the size values of flakes with nibbling retouch, retouched flakes and side scrapers showed that the smallest of flakes were used for the former (also smaller than 2.5 cm) and were not maintained, while for the latter flakes larger than 2.5 cm were used, and were subjected to only a low maintenance (reshaped into raclettes). For the production of side scrapers, on the other hand, much larger flakes were selected.
- Side scrapers were maintained more intensely

pokazala, da so intenzivneje vzdrževana orodja močnejše fragmentirana, kar je verjetno posledica intenzivnejše in daljše uporabe.

- Primerjava merskih vrednosti jeder, odbitkov z drobtinčasto retušo in retuširanih odbitkov je pokazala, da so za vzdrževana orodja uporabljali odbitke, ki so bili v izhodišču večji od 2,5 cm.
- Primerjava merskih vrednosti in deležev fragmentacije retuširanih odbitkov in strgalc je pokazala, da so strgalca verjetno naslednja stopnja v obdelavi in vzdrževanju retuširanih odbitkov.
- Primerjava merskih vrednosti odbitkov z drobtinčasto retušo, retuširanih odbitkov in strgal je pokazala, da so za prve uporabljali najmanjše odbitke (tudi manjše od 2,5 cm), ki jih niso vzdrževali, za druge so uporabljali odbitke večje od 2,5 cm, ki so jih le malo vzdrževali (predelali v strgalca), za izdelavo strgal pa so izbirali veliko večje odbitke.
- Strgala so vzdrževali intenzivneje ter na drugačen način, kar pričajo izdelava stopnjevite školjkovite retuše na delavnem robu (ki jo omogoča le debel odbitek) in drugačni načini ponovne naostritve delovnega roba (z večjim longitudinalnim odbikom).
- Orodja so uporabljali na kraju, ki ga je spodjedla Ljubija, vzdrževali pa drugje. Na najdišču manjkajo mali odbitki, ki so značilni za izdelavo in vzdrževanje orodij in na najdišču imamo zraven izrabljenih in zavrženih orodij odlomke orodij, nimamo pa delov orodij, od katerih so bili ti fragmenti odlomljeni. Trdimo lahko, da so proces obnavljanja še uporabnih orodij izvajali drugje.
- Če pojmujeemo tip orodja kot mentalno šablono izdelovalca, ki si je zamislil, kako bo orodje izgledalo, kako ga bo uporabljal in kako ga bo vzdrževal, potem smo obravnavali tri ločene tipe - odbitek z drobtinčasto retušo, retuširan odbitek (strgalce je le močno vzdrževana faza tega) in strgalo, če pa uporabimo dinamično koncepcijo razvoja in spremembe izgleda orodij kot posledice uporabe in vzdrževanj, potem predstavljajo retuširani odbitki in strgalca zgolj dve točki v kontinuumu preobrazb odbitkov.

S težjo nalogo smo se soočili pri pregledu posebnih orodnih oblik - to je tistih orodnih oblik, za katere bi lahko domnevali, da so izraziteje kulturno ali pa vsaj opravilno specifične. Vendar se je pokazalo, da kljub večjemu številu kostnih ostankov na najdišču, ni bilo prisotne najbolj kulturno izpovedne skupine orodij - konic projektilov. Razen dveh nekoliko atipičnih trikotnikov (*t. 1: 2,16*), dveh klin s poševno prečno retušo (*t. 12: 182; 14: 206*) ter 8 fragmentov klinic s hrptom (*t. 6: 86,88; 7: 100; 14: 218; 16: 240,241; 19: 284,294*) (skupaj 3,3 % vseh orodij), ni bilo odkritih drugih orodij, ki bi jih lahko interpretirali kot projektilne oziroma dele sestavljenih projektilov. Med ostalimi

and in a different manner, which is indicated by scaliform conchoidal retouch on the working edge (possible only on a thick flake) and by different manners of resharpening the working edge (with a large longitudinal flake).

- The tools were used at the spot undermined by the Ljubija but maintained elsewhere. The site lacks small flakes characteristic for the production and maintenance of tools. Beside the worn and discarded tools, the site did, however, yield fragments of tools without the parts off which these fragments were broken. It may be asserted therefore that the process of renewing of the still useful tools took place elsewhere.
- If the type of tool is understood as a mental template of the maker who envisaged how the tool should look like, how it will be used and how maintained, then three different types have been treated - flakes with nibbling retouch, retouched flakes (raclettes are only a heavily maintained phase of these) and side scrapers. If, on the other hand, a dynamic concept of development and change of the appearance of tools as the consequence of use and maintenance is considered, then the retouched flakes and raclettes represent only two points in the continuous alterations of flakes.

A more demanding task was faced during the overview of special tool forms, those for which a culturally or at least functionally more specific character could be supposed. It turned out, however, that despite the high number of bone remains at the site, the culturally most telling group of tools – projectile points – was absent. With the exception of two somewhat atypical triangles (*Pl. 1: 2,16*), two obliquely truncated blades (*Pl. 12: 182; 14: 206*) and eight fragments of backed bladelets (*Pl. 6: 86,88; 7: 100; 14: 218; 16: 240,241; 19: 284,294*) (together 3.3% of all tools), there were no other tools found that could be interpreted as projectiles or parts of composite projectiles. Other tool types, also parts of the tool kit that originate from the formal range of the Late Palaeolithic tool types and remain in use all to the Neolithic period, include a burin (*Pl. 8: 108*) and two borers (*Pl. 4: 67; 19: 295*). Unfortunately, these are either not typical or culturally insensitive tools.

We therefore compared, within this group of tools, the percentage of the tool types that were supposed to act as indicators of tool maintenance according to the archaeological theory on the maintenance of tool types. First the supposedly most common tool types of the Mesolithic were analyzed - notched flakes (*Pl. 1: 1; 2: 22,27,35; 3: 42; 8: 117,118; 9: 122; 12: 165,179; 14: 204,211; 16: 238; 17: 272; 19: 293,298*), denticulated flakes (*Pl. 2: 23; 14: 205,221; 15: 216,230; 16: 243*), notched blades (*Pl. 11: 158,163; 13: 193*) and denticulated blades (*Pl. 14: 215; 16: 232*). In accordance

orodnimi tipi, ki so prav tako del orodnega inventarja, ki izvira še iz formalnega spektra poznopaleolitskih orodnih tipov in ostane v uporabi vse do neolitika, lahko omenimo še vbadalo (t. 8: 108) in dva svedra (t. 4: 67; 19: 295). Žal gre v vseh primerih za netipična ali pa kronološko in kulturno neobčutljiva orodja.

Zato smo znotraj skupine orodij primerjali odstotne zastopanosti tistih orodnih tipov, ki naj bi v skladu z arheološko teorijo o vzdrževanju orodnih tipov delovali kot pokazatelji vzdrževanosti orodij. Najprej smo izpostavili domnevno v mezolitu pogostejše orodne tipe - odbitke z izjedo (t. 1: 1; 2: 22,27,35; 3: 42; 8: 117,118; 9: 122; 12: 165,179; 14: 204,211; 16: 238; 17: 272; 19: 293,298) in nazobčane odbitke (t. 2: 23; 14: 205,221; 15: 216,230; 16: 243) ter kline z izjedo (t. 11: 158,163; 13: 193) in nazobčane kline (t. 14: 215; 16: 232). V skladu z arheološko teorijo je izhodiščna oblika orodje z izjedo in nazobčanje nastane z dodajanjem istih elementov na najdaljšem ravnem robu orodja, ko predhodni niso več uporabni. Večje število nazobčanih orodij v primerjavi z orodji z izjedo se tako šteje za dejavnik, ki kaže na intenzivno vzdrževanost industrije (tab. 4.10). Orodja z izjedo in nazobčana orodja so zastopana z 36 orodji oziroma z 11,7 % orodnega zbira. Kljub dokaj majhnemu številu orodij, vzorec pokaže, da predstavljajo orodja z izjedo 10,2 % in nazobčana orodja 1,5 % celotnega orodnega zbira. Posledično lahko trdimo, da na podlagi številčne zastopanosti oziroma dominancije orodij z izjedo nad nazobčanimi orodji, ne moremo domnevati, da bi orodja z izjedo intenzivneje vzdrževali oziroma popravljali.

Druga orodja na osnovi katerih bi lahko izpeljevali trditve o intenzivnosti vzdrževanja orodij so praskala. Odkritih je bilo 37 primerkov oziroma 12 % vseh orodij. Glede na obdelavo čela, podlago, na kateri so narejena, in na obliko smo jih ločili v praskala na odbitkih (t. 3: 43,49; 5: 83; 8: 108; 11: 162; 12: 171,172,180; 14: 214; 17: 250,255; 18: 278), praskala na klinah (t. 4: 65; 7: 98; 10: 139; 18: 287; 19: 297), atipična praskala (t. 1: 17; 2: 20; 3: 45; 4: 66,70; 5: 72; 6: 93; 8: 112,113; 9: 136; 16: 249; 19: 302,303) in krožna praskala (t. 1: 5; 16: 251; 18: 286).

Pregled povprečnih velikosti je pokazal (tab. 4.11; sl. 4.10), da predstavljajo najštevilčnejšo kategorijo praskala na odbitkih in atipična praskala ter da so največja praskala na odbitkih. Pravzaprav sta bili

Tab. 4.11: Povprečne merske vrednosti praskal.

Tab. 4.11: Average size values of endscrapers.

| | Dolžina / <i>Length</i> | Širina / <i>Width</i> | Debelina / <i>Thickness</i> | Število / <i>Number</i> |
|--|----------------------------|--------------------------|--------------------------------|----------------------------|
| Praskala / <i>Endscrapers</i> | 2,2 | 1,97 | 0,67 | 14 |
| Atipična praskala / <i>Atypical endscrapers</i> | 1,96 | 1,83 | 0,74 | 15 |
| Praskala na klini / <i>Endscrapers on blades</i> | 2,06 | 1,26 | 0,5 | 5 |
| Krožna praskal / <i>Circular endscrapers</i> | 1,3 | 1,4 | 0,53 | 3 |

with the above-mentioned theory, the initial form is a notched tool. Denticulation then appears by adding the same elements on the longest straight edge of the tool when the previous ones are no longer needed. The high number of denticulated tools in comparison to the notched tools is considered to be a factor that

Tab. 4.10: Število orodij in odstotna zastopanost orodnih tipov v celotnem skupku obdelanih orodij.

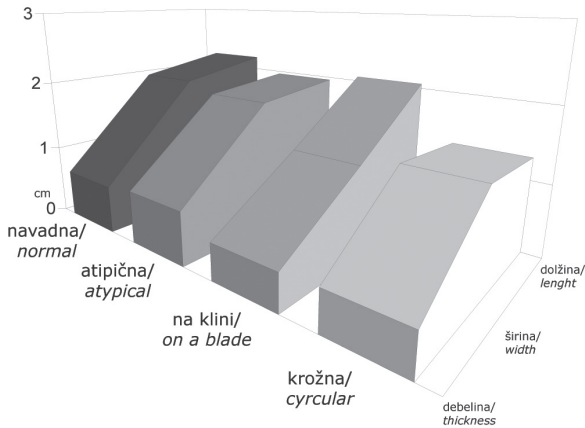
Tab. 4.10: Tool number and percentage of tool types in the entire assemblage of worked tools.

| | | |
|--|----|-------|
| Odbitek z izjedo / <i>Notched flake</i> | 20 | 6,6 % |
| Klina z izjedo / <i>Notched blade</i> | 3 | 0,9 % |
| Nazobčan odbitek / <i>Denticulated flake</i> | 11 | 3,6 % |
| Nazobčana klina / <i>Denticulated blade</i> | 2 | 0,6 % |

indicates intensive industry maintenance (Tab. 4.10). Notched tools and denticulated tools are represented with 36 tools or 11.7% of the tool assemblage. Despite the fairly low tool number, the sample shows that the former represent 10.2% and the latter 1.5% of the entire tool assemblage. Consequentially, it may be asserted that the numerical representation or the dominance of notched tools over the denticulated tools does not allow for the supposition that the former would be more intensely maintained or repaired.

Another tool that might serve as the basis for observing the intensity of tool maintenance is the end scraper. There were 37 examples or 12% of all tools found. Based on the working of the face, that is the base onto which they were made, and their form, they were divided into end scrapers on flakes (Pl. 3: 43,49; 5: 83; 8: 108; 11: 162; 12: 171,172,180; 14: 214; 17: 250,255; 18: 278), end scrapers on blades (t. 4: 65; 7: 98; 10: 139; 18: 287; 19: 297), atypical end scrapers (Pl. 1: 17; 2: 20; 3: 45; 4: 66,70; 5: 72; 6: 93; 8: 112,113; 9: 136; 16: 249; 19: 302,303) and circular end scrapers (Pl. 1: 5; 16: 251; 18: 286).

The overview of the average sizes revealed that the most numerous category are the end scrapers on flakes and atypical end scrapers and that the largest end scrapers are the former (Tab. 4.11; Fig. 4.10). Actually, the categories of end scrapers on blades and circular end scrapers are too small to enable the formulation of appropriate theories. The graphic representation showed the similarity of the relationships between



kategoriji praskal na klinah ter krožnih praskal pre-majhni, da bi lahko na njuni podlagi sploh formulirali ustrezne hipoteze. Grafičen prikaz je pokazal podobnost razmerij med praskali na odbitkih in atipičnimi praskali ter odstopanje pri obeh manj številnih skupinah praskal. Pri praskalih na klinah je širina veliko manjša od dolžine ter pri krožnih praskalih je širina celo večja od dolžine - obe značilnosti neposredno izhajata iz morfoloških značilnosti polizdelkov, na katerih sta izdelana oba tipa orodij.

Za prikaz intenzivnosti uporabe smo dodali še pregled fragmentacije praskal na odbitkih in atipičnih praskal na odbitkih. Izhajajoč iz domneve, da je tipično oblikovanje čela praskala posledica intenzivnejšega vzdrževanja začetno atipično izdelanih kosov, smo primerjali odstotne deleže celih in polomljenih praskal (tab. 4.12). Odstotkovni prikaz majhne skupine primerjanih najdb je domnevo zanikal. Pokazalo se je, da so atipična praskala večkrat polomljena od tipičnih. Ker domnevamo, da je njihova fragmentacija posledica intenzivne uporabe, očitno tipično oblikovanje čela praskala ni posledica intenzivne uporabe in popravljanja, ampak zavestne odločitve izdelovalca. Domnevamo lahko, da na njegovo hotenje vplivajo številni dejavniki, kot so surovina, iz katere je orodje izdelano, dejavnost, za katero se bo orodje domnevno uporabljalo ter rokodelske spretnosti izdelovalca. Očitno so za specifično dejavnost preferirali manjša orodja, v katera so vložili minimalno energije za njihovo obdelavo in vzdrževanje. Podoben podatek smo dobili že iz analize merskih vrednosti praskal, kjer so bila tipična praskala večja od atipičnih. Razlike v oblikovanju čela praskal, ki jih v tipološkem opisu označujemo kot tipična in atipična so domnevno posledica hotenja izdelovalcev - očitno na ravni izbire odbitkov

Sl. 4.10: Grafičen prikaz povprečnih merskih vrednosti praskal.

Fig. 4.10: Graphic representation of the average size values of endscrapers.

end scrapers on flakes and atypical end scrapers as well as a deviation in both less numerous groups. The width of the end scrapers on blades is considerably smaller than the length, while the width of the circular end scrapers is even larger than the length. Both characteristics originate directly from the morphological characteristics of the semi-products on which the tool types were made.

The overview of the fragmentation of end scrapers on flakes and atypical end scrapers was added in order to present the intensity of use. Based on the supposition that the typical form of the end scraper face is a consequence of a more intensive maintenance of the initially atypically made pieces, the percentages of complete and broken end scrapers were compared (Tab. 4.12). The percentage of the small group of the compared finds refuted the supposition. The atypical end scrapers were revealed to be broken more often than the typical ones. According to the supposition that their fragmentation is the consequence of intensive use, the typical forming of the end scraper face is apparently not the consequence of intensive use and repair but rather a conscious decision on the part of the maker. It can be supposed, however, that the maker's will was influenced by numerous factors such as raw material, the activity for which a tool was destined as well as the ability of the maker. Apparently, smaller tools were preferred for specific activities, into the working and maintenance of which minimal energy was invested. Similar data was obtained already from the analysis of the value sizes of end scrapers, where the typical were larger than the atypical ones. The differences in the form of the end scraper face, described typologically as typical and atypical, are supposed to be the consequence of the maker's will - obviously on the level of the choice of flakes to make tools and the working of the tools - and not of a more intensive use. To sum up:

Tab. 4.12: Prikaz fragmentacije praskal.

Tab. 4.12: Presentation of the fragmentation of endscrapers

| | Cela / <i>Whole</i> | % | Polomljena / <i>Fragmented</i> | % |
|---|------------------------|------|-----------------------------------|------|
| Praskala na odbitkih / <i>Endscrapers on flakes</i> | 11 | 78,5 | 3 | 21,4 |
| Atipična praskala na odbitkih / <i>Atypical endscrapers on flakes</i> | 5 | 33,3 | 10 | 66,6 |

za izdelavo orodij ter na ravni obdelave orodja in ne intenzivnejše uporabe. Če strnemo:

- Primerjava orodij z izjedo ter nazobčanih orodij kaže, da orodja niso bila intenzivno vzdrževana in uporabljana.
- Primerjava praskal kaže, da so močno vzdrževana krožna praskala redka, praskala na klinah pa niso močno vzdrževana.
- Primerjava tipičnih in atipičnih praskal kaže, da je njihova oblika posledica hotenja izdelovalcev in ne intenzivnosti vzdrževanja. Očitno so za dejavnost intenzivneje uporabljali manjša, manj sofisticirano izdelana orodja.
- Nizka zastopanost klin s poševno prečno retušo in klinic s hrbtom, ki bi jih lahko razlagali kot projekte, kaže, da orodni inventar ni bil posledica izdelave, uporabe ali oskrbe najdišča z orodji, ki so se uporabljala kot deli lovske opreme.
- Nizka zastopanost specialnih oblik orodij - vbodal, klin s prečno retušo in svedrov kaže, da se na najdišču niso opravljala specialna dela oziroma dela, kjer bi obdelovali manjše predmete iz trdih materialov.

4 DISKUSIJA

Za ustrezno razumevanje fenomena značilnosti kamnitih orodij z najdišča Zalog je potrebno razumeti širšo perspektivo razvoja končnega paleolitika ter zgodnjeholocenskih tehnoloških in tipoloških tradicij na področju med Panonsko kotlino, Balkanom ter *Caput Adriae*. Tipološke in tehnološke značilnosti kamnitega gradiva uvrščajo Zalog pri Verdu v širši okvir zgodnje holocenskih najdišč z opazno epipaleolitsko tradicijo, pri čemer bi sodilo med najmlajša. To oznako utemeljujejo predvsem diskasta jedra, klinice s hrbti, praskala in drugi elementi, ki najdišče povezujejo z orodnimi inventarji iz končnega paleolitika (*epigravettien*), po drugi strani pa odsotnost orodij, značilnih za sovterjen (*sauvetterien*), ki so mu pripisana najdišča starejše faze mezolitika (9600-7800/7600 pred sedanostjo) med južnimi Alpami in osrednjo Slovenijo.

Po Kozłowskiem lahko tardigravettien še ločimo v dve večji skupini z različnima tradicijama zastopano - sti posameznih orodnih tipov ter prisotnosti različnih tehnoloških elementov izdelovanja orodij, ki verjetno izvirata še iz migracij in fragmentacij populacij v času viška poznega glaciala (Kozłowski 1978, 50-60). Na eni strani gre za področje osrednjega in vzhodnega Balkana (Temnata, Bačo Kiro, Climente), kjer industrije vsebujejo obojestransko retuširane kline, na drugi strani pa področje slovenskega Krasa in Istre (spodnja plast Ovčje jame, Šandalja II, Županov spodmol AB), kjer so značilne kline s hrbtom, v relativni zastopanosti orodnih tipov pa praskala dominirajo nad

- The comparison of notched and denticulated tools shows that they were not intensely maintained and used.
- The comparison of end scrapers shows that the heavily maintained circular end scrapers are rare, while the end scrapers on blades are not heavily maintained.
- The comparison of typical and atypical end scrapers shows that their form is a consequence of the maker's will and not the intensity of maintenance. Smaller, less sophisticatedly made tools were apparently more intensely used.
- The low representation of obliquely truncated blades and backed bladelets that could be interpreted as projectiles shows that the tool kit was not the consequence of the production, use or supply of the site with tools used as parts of hunting equipment.
- The low representation of the special forms of tools - burins, truncated blades and borers shows that special activities or activities where smaller objects of hard materials would be worked did not take place at the site.

4 DISCUSSION

In order to correctly understand the phenomenon that the characteristics of the stone tools uncovered at the Zalog site represent, a broader view of the development of the End Palaeolithic and the Early Holocene technological and typological traditions in the area between the Pannonian basin, the Balkans and *Caput Adriae* needs to be considered. The typological and technological characteristics of its stone material place Zalog near Verd within a broader frame of the Early Holocene sites with a noticeable Epi-Palaeolithic tradition. Among these, the Zalog site ranks among the youngest. This is based mostly on discoid cores, backed bladelets, end scrapers and other elements that tie the site to tool kits from the End Palaeolithic (Epi-Gravettian), but also on the absence of tools characteristic for Sauvetterian, to which the sites of the early phase of the Mesolithic (9600-7800/7600 BP) between the southern Alps and central Slovenia are ascribed.

According to Kozłowski, Tardigravettian can be divided into two large groups with different technological traditions of the individual tool types represented and with the presence of different technological elements of tool making that probably originate from migrations and population fragmentations at the height of the Late Glacial (Kozłowski 1978, 50-60). One group covers the area of the central and eastern Balkans (Temnata, Bačo Kiro, Climente), where the industries contain bifacially retouched blades, and the other group is in the area of the Slovene Kras and Istria

vbadali. V obdobju interstadiala Xanthi (Bölling - Alleröd) v 11. in 10. tisočletju pr. n. št. pride do relativne homogenizacije kamenih industrij na področju od Krasa do Železnih vrat. Prevladuje kratka praskala, kline z upognjenim hrbtom in geometrijski mikroliti (Županov spodmol, Šandalja b, Lopar, Zakajeni spodmol plast 3, Romualdova pečina, Babja jama). V vseh naštetih najdiščih prevladuje jelenjad kot poglavitna lovna žival.

Ob koncu pleistocena v Dryasu III (9. tisočletje pr. n. št.) postane opazna fragmentacija nekoč enotnega kulturnega prostora. Kozłowski je v svojih zgodnjih analizah opisoval končni tardigravettien mediteranskega tipa v vzhodnem predgorju Alp in Balkanu (Poljšiška cerkev, Šandalja - zgornji del plasti b, Baile Herculane, Cuina Turcului-Dubova) (Kozłowski 1973, 317). Za tardigravettian naj bi bilo značilno, da vsebuje predvsem tri skupine orodij, kline in klinice s hrbtom (do 20 %), geometrijska orodja (do 6 %) in dominantna so praskala, večinoma kratka (do 52 %). Vbadala so le redka. Kasneje pa je ločil, da se iz tardigravettianske tradicije razvijejo najmanj tri ločene skupine - slovenski Kras s Šandaljo II, enotno kulturno skupino s področja Železnih vrat ter skupino Dekilitaž v osrednji in vzhodni Bolgariji (Kozłowski 1977, 60).

V zgodnjem holocenu (8. do 6./5. tisočletje pr. n. št.) smo še vedno priča nadaljevanja tradicije tardigravettiana. Še vedno so prisotne klinice s hrbtom (do 22 %) in geometrijska orodja (do 3 %), dominirajo praskala - predvsem kratka in diskasta (do 55 %). Redka so vbadala do 3 %, hkrati pa ni več trikotnikov (Kozłowski 1973, 320). Sočasno pa se na centralnem Balkanu, oziroma v Železnih vratih, pojavijo industrije, kjer mikrolitizacija ni tako izrazita - kline z ukrivljenim hrbtom so še vedno dokaj velike, geometrijskih orodij pa skoraj ni. Praskala so nepravilna in kratka, izdelana na odbitkih. Pogosti so retuširani odbitki ter posamezna orodja s prečno retušo, redke so retuširane kline in kline z izjedo. Pravzaprav je opazna tendenca k večji uporabi odbitkov kot klin, pogosti pa so tudi okrcani odbitki. Pri izdelavi orodij prevladuje uporaba lokalnih surovin slabše kvalitete. Pomemben element je tudi razvita produkcija orodij iz jelenovega rogovja. Tradicionalno se je pojasnjevalo, da se je industrija razvila v izolaciji iz lokalnega tardigravettiana Cuine Turcului (Kozłowski, Kozłowski 1984b, 42,43,53). Vendar je za slednjo, zraven bogate industrije obdelave kosti in rogovja, značilna predvsem mikrolitska kamena industrija s številnimi geometričnimi orodji. Prav tako pa je bila datirana v obdobje med 13. in 10. tisočletjem pr. n. št. Kultura, ki jo romunski avtorji poimenujejo Schela Cladovei, se je na istem območju izoblikovala v obdobju druge polovice Boreala in ni vsebovala mikrolitskih orodij (Paunescu 1989, 146-153). Novejše datacije skeletov iz Vlasca in Schele Cladovei, so končno vzpostavile

(the lower layer at Ovčja jama, Šandalja II, Županov spodmol AB), where backed blades are characteristic and, in the relative representation of tool types, end scrapers dominate over burins. The period of the Xanthi interstadial (Bölling - Alleröd) in the 11th and 10th millennia BC witnesses a relative homogenization of stone industries in the area from the Kras to the Iron Gates. The dominating tools are short end scrapers, curved backed blades and geometric microliths (Županov spodmol, Šandalja b, Lopar, layer 3 at Zakajeni spodmol, Romualdova pečina, Babja jama). All the enumerated sites reveal cervids as the main hunting animal.

The once uniform cultural space witnesses fragmentation at the end of the Pleistocene, in Dryas III (9th millennium BC). In his early analyses, Kozłowski described the Final Tardigravettian of the Mediterranean type in the eastern Subalpine area and the Balkans (Poljšiška cerkev, Šandalja - upper part of layer b, Baile Herculane, Cuina Turcului-Dubova) (Kozłowski 1973, 317). He saw, as a characteristic of the Tardigravettian, the fact that it contained mostly three groups of tools, backed blades and bladelets (up to 20%), geometric tools (up to 6%) and the dominant, mostly short, end scrapers (up to 52%). Burins appear only rarely. Later, Kozłowski argued that at least three separate groups develop from the Tardigravettian tradition - the Slovene Kras with Šandalja II, a uniform cultural group of the Iron Gates area and the Dekilitaž group in central and eastern Bulgaria (Kozłowski 1977, 60).

The Tardigravettian tradition continues in the Early Holocene (8th to 6th/5th millennium BC). The backed bladelets (up to 22%) and geometric tools (up to 3%) are still present and end scrapers, mostly short and discoid, dominate (up to 55%). Burins are rare (up to 3%) and triangles absent (Kozłowski 1973, 320). Contemporarily, the central Balkans, more precisely the Iron Gates, see the appearance of industries where the microlithization is not as pronounced - curved backed blades are still rather large - and geometric tools are almost absent. End scrapers are irregular, short and made on flakes. Retouched flakes and individual truncated tools are frequent, while retouched and notched blades are rare. In fact, there is a tendency towards a more frequent use of flakes instead of blades with numerous splintered pieces. In tool production, the use of local raw material of a poorer quality predominates. An important element is also a developed production of tools made of red deer antler. The traditional explanation suggested that this industry developed in isolation from the local Tardigravettian of Cuine Turcului (Kozłowski, Kozłowski 1984b, 42,43,53). But the latter is characterized, beside the rich industry of working bone and antler, mostly by a microlithic stone industry with numerous geometric tools. In the period between the 13th and the 10th millennium BC, the culture, named by Romanian authors

okvir za razumevanje absolutne kronološke pozicije najdišč. Presenečenje je bilo AMS datiranje skeleta 72 in faze Vlasac I, za katerega se je pokazalo, da sodi v sam konec pleistocena (OxA-5824 10.240±120 PS in OxA-5825 10.140±160 PS), drugače pa skeleti iz faz Vlasac I do III sodijo v 9. tisočletje pr. n. št., skeleti z območja III v Scheli Cladovei sodijo v sredino in konec 9. tisočletja PS (Bonsall *et al.* 1997, 66). Problematično ostaja datiranje najstarejše faze Lepenskega Vira - po konvencionalnih datumih je bila hiša 36 iz faze Ia (Bln-740b 7.360±100 PS in Bln-740a 7.310±100 PS) 800 let starejša od hiše XXXII iz faze II. AMS datumi skeletov iz faze III so pokazali starosti med prvo četrtino 8. in začetkom 7. tisočletja PS (Bonsall *et al.* 1997, 53-66). Če upoštevamo maksimalni razpon med fazama I in II, pridobljen s konvencionalnimi datumi, lahko domnevamo, da je faza I vsaj 800 let starejša od faze III, kar pomeni, da lahko pričakujemo, da bi AMS datacija faze I sodila v sredino 9. tisočletja PS. Tako dobimo kulturno in kronološko homogeno skupino v 9. tisočletju PS, ki jo Ivana Radovanović poimenuje »mezolitik Železnih vrat« (Radovanović 2000, 330,331). Na najdiščih v Železnih vratih so bili odkriti številni pokopi, sekundarni pokopi, pokopi brez lobanje ter izolirani pokopi lobanj (Letica 1969, 9; Borneanț, Plopsor 1990, 63). Morda lahko v podobnem kulturni kontekst oziroma v podobno prakso manipulacije s človeškimi skeletnimi ostanki uvrstimo tudi izolirano žensko lobanjo Ig 2, ki po svojih morfometričnih značilnostih ustreza lobanji iz Zaloga (Štefančič 1992, 127-134).

Ključni problem interpretacije zgodnjemezolit-
skih kultur je v nacionalnem merilu vzpostavljena regionalna fragmentacija prostora oziroma raziskovalna tendenca, ki se je v zadnjem obdobju posvečala predvsem interpretaciji poznega mezolitika v kontekstu transformacije k predelovalnemu gospodarstvu. Če zanemarimo nacionalne meje, ugotovimo, da bi v grobih potezah lahko s kulturo primerjali vsaj najdbe kamnitih orodij iz Zaloga ter najdbe iz plasti IVb2 in V v Crvenih Stijenah (Basler 1975, t. 4-8; Mihajlović 1999, 350). Na drugi strani bi lahko ustvarili povezavo med slovenskim prostorom ter prostorom Železnih vrat na podlagi odkritij enorednih harpun z zalustmi - najdbe iz Vlasca (Srejović, Letica 1978, t. 57) imajo edine neposredne primerjave v harpunah iz Špehovke (Brodar 1993, t. H: h) in iz Ljubljane (Turk 2004c, 16).

V mezolitiku smo na prostoru nekdanjega tardigravettiana priča tako fragmentaciji tradicionalnih kulturnih krogov kot tudi krizi interpretacij arheoloških ostankov. Očitno se v 9. tisočletju PS v osrednjem delu Balkana izoblikuje specifičen kulturni fenomen, ki je drugačen tako od mezolitika jadranskega prostora kot tudi od mezolitika Podonavja, ki oba temeljita na mikrolitizirani tradiciji tardigravettiana in vsebujeta številna geometrijska orodja. Na najdiščih s področja

as Schela Cladovei, formed in the same area and in the second half of the Boreal period did not contain microlithic tools (Paunescu 1989, 146-153).

Recent dates for the skeletons from Vlasac and Schela Cladovei have finally provided the frame for the understanding of the sites' absolute chronological position. The AMS date for Skeleton 72 from the Vlasac I phase was a surprise, since it pointed to the very end of the Pleistocene (OxA-5824 10.240±120 BP and OxA-5825 10.140±160 BP). The skeletons from the Vlasac I to III phases otherwise belong to the 9th millennium BC and the skeletons from area III at Schela Cladovei to the middle and the end of the 9th millennium BP (Bonsall *et al.* 1997, 66). The dating of the earliest phase of Lepenski Vir remains problematic, since the conventional dates place house 36 from phase Ia (Bln-740b 7.360±100 BP and Bln-740a 7.310±100 BP) 800 years earlier than house 32 from phase II. The AMS dates of the skeletons from phase III have indicated an age between the first quarter of the 8th and the beginning of the 7th millennium BP (Bonsall *et al.* 1997, 53-66). Considering the maximum span between phases I and II, obtained by conventional dates, it may be suggested that phase I was at least 800 years earlier than phase III. It may thereby be expected that the AMS date of phase I belongs into the middle of the 9th millennium BP. This results in a culturally and chronologically homogenous group of the 9th millennium BP, named "the Mesolithic of the Iron Gates" by Ivana Radovanović (Radovanović 2000, 330,331). The Iron Gates sites yielded many burials, secondary burials, burials without a skull and isolated burials of skulls (Letica 1969, 9; Borneanț, Plopsor 1990, 63). Perhaps the isolated female skull Ig 2, that corresponds to the skull from Zalog in its morphometric characteristics, may be classified into a similar cultural context or to a similar practice of handling human skeletal remains (Štefančič 1992, 127-134).

The key problem in interpreting the Early Mesolithic cultures in Slovenia is the existing regional fragmentation of space. And the research tendency that concentrated, in the recent past, mostly on the interpretation of the Late Mesolithic in the context of transition to farming. If the state borders are set aside, however, at least the finds of stone tools from Zalog and the finds from layers IVb2 and V at Crvene Stijene (Basler 1975, Pl. 4-8; Mihajlović 1999, 350) may roughly be compared. In addition, the connection between the Slovene and the Iron Gates areas may be established on the basis of the finds of unilaterally barbed harpoons. The finds from Vlasac (Srejović, Letica 1978, Pl. 57), for example, have their direct comparison only in the harpoons from Špehovka (Brodar 1993, Pl. H: h) and from the Ljubljana (Turk 2004c, 16).

During the Mesolithic, the area of the former Tardigravettian witnessed a fragmentation of the traditional

Železnih vrat in Ljubljanskega barja so bile odkrite kamnite industrije, kjer so skupnosti izkoriščale predvsem lokalne surovine slabše kvalitete. Vsem industrijam je skupno, da so temeljile na izdelavi odbitkov in ne klin ter da so vsebovale le redka geometrijska orodja. Večji del orodij predstavljajo retuširani odbitki in nepravilna strgala (med 30 in 50 %), pogosta so večinoma majhna praskala izdelana na odbitkih (med 10 in 20 %), retuširane kline (15 do 25 %) ter kline s hrbtom (od 10 do 20 %) (Kozłowski, Kozłowski 1984a, 263-267; Boroneanț 1970, 2-25). Edino najdišče, ki izstopa po majhnem številu klin s hrbtom, je Zalog, pri čemer domnevamo, da je slednje posledica metodologije zaščitne raziskave.

Artefaktni skupek z najdišča tako močno izstopa iz okvirov klasičnih mezolitskih orodnih skupkov. Glede na tipološko sestavo in zastopanost orodnih tipov predstavlja novo kategorijo najdišč. Če sta Kozłowski in Dalmeri (2000, 15) delila glede na zastopanost mikrolitov in strgal ter retuširanih klin mezolitska najdišča na tista, ki naj bi predstavljala lovske tabore ter bazne tabore, imamo v primeru obravnavanega najdišča opravka z ekstremno obliko baznega tabora. Zanimljivo število mikrolitov, ki pa ni zgolj posledica načina zbiranja artefaktov, relativno visoko število strgal ter predvsem visoko število prej naključno retuširanih odbitkov kaže, da gre za najdišče, ki ga najlažje razlagamo kot prostor specialne aktivnosti znotraj področja baznega tabora. Relativno slaba kvaliteta surovin za izdelavo orodij ter velika količina dokaj velikih odbitkov kažeta na nizko rezidenčno mobilnost populacije ter hkrati na nizko logistično mobilnost orodja so odraz grobih del, ki so se izvajala na ožjem prostoru najdišča. Glede na veliko količino odkritih kostnih ostankov živali lahko domnevamo, da gre za specifičen prostor razkosavanja, na katerega so transportirali plen ter ga tam obdelali.

Že izkoriščanje lokalnih virov surovin za kamnita orodja nakazuje, da skupnosti niso bile zelo rezidenčno mobilne. Domnevamo lahko, da je šlo za skupnosti, ki so bile specializirane za dolgotrajno izkoriščanje lokalno omejenih virov. Na vseh najdiščih so bili odkriti ostanki dolgotrajnih semisedentarnih naselbin, kjer je bilo odkritih veliko število arheoloških ostankov, zaradi obsega naselbin, pa je prišlo tudi do formiranja notranje funkcionalne delitve. Prav v tem argumentu lahko prav tako iščemo razloge za manjše število geometrijskih orodij ter klin s hrbtom na najdišču Zalog, kjer je bil odkrit zgolj delovno specifičen del naselbine. Gre za ključni problem, ki ga je že drugje izpostavila O. Soffer - problem kulturne nekompatibilnosti v kamenodobnih študijah tiči v problemu, ker opisovalci niso znali zajeti pomena tako znotrajnaselbinske kot tudi mednaselbinske variabilnosti arheoloških ostankov (Soffer 1985, 225), oziroma so funkcionalne dele naselbin pojmovali kot celote značilne za kulture.

cultural circles, which caused difficulties in the interpretation of archaeological remains. The 9th millennium BP in the central Balkan area apparently sees the formation of a specific cultural phenomenon that is different both from the Mesolithic of the Adriatic area as well as from the Mesolithic of the Danube basin, both based on the microlithic tradition of the Tardigravettian and contain numerous geometric tools. The sites of the Iron Gates and the Ljubljansko barje yielded stone industries, for the production of which mostly local raw material of poorer quality was exploited. The common characteristics of these industries are that they were all based on the production of flakes rather than blades and that they contained only rare geometric tools. Most tools are retouched flakes and irregular side scrapers (between 30 and 50%) with frequently appearing end scrapers, mostly small and made on flakes (between 10 and 20%), retouched blades (15 to 25%) and backed blades (from 10 to 20%) (Kozłowski, Kozłowski 1984a, 263-267; Boroneanț 1970, 2-25). The only site that stands out in its small number of backed blades is Zalog, which is assumed to be the consequence of the methodology used in the rescue research.

The artefact assemblage from the Zalog site thereby strongly stands out from the frames of the classic Mesolithic tool assemblages. Its typological composition and representation of tool types suggests a new category of sites. According to the division of Mesolithic sites by Kozłowski and Dalmeri (2000, 15) on those that represented hunting and those that represented base camps, a division based on the representation of microliths, side scrapers and retouched blades, the Zalog site is an extreme form of a base camp. The negligible number of microliths, which is not only the consequence of the collection method, the relatively high number of side scrapers and mostly the high number of rather coincidental retouched flakes, indicates a site that is most readily interpreted as an area of special activity within a base camp. The relatively poor quality of raw material for tool production and a great quantity of fairly large flakes indicate a low residential mobility as well as a low logistic mobility of the population. The uncovered tools are a reflection of rough work conducted on a limited area of the site. Considering the great quantity of the uncovered animal bone remains, it may be supposed that the site represents a specific area where the prey was transported to and then butchered. The exploitation of the local sources of raw material for stone tools indicates that the communities were residentially not very mobile. It may be supposed that these communities were specialized in a long-term exploitation of locally limited resources. All the sites yielded remains of long-term semi-sedentary settlement, where a great number of archaeological remains were uncovered and where, due to the extent of the settlement, the formation of an internal functional division occurred. This might also contain the reasons

Na tej točki se približamo tudi problemu logistične mobilnosti, kot jo je definiral Sinclair - za potrebe izkoriščanja specifičnih virov nabiralci prestavijo svoj tabor, logistični zbiralci pa napravijo malo rezidenčnih premikov ter pošiljajo v prostor skupine, ki prinašajo vire na mesto naselbine. Tako logistična mobilnost ustvarja v prostoru serijo različnih tipov najdišč - rezidenčna najdišča, prostore zbiranja rastlin, prostore uboja in razkosavanja, delavnice, prostore pridobivanja surovine, prenočevalne postaje (Sinclair 1999, 191), ki zapustijo vsako svoj specifični arheološki zapis. Na drugi strani ustvari nizka logistična mobilnost nastanek velikih naselij, ki producirajo velike količine odpadkov. Značilnost teh velikih in kompleksnih naselij je notranja segmentacija dejavnosti, ki ustvarja razlike v materialni kulturi. Načelno lahko za končni paleolitik in zgodnji mezolitik glede na majhne količine odkritih orodij na posameznih najdiščih domnevamo visoko stopnjo rezidenčne mobilnosti, hkrati pa se moramo zavedati tudi izjem - pa naj gre za velike kompleksne naselbine (Zemona II, Zalog pri Verdu) ali pa za točke, ki so tisočletja dolgo vedno znova privlačile poselitev (Breg pri Škofljici).

Funkcionalna interpretacija najdišč je bila mogoča v primerih majhnih prostorov dejavnosti, odpovedala pa je v primeru velikih celot, za katere se domneva, da vsebujejo tudi večjo segmentacijo. V primeru odkritega dela najdišča Zalog pri Verdu smo imeli srečo, saj je bil uničen in raziskan manjši del večjega najdišča, pri čemer lahko upoštevajoč podatke o odkriti favni, koščeni in kamniti orodjih določimo tudi funkcijo dela najdišča. Funkcionalna jasnost najdišča predstavlja problem za kulturno opredelitev odkritih ostankov. Kulturo oziroma stil lahko določimo kot formalno variacijo v materialni kulturi, ki prenaša informacije o osebni in socialni identiteti (Wiessner 1983, 253), v primeru Zaloga pa tega ne moremo trditi na podlagi kamnitih orodij, nekoliko bolj izpovedna pa so koščena in orodja iz rogovine oziroma tisti socialni dejavniki, ki jih lahko rekonstruiramo na podlagi strukturiranja arheološkega zapisa. Kamnita orodja predstavljajo tu predvsem orodja za opravljanje specifičnih funkcij, oblikovanje koščeni in rogovinastih orodij pa je stilno vplivano. In če domnevamo, da so velika semisedentarna naselja ob vodotokih oblika adaptacije na okoljske razmere, so sekundarni pokopi oziroma deponiranje izoliranih lobanj kulturna značilnost.

J. Kozłowski je opozarjal, da monotetični sistemi tipologij, ki temeljijo na prisotnosti in odsotnosti elementov niso najbolj primerni, ker ne odražajo ustrezno kompleksnosti. Menil je, da je razlika med staro in srednje paleolitskimi ter mlajše paleolitskimi in mezolitskimi tipologijami v tem, da prve temeljijo na relativnih zastopanostih posameznih elementov, druge pa na prisotnosti oziroma odsotnosti specifičnih elementov

for a low number of geometric tools and backed blades on the Zalog site, where only a productionally specific part of the settlement was uncovered. It is a key problem raised already by O. Soffer. The problem of cultural incompatibility in the Stone Age studies lies in the inability on the part of the researchers to incorporate the significance of both inter- and intrasettlement variability of archaeological remains (Soffer 1985, 225) and their considering the functional parts of settlements as culturally characteristic wholes.

At this point the problem of logistic mobility, as defined by Sinclair, is touched upon. He wrote that, in order to exploit specific sources, gatherers move their camp, while the logistic foragers make few residential moves and rather send groups into the surrounding areas to bring sources to the settlement. Logistic mobility thus creates a series of different site types in space – residential sites, areas of gathering plants, areas of killing and butchering animals, work areas, areas of raw material exploitation, overnight stations (Sinclair 1999, 191). Each of these areas leaves its own archaeological record. Low logistic mobility, on the other hand, causes the appearance of large settlements that produce large quantities of refuse. Characteristic of these large and complex settlements is the segmentation of activities within a settlement, which creates differences in the material culture. Based on the small quantity of tools uncovered at individual sites, a high degree of residential mobility may in principle be supposed for the End Palaeolithic and the Early Mesolithic. At the same time, we need to be aware of exceptions, either large complex settlements (Zemona II, Zalog near Verd) or points that attracted settlement through millennia (Breg near Škofljica).

Functional interpretation of a site was possible in cases of small activity areas but failed in cases of large wholes for which greater segmentation is supposed. For the uncovered part of the Zalog near Verd site, the favourable circumstance was that only a small part of a large settlement was endangered and subsequently investigated, whereby the function of this part of the site may be determined on the basis of the uncovered fauna as well as bone and stone remains. This functional clarity of the site then represents a problem for the cultural determination of the uncovered remains. The culture or style may be determined as a formal variation in the material culture that brings information as to the personal and social identity (Wiessner 1983, 253). In the case of Zalog, stone tools do not provide a basis for such a claim. Bone and antler tools as well as social factors that may be reconstructed on the basis of the structuration of the archaeological record, are somewhat more telling. Stone tools represent mostly tools for specific functions, while the production of bone and antler tools is stylistically influenced. Thus, if it is supposed that large semi-sedentary settlements near water are a form

(Kozłowski 1980, 123). Da bi se izognili pomanjkanju posameznih orodnih tipov, smo za obdelavo kamnitih orodij tipološke sheme dokaj poenostavili. Tako smo, da bi lahko določili aspekte artefaktov, ki bi lahko bili povezani z kognitivnimi domenami izdelovalcev, opazovali artefakte na makro ravni. S tem smo se izognili poglobitnemu problemu slovenske kamenodobne arheologije, pri katerem upoštevanje velikega števila parametrov vodi večkrat k temu, da ne pride do formiranja konsistentnih skupin oziroma do grupiranja orodnih tipov. Zavedajoč se, da so tipologije sestavljene na osnovi ciljev in ti cilji določajo kriterije, ki se jih uporablja pri tipologiji, smo opazovali zgolj osnovne tipe orodij.

Opazovanje skupka kamnitih orodij je pokazalo, da v izdelavo posebnih oblik ni bilo vložena veliko časa in energije - večino orodij predstavljajo retuširani odbitki. Teorija o uporabi odbitkov je nekoč pripovedovala, da bo oblika odbitka določala ali se bo uporabljal za orodje oziroma kako se bo držal in kje bo delovni rob - gre za kriterije prenosa energije od uporabnika na delovni rob. Pozneje so etnoarheološke raziskave pokazale, da je bila poglobitna analitična enota ostrina delovnega roba oziroma kot delovnega roba in ne oblika orodja (Read, Russel 1996, 673). Sedanja teorija trdi, da narava subsistenčne strategije in dostopnost surovine določata vidike izdelave in vzdrževanja orodij znotraj generalnih okvirov prilagoditev - posledično so pomembni dejavniki kot dostopnost surovin, strategije mobilnosti in vzorci poselitve, organizacija subsistence in »opremljanje«, življenjski rok tehnologije, ter zanesljivost in sposobnost za vzdrževanje. Seveda to ne zanika kulturno specifičnih tehnoloških sistemov (Sinclair 1999, 191).

Zaradi domnevno večje logistične in manjše rezidenčne mobilnosti so skupnosti iz tega obdobja zapustile za sabo cel spekter najdišč, ki so na osnovi tipoloških analiz kamnitih orodij dokaj različna. Na eni strani gre za velika semisedentarna naselja ter občasne točke dejavnosti. Gre za prostore različnih dejavnosti znotraj cikla primarne ekonomije. Na eno izmed takih najdišč smo naleteli v primeru Zaloga pri Verdu - gre za najdišče, kjer so minimalno zastopani »tipični« orodni tipi tega obdobja, ki jih povezujemo z lovom. Večino odkritih orodij predstavljajo generalna orodja, ki so služila drugim dejavnostim, kot je bilo obdelovanje rogovine ter razkosavanje lovskega plena. Orodja so bila narejena na kraju uporabe iz manj kvalitetnih surovin, le malo uporabljana in hitro zavržena, v primeru intenzivnejše uporabe pa popravljana drugje. A. Dagan-Ginter je opozarjala, da je tradicionalna evolucionistično usmerjena arheologija večinoma skrbno opazovala in izpostavljala orodja na klinah, pri tem pa je zanemarjala orodja izdelana na odbitkih - večino teh orodij in njihove poglobitne oblike odkrijemo na najdiščih, kjer so pridobivali in

of adaptation to the conditions in the environment, then the secondary burials or depositions of isolated skulls are a cultural characteristic.

J. Kozłowski drew attention to the fact that monothetic systems of typologies, based on the presence and absence of elements, are not the most suitable, since they do not reflect the appropriate degrees of complexity. He thought that the difference between the Lower and the Middle Palaeolithic, on the one hand, and the Late Palaeolithic and the Mesolithic typologies, on the other, lies in the fact that the former are based on the relative representations of individual elements and the latter on the presence or absence of specific elements (Kozłowski 1980, 123). So as to avoid the shortage of individual tool types, we rather simplified the typological schemes in analyzing stone tools. To determine the aspect of the artefacts that might be connected to the cognitive domains of the maker, the artefacts were observed on a macro level. In this manner, the main problem of the Slovene Stone Age archaeology was avoided, where the consideration of a high number of parameters leads to the inability to form consistent groups, that is to group tool types. Bearing in mind that typologies are made on the basis of certain aims and that these aims define the criteria used in typology, only the basic tool types were observed.

The observation of the stone tool assemblage showed that not much energy and time was invested into the production of special forms, since most tools are retouched flakes. The theory of the use of flakes once asserted that the form of the flake determined whether the flake would be used as a tool, how it would be held and where the working edge would be. These are the criteria of the transfer of energy from the user to the working edge. Later, the ethnoarchaeological research showed that the main analytical unit was the sharpness or the angle of the working edge rather than the form of the tool (Read, Russel 1996, 673). The present theory asserts that the nature of subsistence strategy and the availability of raw material determine the aspects of tool production and maintenance within general frames of adaptations. Consequentially, the important factors become the availability of raw material, the strategies of mobility and settlement patterns, the organization of subsistence and supply, the expiry date of the technology as well as reliability and maintenance capacities. This, of course, does not deny the culturally specific technological systems (Sinclair 1999, 191).

Due to the supposedly higher logistic and lower residential mobility, the communities of this period left behind a spectre of sites that are fairly varied as revealed by the typological analyses of stone tools. There are large semi-sedentary settlements on the one hand and occasional points of activity on the other. These are spaces of various activities within the cycle of subsistence. One of such sites was uncovered

predelovali surovine. Ti odbitki so najbolj uporabni masivni stranski produkti za izdelavo grobih orodij (Dagan-Ginter 1980, 139).

Na podlagi interpretacije tipoloških značilnosti kamnitih orodij, vzorca vzdrževanja uporabljenih orodij, vzorca popravljanja poškodovanih orodij in vzorca izdelave in uporabe odbitkov, lahko domnevamo, da najdišče predstavlja prostor aktivnosti, kjer so se pretežno izdelovala in uporabljala generalna in večnamenska orodja. Posebne oblike kamenih orodij se niso intenzivneje vzdrževale in uporabljale, drugače pa je bilo z generalnimi oblikami orodij, ki kažejo poleg višje odstotne zastopanosti tudi višjo stopnjo fragmentacije, ki jo lahko razložimo z intenzivnejšo uporabo. Na podlagi opazovanja lahko domnevamo, da gre v primeru najdišča v Ljubiji za poseben prostor aktivnosti, na katerem so razkosavali prinešen lovski plen. Taki prostori dejavnosti so se navadno nahajali na robu naselij oziroma izven naselij ob tekoči vodi. Na njih se odkriva generalne orodne tipe ter malo projektilov in specialnih orodij. Prisotna je predvsem izdelava večjih grobih orodij iz manj kvalitetnih surovin, odsotna pa je izdelava specialnih oblik orodij. Vzorci fragmentacije velikokrat kažejo, da so na najdišču prisotni odlomljeni deli orodj, poškodovana orodja pa so popravljali na drugih krajih.

Kljub pionirski kompilaciji vedenj o mezolitiku v Sloveniji pred več kot desetletjem (Josipovič 1992) je natančna objava arheoloških in paleontoloških najdb z najdišča Zalog pri Verdu šele drugi korak za objavo Viktorjevega spodmola (Turk 2004) k ustrežnejši predstavitvi arheoloških ostankov delovanja lovskih in nabiralskih skupnosti iz starejšega holocena na področju Slovenije. Tako lahko danes na podlagi pridobljenih podatkov domnevamo obstoj najmanj dveh ločenih kulturnih krogov v Borealu - mediteranskega na področju zahodne in jugozahodne Slovenije ter balkanskega na področju osrednje in vzhodne Slovenije. Za natančnejšo pojasnitev dogajanja v Borealu na področju Ljubljanskega barja bo v prihodnosti potrebna obdelava in objava Brega pri Škofljici, ki bi glede na notranjo funkcionalno segmentacijo obsežnega najdišča, raziskanega s sodobnimi metodami, omogočalo tipološko, tehnološko in funkcionalno ter posledično kulturno opredelitev in primerjavo z Zalogram.

at Zalog near Verd. This is a site where the "typical" tool types of the period that are connected with hunting are minimally represented. Most tools uncovered are general tools used for purposes other than hunting, such as working of antler and butchering of prey. Tools were made where they were used, from raw materials of a poorer quality, used only briefly and quickly discarded. When used more intensely, they were repaired elsewhere. A. Dagan-Ginter pointed out that traditional archaeology, evolutionistically oriented, mostly carefully observed and paid special attention to tools on blades, while, at the same time, neglecting tools made on flakes, most of which are uncovered, with their main forms, on sites where the raw material was extracted and reworked. These flakes are the most useful mass side-products for the production of rough tools (Dagan-Ginter 1980, 139).

Based on the interpretation of the typological characteristics of stone tools, the pattern of maintenance of the tools used, the pattern of repairing the damaged tools and the pattern of production and use of flakes, it may be supposed that the site represents an activity area where mostly general and multi-purpose tools were produced and used. Special forms of stone tools were not intensely repaired and used. The general tool forms, on the other hand, show a higher percentage and also a higher degree of fragmentation that can be explained through a more intensive use. Observations allow for the supposition that the site uncovered in the Ljubija is a special point of activity where the brought-in prey was butchered. Such points of activity were usually situated on the edges of settlements or near flowing water outside of them. They yield general tool types and few projectiles and special tools. Mostly the production of large rough tools made of a poorer quality raw material is present there, while the production of special tool forms is absent. Patterns of fragmentation often indicate that the broken parts of tools are present at the site but that the damaged tools were repaired elsewhere.

A pioneering compilation of knowledge on the Mesolithic in Slovenia was published more than a decade ago (Josipovič 1992). In spite of that, a more detailed publication of the archaeological and palaeontological finds from the Zalog near Verd site is only the second step to a more appropriate presentation of the archaeological remains of the activity of the hunter-gatherer communities from the Early Holocene in the Slovene area, that is after the publication of the rock shelter of Viktorjev spodmol (Turk 2004). At present, gathered data indicates at least two separate cultural circles in the Boreal period - the Mediterranean circle in the area of western and south-western Slovenia, on the one hand, and the Balkan circle in the area of central and eastern Slovenia, on the other. A more detailed explanation of the activities in the Boreal in the area of the Ljubljansko barje will only be possible after the site

5 ZAKLJUČEK

Glede na odkrite najdbe sodi najdišče ob Ljubiji v širši okvir zgodnjeholocenskih epigravetienskih najdišč balkansko-podonavskega kompleksa. Zaradi velike logistične in rezidenčne mobilnosti so skupnosti iz tega obdobja zapustile za sabo cel spekter najdišč, ki so na osnovi tipoloških analiz kamnitih orodij dokaj različna. Gre za prostore različnih dejavnosti znotraj cikla primarne ekonomije. Na eno izmed takih najdišč smo naleteli v primeru Ljubije - gre za najdišče, kjer so minimalno zastopani »tipični« orodni tipi tega obdobja, ki jih povezuje z lovom. Večino odkritih orodij predstavljajo generalna orodja, ki so služila drugim dejavnostim. Orodja so bila narejena na kraju uporabe iz manj kvalitetnih surovin, le malo uporabljana in hitro zavržena, v primeru intenzivnejše uporabe pa popravljana drugje.

Na podlagi interpretacije tipoloških značilnosti kamenih orodij, vzorca vzdrževanja uporabljanih orodij, vzorca popravljanja poškodovanih orodij in vzorca izdelave in uporabe odbitkov, lahko domnevamo, da najdišče predstavlja prostor aktivnosti, kjer so se pretežno izdelovala in uporabljala generalna in večnamenska orodja. Posebne oblike kamenih orodij se niso intenzivneje vzdrževale in uporabljale, drugače pa je bilo z generalnimi oblikami orodij, ki kažejo zraven višje odstotne zastopanosti tudi višjo stopnjo fragmentacije, ki jo lahko razložimo z intenzivnejšo uporabo. Na podlagi opazovanja in preden dobimo natančnejše analize favnističnih ostankov, lahko upoštevajoč ostale arheološke najdbe domnevamo, da gre v primeru najdišča v Zalogu za poseben prostor aktivnosti na katerem so razkosavali prinesen lovski plen.

Taki prostori dejavnosti so se navadno nahajali na robu naselij oziroma izven naselij ob tekoči vodi. Na njih se odkriva generalne orodne tipe ter malo projektilov in specialnih orodij. Prisotna je predvsem izdelava večjih grobih orodij iz manj kvalitetnih surovin, odsotna pa je izdelava specialnih oblik orodij. Vzorci fragmentacije velikokrat kažejo, da so na najdišču prisotni odlomljeni deli orodij, poškodovana orodja pa so popravljali na drugih krajih. Ostanke lesene konstrukcije lahko razlagamo kot ostanke ploščadi na kateri so razkosavali plen, oziroma celo kot ostanke mesarskih stojal. Odkrito človeško lobanjo lahko na podlagi podobnih primerov s paleolitskih, mezolitskih in neolitskih najdišč razlagamo na številne načine - kot del

of Breg near Škofljica will be analyzed and published. This site was researched using modern methods and would, considering the preserved data, enable an appropriate typological, technological, functional and, consequentially, cultural determination of that site and a comparison with Zalog.

5 CONCLUSION

Considering the finds, the site in the Ljubija belongs in a wider frame of the Early Holocene Epigravettian sites of the Balkan-Danubian complex. The high logistic and residential mobility of the communities of the period left behind a large spectre of sites that the typological analyses of stone tools reveal quite different from one another. They represent areas of different activities within the cycle of subsistence. One such site was uncovered in the Ljubija. It is a site where the "typical" tool types of the period connected with hunting are minimally represented; most of the uncovered tools are general and were used in activities other than hunting. The tools were made where they were used from raw materials of poorer quality; they were little used and soon discarded. When used more intensely, they were repaired elsewhere.

Based on the interpretation of the typological characteristics of stone tools, the pattern of maintenance of the tools used, the pattern of repairing the damaged tools and the pattern of production and use of flakes, it may be supposed that the site represents an activity area where mostly the general and multi-purpose tools were produced and used. Special forms of stone tools were not intensely repaired and used. The general tool forms, on the other hand, show a higher percentage and also a higher degree of fragmentation that can be explained through a more intensive use. Observations that are based on the archaeological finds allow, in the absence of a more detailed analysis of faunistic remains, for the supposition that the site uncovered in the Ljubija is a special point of activity where the brought-in prey was butchered.

Such points of activity were usually situated on the edges of settlements or near flowing water outside of them. They yield general tool types and few projectiles and special tools. Mostly the production of large rough tools of raw material of a poorer quality is present there, while the production of special tool forms is absent. Patterns of fragmentation often indicate that the broken parts of tools are present at the site but the damaged tools were repaired elsewhere. The remains of a wooden construction at the site may be interpreted as the remains of a platform where the prey was butchered, possibly even the remains of butcher blocks. The human skull found beside faunal remains may be interpreted in various ways, based on similar cases from

lovskega plena, ritualnega kanibalizma, sekundarne oblike pokopa...

6 KATALOG ORODIJ IN JEDER

V katalogu je predstavljen celoten seznam retuširanih kamnitih orodij in jeder z najdišča Zalog pri Verdu. Orodja so razvrščena zaporedno po vrstnem redu zbiralnih enot. Najprej so predstavljena retuširana orodja, sledi pa jim seznam jeder. Na tabelah je upodobljen širši izbor orodij, ki so v seznamu opisana s celotnim kataloškim opisom. V kataloškem opisu je podana tipološka opredelitev orodja, oblika in ohranjenost podlage, na kateri je izdelano, trenutna barva orodja in njegove merske vrednosti podane v centimetrih. Kratica D predstavlja dolžino, kratica S širino in kratica B debelino orodja. V primeru ohranjenosti je opisana vrsta in oblika talona. Obdelava orodja je opisana glede na pozicijo na podlagi ter vrsto in obliko obdelave. Na koncu sta podana še številka zbiralne enote, iz katere orodje izvira, ter tabela, kjer je upodobljeno. Pri orodjih, ki niso upodobljena, je podana le njihova tipološka opredelitev, merske vrednosti ter številka zbiralne enote.

6.1 Orodja

1. Odbitek z izjedo iz sivo zelenega do rjavega roženca (D 2,6; S 2,7; B 0,6). Talon je fasetiran. Na distalnem delu desnega lateralnega roba na dorzalni strani je izdelana retuširana izjeda. LZ II-04/N 002; *t. I:* 1.
2. Trikotnik iz fragmentiranega odbitka iz sivenga roženca (D 1,1; S 0,7; B 0,2). Talon je gladek. Na desnem lateralnem robu je izdelana strma prečna retuša. LZ II-04/N 003; *t. I:* 2.
3. Del strgala (del delovnega roba) iz temno rjavo sivenga roženca (D 1,8; S 1,8; B 0,5). Talon je gladek. Na proksimalnem delu na dorzalni strani se nahajajo retuše. LZ II-04/N 005; *t. I:* 3.
4. Retuširan odbitek iz rjavo sivenga roženca (D 2,2; S 1,2; B 0,4). Talon je gladek. Na proksimalnem in distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 005; *t. I:* 4.
5. Krožno praskalo na fragmentiranem odbitku iz temno sivenga do rjavega roženca (D 1,7; S 1,6; B 0,7). Talon je gladek. Na levem in desnem lateralnem robu na dorzalni strani je s stopnjevitno retušo izdelano čelo praskala. LZ II-04/N 005; *t. I:* 5.
6. Retuširan fragment odbitka iz temno zelenkasto-sivenga roženca (D 2,5; S 1,3; B 0,6). Na proksimalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 006; *t. I:* 6.
7. Vbadalo na bipolarnem jedru (D 3; S 2,3; B 1,5). LZ II-04/N 007.
8. Retuširan odbitek (D 4,1; S 3,5; B 1,2). LZ II-04/N 009.
9. Retuširan odbitek iz svetlo sivenga do rjavega roženca pokrit z vijoličasto patino (D 2,7; S 2; B 1,1). Talon je

Palaeolithic, Mesolithic and Neolithic sites: it may be a part of a hunting prey, the remains of ritual cannibalism, a secondary form of burial or other.

6 CATALOGUE OF THE STONE TOOLS

The catalogue presents the whole collection of the retouched stone tools discovered at the Zalog near Verd site. Tools are numbered according to the succession of the collection units. First the retouched stone tools are presented, followed by the cores. A broader selection of the tools described in the catalogue is presented on the tables. The description includes type, form and state of preservation of the tool, momentary colour and its size in centimetres. Unit D represents the length, unit S the width and unit B the thickness of the tool. Where the striking platform was preserved, its form is described. The modification of the flake is described according to the position of the modification and its form. At the end the number of the collection unit and the location on the tables is indicated. Tools not represented on the tables are listed in the catalogue only with a description of their type and collection unit.

6.1 Tools

1. Notched flake of greyish-green to brown chert (L 2.6; W 2.7; Th 0.6). Striking platform is faceted. A retouched notch is made on the distal part of the right lateral edge on the dorsal side. LZ II-04/N002; *Pl. I:* 1.
2. Triangle from a fragmented flake of grey chert (L 1.1; W 0.7; Th 0.2). Striking platform is smooth. A steep truncation is made on the right lateral edge. LZ II-04/N 003; *Pl. I:* 2.
3. Part of a side scraper (part of a working edge) of dark brownish-grey chert (L 1.8; W 1.8; Th 0.5). Striking platform is smooth. Retouch is on the proximal part on the dorsal side. LZ II-04/N 005; *Pl. I:* 3.
4. Retouched flake of brownish-grey chert (L 2.2; W 1.2; Th 0.4). Striking platform is smooth. Retouch is on the proximal and distal parts of the right lateral edge on the dorsal side. LZ II-04/N 005; *Pl. I:* 4.
5. Circular end scraper on a fragmented flake of dark grey to brown chert (L 1.7; W 1.6; Th 0.7). Striking platform is smooth. End scraper is made with scalliform retouch on the left and right lateral edges on the dorsal side. LZ II-04/N 005; *Pl. I:* 5.
6. Retouched flake fragment of dark greenish-grey chert (L 2.5; W 1.3; Th 0.6). Retouch is on the proximal part of the right lateral edge on the dorsal side. LZ II-04/N 006; *Pl. I:* 6.
7. Burin on a bipolar core. LZ II-04/N 007; *Pl. I:* 7.
8. Retouched flake. LZ II-04/N 009.
9. Retouched flake of light grey to brown chert with a purple coating (L 2.7; W 2; Th 1.1). Striking platform is

- gladek. Na srednjem delu levega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 009; *t. 1*: 9.
10. Strgalo na fragmentu odbitka iz temno sivega do temno rdečkasto rjavega roženca (D 3,3; S 1,6; B 1,3). Na desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 011; *t. 1*: 10.
 11. Retuširan fragment odbitka iz temno sivega do temno rjavega roženca (D 2,8; S 4,2; B 0,7). Na proksimalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. Na srednjem delu desnega lateralnega roba na ventralni strani se nahajajo retuše. Na distalnem delu na dorzalni strani se nahajajo retuše. LZ II-04/N 011; *t. 1*: 11.
 12. Retuširan odbitek iz temno sivega do rjavega roženca (D 2,4; S 2,1; B 0,7). Talon je gladek. Na desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 012; *t. 1*: 12.
 13. Strgalo na odbitku (D 2,9; S 2; B 1,3). LZ II-04/N 012.
 14. Strgalo na fragmentu odbitka (D 2,7; S 1,8; B 1,3). LZ II-04/N 012.
 15. Odbitek z drobtinčasto retušo iz temno rjavega roženca (D 2,9; S 2,5; B 0,6). Talon je gladek. Na srednjem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 013; *t. 1*: 15.
 16. Trikotnik na fragmentu odbitka iz rdečkasto sivega prosojnega roženca (D 1,8; S 0,9; B 0,3). Talon je fase-tiran. Na levem lateralnem robu na dorzalni strani je s strmo retušo izdelana prečna retuša. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 013; *t. 1*: 16.
 17. Atipično praskalo na fragmentiranem odbitku iz temno sivo rjavega roženca (D 1,8; S 1,9; B 0,4). Talon je gladek. Na desnem lateralnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 013; *t. 1*: 17.
 18. Klina z drobtinčasto retušo iz sivnega roženca (D 2,2; S 1,1; B 0,4). Talon je gladek. Na distalnem delu levega lateralnega roba na ventralni strani se nahajajo drobtinčaste retuše. LZ II-04/N 013; *t. 2*: 18.
 19. Klina z drobtinčasto retušo (D 2; S 1; B 0,4). LZ II-04/N 013.
 20. Atipično praskalo na fragmentu odbitka iz rjavega roženca (D 1; S 2,2; B 1,2). Na distalnem delu desnega lateralnega roba na ventralni strani in na distalnem delu levega lateralnega roba na dorzalni strani se nahajata izdelani čelu praskal. LZ II-04/N 013; *t. 2*: 20.
 21. Fragment retuširanega odbitka (D 1,7; S 1,1 B 0,5). LZ II-04/N 014.
 22. Odbitek z izjedama iz temno sivnega do rjavega roženca (D 2,2; S 2,1; B 0,4). Talon je gladek. Na proksimalnem delu desnega lateralnega roba na ventralni strani in na distalnem delu levega lateralnega roba na ventralni strani sta izdelani retuširani izjedi. LZ II-04/N 014; *t. 2*: 22.
 23. Nazobčan odbitek iz temno sivnega roženca (D 2; S 2,7; B 0,9). Talon je pokrit s korteksom. Na distalnem delu se nahajajo izdelana alternirajoče retuše. LZ II-04/N 014; *t. 2*: 23.
 24. Odbitek z drobtinčasto retušo iz temno sivnega roženca (D 1,5; S 1,5; B 0,4). Talon je gladek. Na proksimalnem in srednjem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 015; *t. 2*: 24.
 25. Fragment odbitka z drobtinčasto retušo (D 2,2; S 1,6; B 0,3). LZ II-04/N 015.
 26. Klina z drobtinčasto retušo iz zelenkastega roženca smooth. Retouch is on the middle part of the left lateral edge on the ventral side. LZ II-04/N 009; *Pl. 1*: 9.
 10. Side scraper on a flake fragment of dark grey to dark reddish-brown chert (L 3.3; W 1.6; Th 1.3). Retouch is on the right lateral edge on the dorsal side. LZ II-04/N 011; *Pl. 1*: 10.
 11. Retouched flake fragment of dark grey to dark brown chert (L 2.8; W 4.2; Th 0.7). Retouch is on the proximal part of the right lateral edge on the dorsal side, on the middle part of the right lateral edge on the ventral side as well as on the distal part on the dorsal side. LZ II-04/N 011; *Pl. 1*: 11.
 12. Retouched flake of dark grey to brown chert (L 2.4; W 2.1; Th 0.7). Striking platform is smooth. Retouch is on the right lateral edge on the dorsal side. LZ II-04/N 012; *Pl. 1*: 12.
 13. Side scraper on a flake. LZ II-04/N 012.
 14. Side scraper on a flake fragment. LZ II-04/N 012.
 15. Flake with nibbling retouch of dark brown chert (L 2.9; W 2.5; Th 0.6). Striking platform is smooth. Nibbling retouch is made on the middle part of the left lateral edge on the dorsal side. LZ II-04/N 013; *Pl. 1*: 15.
 16. Triangle on a flake fragment of translucent reddish-grey chert (L 1.8; W 0.9; Th 0.3). Striking platform is faceted. Truncation is made with steep retouch on the left lateral edge on the dorsal side. Retouch are also on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 013; *Pl. 1*: 16.
 17. Atypical end scraper on a fragmented flake of dark grey-brown chert (L 1.8; W 1.9; Th 0.4). Striking platform is smooth. End scraper is made on the right lateral edge on the dorsal side. LZ II-04/N 013; *Pl. 1*: 17.
 18. Blade with nibbling retouch of grey chert (L 2.2; W 1.1; Th 0.4). Striking platform is smooth. Nibbling retouch is made on the distal part of the left lateral edge on the ventral side. LZ II-04/N 013; *Pl. 2*: 18.
 19. Blade with nibbling retouch. LZ II-04/N 013.
 20. Atypical end scraper on a flake fragment of brown chert (L 1; W 2.2; Th 1.2). End scrapers are on the distal part of the right lateral edge on the ventral side and on the distal part of the left lateral edge on the dorsal side. LZ II-04/N 013; *Pl. 2*: 20.
 21. Fragment of a retouched flake. LZ II-04/N 014.
 22. Flake with two notches of dark grey to brown chert (L 2.2; W 2.1; Th 0.4). Striking platform is smooth. Retouched notches are made on the proximal part of the right lateral edge on the ventral side and on the distal part of the left lateral edge on the ventral side. LZ II-04/N 014; *Pl. 2*: 22.
 23. Denticulated flake of dark grey chert (L 2; W 2.7; Th 0.9). Striking platform is covered with the cortex. Alternating retouch is on the distal part. LZ II-04/N 014; *Pl. 2*: 23.
 24. Flake with nibbling retouch of dark grey chert (L 1.5; W 1.5; Th 0.4). Striking platform is smooth. Nibbling retouch is on the proximal and the middle part of the right lateral edge on the dorsal side. LZ II-04/N 015; *Pl. 2*: 24.
 25. Flake fragment with nibbling retouch. LZ II-04/N 015.
 26. Blade with nibbling retouch of greenish chert (L 3.3;

- (D 3,3; S 1,7; B 0,4). Talon je diedričen. Na srednjem delu levega lateralnega roba na ventralni strani in na distalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 015; *t.* 2: 26.
27. Odbitek z izjedo iz sivega roženca (D 2; S 1,6; B 0,3). Talon je diedričen fasetiran. Na srednjem delu levega lateralnega roba na ventralni strani je izdelana retuširana izjeda. LZ II-04/N 016; *t.* 2: 27.
28. Oblič na odbitku iz temno sivega do črnega roženca (D 3,1; S 1,1; B 0,8). Talon je gladek. Na distalnem delu desnega lateralnega roba na dorzalni strani je izdelano čelo obliča. LZ II-04/N 016; *t.* 2: 28.
29. Odbitek z izjedo (D 1,8; S 2,2; B 0,7). LZ II-04/N 017.
30. Klina z drobtinčasto retušo iz sivega roženca (D 2,9; S 1,6; B 0,3). Talon je gladek. Na levem in desnem lateralnem robu na dorzalni in ventralni strani se nahajajo drobtinčaste retuše. LZ II-04/N 017; *t.* 2: 30.
31. Retuširan fragment odbitka (D 3,5; S 1,5; B 0,6). LZ II-04/N 018.
32. Del strgala na odbitku iz sivo rjavega roženca (D 1,5; S 2; B 1). Talon je gladek. Na proksimalnem delu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 019; *t.* 2: 32.
33. Retuširana klina iz sivega roženca (D 5,9; S 1,5; B 0,7). Talon je gladek. Na proksimalnem in srednjem delu levega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 019; *t.* 2: 33.
34. Retuširan odbitek iz sivega do rjavega rožena, pokriva ga vijoličasta patina (D 3,2; S 2; B 0,7). Talon je gladek. Na srednjem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 020; *t.* 2: 34.
35. Fragmentiran odbitek z izjedo iz temno sivo rjavega roženca (D 2,6; S 2,8; B 0,7). Talon je fasetiran. Na distalnem delu levega lateralnega rob na dorzalni strani se nahaja izdelana retuširana izjeda. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 020; *t.* 2: 35.
36. Oblič na odbitku (D 3,6; S 1,8; B 1,2). LZ II-04/N 020.
37. Fragment retuširanega odbitka iz svetlo sivo-rjavega roženca (D 2,1; S 2,4; B 0,5). Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 020; *t.* 2: 37.
38. Klina z drobtinčasto retušo iz svetli sivega roženca (D 2,9; S 1,3; B 0,2). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 020; *t.* 3: 38.
39. Retuširan odbitek (D 2,4; S 1,9; B 0,7). LZ II-04/N 021.
40. Retuširan odbitek iz temno sivega roženca (D 3,8; S 2,2; B 1). Talon je gladek. Na levem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 021; *t.* 3: 40.
41. Fragment retuširanega odbitka iz sivo rjavega prosojnega roženca (D 1,7; S 1,5; B 0,4). Na distalnem delu levega in desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 023; *t.* 3: 41.
42. Odbitek z izjedo iz temno sivega roženca (D 3,3; S 2,5; B 0,8). Talon je gladek. Na distalnem delu na dorzalni strani je izdelana izjeda. LZ II-04/N 023; *t.* 3: 42.
- W 1.7; Th 0.4). Striking platform is dihedral. Nibbling retouch is on the middle part of the left lateral edge on ventral side and on the distal part of the left lateral edge on the dorsal side. LZ II-04/N 015; *Pl.* 2: 26.
27. Notched flake of grey chert (L 2; W 1.6; Th 0.3). Striking platform is dihedral and faceted. A retouched notch is made on the middle part of the left lateral edge on the ventral side. LZ II-04/N 016; *Pl.* 2: 27.
28. Rabot on a flake of dark grey to black chert (L 3.1; W 1.1; Th 0.8). Striking platform is smooth. Rabot is made on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 016; *Pl.* 2: 28.
29. Flake with a notch. LZ II-04/N 017.
30. Blade with nibbling retouch of grey chert (L 2.9; W 1.6; Th 0.3). Striking platform is smooth. Nibbling retouch is on the left and right lateral edge on the dorsal and ventral side. LZ II-04/N 017; *Pl.* 2: 30.
31. Retouched flake fragment. LZ II-04/N 018.
32. Part of a side scraper on a flake of greyish brown chert (L 1.5; W 2; Th 1). Striking platform is smooth. Scaliform retouch is on the proximal part on the dorsal side. LZ II-04/N 019; *Pl.* 2: 32.
33. Retouched blade of grey chert (L 5.9; W 1.5; Th 0.7). Striking platform is smooth. Retouch is on the proximal in the middle part of the left lateral edge on ventral side. LZ II-04/N 019; *Pl.* 2: 33.
34. Retouched flake of grey to brown chert with a purple coating (L 3.2; W 2; Th 0.7). Striking platform is smooth. Retouch is on the middle part of the left lateral edge on the dorsal side. LZ II-04/N 020; *Pl.* 2: 34.
35. Fragmented notched flake of dark greyish-brown chert (L 2.6; W 2.8; Th 0.7). Striking platform is faceted. A retouched notch is made on the distal part of the left lateral edge on the dorsal side. Nibbling retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 020; *Pl.* 2: 35.
36. Rabot on a flake. LZ II-04/N 020.
37. Fragment of a retouched flake of light grey-brown chert (L 2.1; W 2.4; Th 0.5). Retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 020; *Pl.* 2: 37.
38. Blade with nibbling retouch of light grey chert (L 2.9; W 1.3; Th 0.2). Striking platform is smooth. Nibbling retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 020; *Pl.* 3: 38.
39. Retouched flake. LZ II-04/N 021.
40. Retouched flake of dark grey chert (L 3.8; W 2.2; Th 1). Striking platform is smooth. Retouch is on the left lateral edge on the dorsal side. LZ II-04/N 021; *Pl.* 3: 40.
41. Fragment of a retouched flake of translucent greyish-brown chert (L 1.7; W 1.5; Th 0.4). Retouch is on the distal part of the left and of the right lateral edge on the dorsal side. LZ II-04/N 023; *Pl.* 3: 41.
42. Notched flake of dark grey chert (L 3.3; W 2.5; Th 0.8). Striking platform is smooth. A notch is made on the distal part on the dorsal side. LZ II-04/N 023; *Pl.* 3: 42.
43. End scraper on a fragmented flake of translucent light grey-brownish green chert (L 2.9; W 2.3; Th 0.7). Striking platform is smooth. End scraper is made on

43. Praskalo na fragmentiranem odbitku iz svetlo sivo-rjavu zelenega rahlo prosojnega roženca (D 2,9; S 2,3; B 0,7). Talon je gladek. Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 023; *t.* 3: 43.
44. Fragment nazobčanega odbitka (D 2,1; S 2,7; B 0,7). LZ II-04/N 023.
45. Atipično praskalo na odbitku iz temno sivega do temno rjavega roženca (D 2,8; S 2,5; B 0,5). Talon je gladek. Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 023; *t.* 3: 45.
46. Fragment odbitka z drobtinčasto retušo iz sivo zelene ga rahlo prosojnega roženca (D 1,6; S 1,3; B 0,3). Na distalnem delu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 023; *t.* 3: 46.
47. Retuširana klina iz svetlo rjavega, temno rjavega in zelenkastega močno preperelega roženca (D 3,8; S 2; B 0,7). Talon je gladek. Na srednjem in distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 024; *t.* 3: 47.
48. Strgalo na fragmentu odbitka iz zelenkastega roženca pokritega z vijoličasto patino (D 2,8; S 1,1; B 1,4). Na desnem lateralnem robu na dorzalni strani se nahajajo izdelane retuše. LZ II-04/N 024; *t.* 3: 48.
49. Praskalo na fragmentiranem odbitku iz temno sivega roženca (D 2,1; S 1,8; B 0,5). Talon je fasetiran. Na distalnem delu se nahaja izdelano čelo praskala. LZ II-04/N 024; *t.* 3: 49.
50. Fragment retuširanega odbitka iz sivega roženca (D 1,3; S 1,4; B 0,3). Na levem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 024; *t.* 3: 50.
51. Fragment retuširane klinice iz temno sivega roženca (D 1,5; S 0,6; B 0,3). Na levem lateralnem robu na ventralni strani se nahajajo retuše. LZ II-04/N 024; *t.* 3: 51.
52. Fragment retuširanega odbitka iz rdečkasto rjavega roženca (D 1,5; S 0,5; B 0,1). Talon je gladek. Na levem lateralnem robu na dorzalni strani se nahaja izdelana strma retuša. LZ II-04/N 024; *t.* 3: 52.
53. Retuširan fragment odbitka iz prosojnega rahlo zelenkastega roženca (begkristal z močvirsko žverco) (D 1,8; S 1,4; B 0,5). Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 024; *t.* 3: 53.
54. Praskalo na fragmentu odbitka iz sivega roženca (D 2; S 1,4; B 0,6). Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 024; *t.* 3: 54.
55. Strgalce na fragmentu odbitka iz sivega roženca (D 2,2; S 1,7; B 0,6). Na levem in desnem lateralnem robu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 025; *t.* 3: 55.
56. Strgalce na fragmentiranem odbitku iz temno sivega roženca z vijolično patino (D 1,8; S 1,6; B 0,5). Talon je fasetiran. Na levem lateralnem robu in na distalnem delu na dorzalni strani se nahajajo retuše. LZ II-04/N 025; *t.* 4: 56.
57. Retuširan odbitek iz sivega roženca (D 3,6; S 2,3; B 0,7). Talon je gladek. Na srednjem delu desnega lateralnega roba na ventralni in na distalnem delu na dorzalni strani se nahajajo retuše. LZ II-04/N 025; *t.* 4: 57.
58. Retuširana klina (sveder?) iz temno sivega roženca (D the distal part on the dorsal side. LZ II-04/N 023; *Pl.* 3: 43.
44. Fragment of a denticulated flake. LZ II-04/N 023.
45. Atypical end scraper on a flake of dark grey to dark brown chert (L 2.8; W 2.5; Th 0.5). Striking platform is smooth. End scraper is made on the distal part on the dorsal side. LZ II-04/N 023; *Pl.* 3: 45.
46. Flake fragment with nibbling retouch of translucent greyish-green chert (L 1.6; W 1.3; Th 0.3). Nibbling retouch is on the distal part on the dorsal side. LZ II-04/N 023; *Pl.* 3: 46.
47. Retouched blade of light brown, dark brown in greenish heavily weathered chert (L 3.8; W 2; Th 0.7). Striking platform is smooth. Nibbling retouch is on the middle and distal parts of the right lateral edge on the dorsal side. LZ II-04/N 024; *Pl.* 3: 47.
48. Side scraper on a flake fragment of greenish chert with a purple coating (L 2.8; W 1.1; Th 1.4). Retouch is on the right lateral edge on the dorsal side. LZ II-04/N 024; *Pl.* 3: 48.
49. End scraper on a fragmented flake of dark grey chert (L 2.1; W 1.8; Th 0.5). Striking platform is faceted. End scraper is made on the distal part. LZ II-04/N 024; *Pl.* 3: 49.
50. Fragment of a retouched flake of grey chert (L 1.3; W 1.4; Th 0.3). Retouch is on the left lateral edge on the dorsal side. LZ II-04/N 024; *Pl.* 3: 50.
51. Fragment of a retouched bladelet of dark grey chert (L 1.5; W 0.6; Th 0.3). Retouch is on the left lateral edge on the ventral side. LZ II-04/N 024; *Pl.* 3: 51.
52. Fragment of a retouched flake of reddish-brown chert (L 1.5; W 0.5; Th 0.1). Striking platform is smooth. Steep retouch is on the left lateral edge on the dorsal side. LZ II-04/N 024; *Pl.* 3: 52.
53. Retouched flake fragment of translucent greenish chert (L 1.8; W 1.4; Th 0.5). Retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 024; *Pl.* 3: 53.
54. End scraper on a flake fragment of grey chert (L 2; W 1.4; Th 0.6). End scraper is made on the distal part on the dorsal side. LZ II-04/N 024; *Pl.* 3: 54.
55. Raclette on a flake fragment of grey chert (L 2.2; W 1.7; Th 0.6). Scaliform retouch is on the left and right lateral edge on the dorsal side. LZ II-04/N 025; *Pl.* 3: 55.
56. Raclette on a fragmented flake of dark grey chert with a purple coating (L 1.8; W 1.6; Th 0.5). Striking platform is faceted. Retouch is on the left lateral edge and on the distal part on the dorsal side. LZ II-04/N 025; *Pl.* 4: 56.
57. Retouched flake of grey chert (L 3.6; W 2.3; Th 0.7). Striking platform is smooth. Retouch is on the middle part of the right lateral edge on ventral and on the distal part on the dorsal side. LZ II-04/N 025; *Pl.* 4: 57.
58. Retouched blade (borer?) of dark grey chert (L 3.5; W 1.4; Th 0.8). Striking platform is smooth. Retouch is on the distal part of the right lateral edge on the dorsal side and on the distal part of the left lateral edge on ventral side. LZ II-04/N 025; *Pl.* 4: 58.
59. Retouched blade of greenish-grey chert (L 3.7; W 0.9; Th 0.5). Striking platform is smooth. Retouch is on the proximal part of the left lateral edge on the dorsal side

- 3,5; S 1,4; B 0,8). Talon je gladek. Na distalnem delu desnega lateralnega roba na dorzalni strani in na distalnem delu levega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 025; *t. 4:* 58.
59. Retuširana klina iz zelenkasto sivega roženca (D 3,7; S 0,9; B 0,5). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani in na srednjem in distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 025; *t. 4:* 59.
60. Odbitek z drobtinčasto retušo iz zelenkastega roženca (D 1,5; S 2,4; B 0,2). Talon je zdrobljen. Na distalnem delu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 026; *t. 4:* 60.
61. Klina z drobtinčasto retušo iz temno sivega roženca (D 3,1; S 1,5; B 0,4). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani in na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 026; *t. 4:* 61.
62. Retuširana klina in vbadalo iz temno sivega roženca (D 6,4; S 2,2; B 0,8). Talon je diedričen fasetiran. Na srednjem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. Na distalnem delu desnega lateralnega roba na dorzalni strani je izdelano vbadalo. LZ II-04/N 026; *t. 4:* 62.
63. Retuširan fragment odbitka (D 4,2; S 2,1; B 1,4). LZ II-04/N 026.
64. Odbitek z drobtinčasto retušo iz sivo zelenkastega roženca (D 2,4; S 1,8; B 0,5). Talon je gladek. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 028; *t. 4:* 64.
65. Praskalo na fragmentirani klini iz rjavkastega roženca (D 2; S 1,4; B 0,6). Talon je gladek. Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 028; *t. 4:* 65.
66. Atipični praskalo na fragmentiranem odbitku iz črnega roženca (D 1,7; S 1,3; B 0,7). Talon je gladek. Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 028; *t. 4:* 66.
67. Sveder na fragmentu klinice iz sivega do zelenkastega roženca (D 2; S 0,6; B 0,4). Na distalnem delu levega in desnega lateralnega roba na dorzalni strani je s strmimi retušami izdelan sveder. Odbitek je bil izpostavljen visoki temperaturi. LZ II-04/N 030; *t. 4:* 67.
68. Oblič na fragmentiranem odbitku iz temno sivega do rjavega roženca (D 2,5; S 2,7; B 1,6). Talon je gladek. Na srednjem delu levega lateralnega roba na dorzalni strani je izdelano čelo obliča. LZ II-04/N 030; *t. 5:* 68.
69. Nazobčan fragment odbitka (D 3,3; S 1,8; B 1). LZ II-04/N 031.
70. Atipično praskalo na fragmentu odbitka iz sivega roženca (D 3,2; S 1,8; B 1). Na distalnem delu desnega lateralnega roba na dorzalni strani j izdelano čelo praskala. LZ II-04/N 031; *t. 4:* 70.
71. Retuširana klina iz sivega roženca (D 2,7; S 1,1; B 0,5). Talon je fasetiran. Na distalnem delu levega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 034; *t. 4:* 71.
72. Atipično praskalo na fragmentu odbitka iz temno sivo-rjavega roženca (D 1,3; S 1,8; B 0,3). Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 034; *t. 5:* 72.
73. Strgalce na fragmentu odbitka iz temno sivega roženca and on the middle and distal parts of the right lateral edge on the dorsal side. LZ II-04/N 025; *Pl. 4:* 59.
60. Flake with nibbling retouch of greenish chert (L 1.5; W 2.4; Th 0.2). Striking platform is crushed. Nibbling retouch is on the distal part on the dorsal side. LZ II-04/N 026; *Pl. 4:* 60.
61. Blade with nibbling retouch of dark grey chert (L 3.1; W 1.5; Th 0.4). Striking platform is smooth. Nibbling retouch is on the proximal part of the left lateral edge on the dorsal side and on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 026; *Pl. 4:* 61.
62. Retouched blade and burin of dark grey chert (L 6.4; W 2.2; Th 0.8). Striking platform is dihedral and faceted. Retouch is on the middle part of the left lateral edge on the dorsal side. Burin is made on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 026; *Pl. 4:* 62.
63. Retouched flake fragment. LZ II-04/N 026.
64. Flake with nibbling retouch of grey-greenish chert (L 2.4; W 1.8; Th 0.5). Striking platform is smooth. Nibbling retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 028; *Pl. 4:* 64.
65. End scraper on fragmented blade of brownish chert (L 2; W 1.4; Th 0.6). Striking platform is smooth. End scraper is made on the distal part on the dorsal side. LZ II-04/N 028; *Pl. 4:* 65.
66. Atypical end scraper on a fragmented flake of black chert (L 1.7; W 1.3; Th 0.7). Striking platform is smooth. End scraper is made on the distal part on the dorsal side. LZ II-04/N 028; *Pl. 4:* 66.
67. Borer on a bladelet fragment of grey to greenish chert (L 2; W 0.6; Th 0.4). Borer with steep retouch is made on the distal part of the left and of the right lateral edge on the dorsal side. Flake was exposed to high temperatures. LZ II-04/N 030; *Pl. 4:* 67.
68. Rabot on a fragmented flake of dark grey to brown chert (L 2.5; W 2.7; Th 1.6). Striking platform is smooth. Rabot is made on the middle part of the left lateral edge on the dorsal side. LZ II-04/N 030.
69. Denticulated flake fragment. LZ II-04/N 031; *Pl. 5:* 69.
70. Atypical end scraper on a flake fragment of grey chert (L 3.2; W 1.8; Th 1). End scraper is made on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 031; *Pl. 4:* 70.
71. Retouched blade of grey chert (L 2.7; W 1.1; Th 0.5). Striking platform is faceted. Retouch is on the distal part of the left lateral edge on the ventral side. LZ II-04/N 034; *Pl. 4:* 71.
72. Atypical end scraper on a flake fragment of dark grey-brown chert (L 1.3; W 1.8; Th 0.3). End scraper is made on the distal part on the dorsal side. LZ II-04/N 034; *Pl. 5:* 72.
73. Raclette on a flake fragment of dark grey chert (L 1.6; W 1.2; Th 0.4). Scaliform retouch is on the left lateral edge on the dorsal side. LZ II-04/N 034; *Pl. 5:* 73.
74. Flake with nibbling retouch of dark brown-grey chert (L 3.8; W 3.2; Th 0.6). Striking platform is smooth. Nibbling retouch is on the proximal and the middle part of the right lateral edge on the dorsal side. LZ II-04/N 034; *Pl. 5:* 74.
75. Flake with nibbling retouch of dark brown-grey chert

- (D 1,6; S 1,2; B 0,4). Na levem lateralnem robu na dorzalni strani so izdelane stopnjevite retuše. LZ II-04/N 034; *t.* 5: 73.
74. Odbitek z drobtinčasto retušo iz temno rjavo-sivega roženca (D 3,8; S 3,2; B 0,6). Talon je gladek. Na proksimalnem in srednjem del desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 034; *t.* 5: 74.
75. Odbitek z drobtinčasto retušo iz temno rjavo-sivega roženca (D 3,3; S 1,8; B 0,8). Talon je zdrobljen. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 034; *t.* 5: 75.
76. Fragment retuširane kline iz zelenkasto sivega roženca (D 3,7; S 1,2; B 0,5) Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 034; *t.* 5: 76.
77. Strgalo na fragmentu odbitka iz temno sivo rjavega roženca (D 4,4; S 4,8; B 1,7). Na levem in desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 034; *t.* 6: 77.
78. Fragmentirana klina z drobtinčasto retušo iz rdečkasto rjavega roženca (D 3,9; S 1,3; B 0,5). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 035; *t.* 5: 78.
79. Fragment retuširane kline iz sivega roženca (D 3; S 0,9; B 0,5). Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 035; *t.* 5: 79.
80. Retuširan odbitek iz sivega roženca (D 3,2; S 2; B 1). Talon je gladek. Na proksimalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 035; *t.* 5: 80.
81. Fragment retuširane kline iz rdečkastega roženca (D 2,4; S 1,2; B 0,6) Na desnem lateralnem robu na ventralni strani se nahajajo retuše. LZ II-04/N 035; *t.* 5: 81.
82. Odbitek z drobtinčasto retušo iz sivega roženca (D 2,5; S 1,4; B 0,9). Talon je gladek. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 035; *t.* 5: 82.
83. Praskalo na odbitku iz temno sivega do rdečkastega roženca (D 2; S 2,2; B 0,9). Talon je ventralno stanjšan. Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 035; *t.* 5: 83.
84. Odbitek z drobtinčasto retušo iz sivega roženca (D 3,1; S 2,5; B 0,7). Talon je diedričen. Na proksimalnem delu desnega lateralnega roba na ventralni strani in na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 035; *t.* 5: 84.
85. Retuširan odbitek iz sivega do zelenkastega roženca (D 5,5; S 3,5; B 1,7). Talon je gladek in ventralno stanjšan. Na distalnem desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 035; *t.* 6: 85.
86. Klinica s hrbotom na fragmentu klinice iz sivega roženca (D 2,8; S 0,4; B 0,2) Na desnem lateralnem robu na dorzalni strani je s strmo retušo izdelan hrbet. LZ II-04/N 036; *t.* 6: 86.
87. Retuširan odbitek iz temno sivega roženca (D 3,2; S 1,6; B 0,4) Talon je gladek. Na proksimalnem delu desnega lateralnega roba na dorzalni strani in na srednjem delu (L 3,3; W 1,8; Th 0,8). Striking platform is crushed. Nibbling retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 034; *Pl.* 5: 75.
76. Fragment of a retouched blade of greenish-grey chert (L 3,7; W 1,2; Th 0,5). Retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 034; *Pl.* 5: 76.
77. Side scraper on a flake fragment of dark grey-brown chert (L 4,4; W 4,8; Th 1,7). Retouch is on the left and the right lateral edges on the dorsal side. LZ II-04/N 034; *Pl.* 6: 77.
78. Fragmented blade with nibbling retouch of reddish-brown chert (L 3,9; W 1,3; Th 0,5). Striking platform is smooth. Nibbling retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 035; *Pl.* 5: 78.
79. Fragment of a retouched blade of grey chert (L 3; W 0,9; Th 0,5). Retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 035; *Pl.* 5: 79.
80. Retouched flake of grey chert (L 3,2; W 2; Th 1). Striking platform is smooth. Retouch is on the proximal part of the right lateral edge on the dorsal side. LZ II-04/N 035; *Pl.* 5: 80.
81. Fragment of a retouched blade of reddish chert (L 2,4; W 1,2; Th 0,6). Retouch is on the right lateral edge on the ventral side. LZ II-04/N 035; *Pl.* 5: 81.
82. Flake with nibbling retouch of grey chert (L 2,5; W 1,4; Th 0,9). Striking platform is smooth. Nibbling retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 035; *Pl.* 5: 82.
83. End scraper on a flake of dark grey to reddish chert (L 2; W 2,2; Th 0,9). Striking platform is ventrally thinned. End scraper is made on the distal part on the dorsal side. LZ II-04/N 035; *Pl.* 5: 83.
84. Flake with nibbling retouch of grey chert (L 3,1; W 2,5; Th 0,7). Striking platform is dihedral. Nibbling retouch is on the proximal part of the right lateral edge on ventral side and on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 035; *Pl.* 5: 84.
85. Retouched flake of grey to greenish chert (L 5,5; W 3,5; Th 1,7). Striking platform is smooth and ventrally thinned. Nibbling retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 035; *Pl.* 6: 85.
86. Backed bladelet on a bladelet fragment of grey chert (L 2,8; W 0,4; Th 0,2). Steep retouch is on the right lateral edge on the dorsal side. LZ II-04/N 036; *Pl.* 6: 86.
87. Retouched flake of dark grey chert (L 3,2; W 1,6; Th 0,4) Striking platform is smooth. Nibbling retouch is on the proximal part of the right lateral edge on the dorsal side and on the middle part of the left lateral edge on the dorsal side. LZ II-04/N 036; *Pl.* 6: 87.
88. Backed bladelet on a bladelet fragment of grey chert (L 1,7; W 0,3; Th 0,2). Steep retouch is on the right lateral edge on the dorsal side. LZ II-04/N 036; *Pl.* 6: 88.
89. Flake with nibbling retouch of grey chert (L 3,2; W 1,5; Th 0,6). Striking platform is smooth. Nibbling retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 036; *Pl.* 6: 89.

- levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 036; *t.* 6: 87.
88. Klinica s hrbtom na fragmentu klinice iz sivega roženca (D 1,7; S 0,3; B 0,2). Na desnem lateralnem robu na dorzalni strani je s strmo retušo izdelan hrbet. LZ II-04/N 036; *t.* 6: 88.
89. Odbitek z drobtinčasto retušo iz sivega roženca (D 3,2; S 1,5; B 0,6). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 036; *t.* 6: 89.
90. Retuširan odbitek iz sivega do zelenkastega roženca (D 2,6; S 2; B 0,5). Talon je pokrit s korteksom. Na srednjem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 040; *t.* 6: 90.
91. Retuširana klina iz temno sivega roženca (D 3,4; S 1,5; B 0,6). Talon je ventralno stanjššan (zdrobljen?). Na srednjem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 040; *t.* 6: 91.
92. Odbitek z drobtinčasto retušo iz temno sivega roženca (D 2,7; S 2; B 0,6). Talon je gladek. Na desnem lateralnem robu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 040; *t.* 6: 92.
93. Atipično praskalo na fragmentirani retuširani klinici iz temno sivega roženca (D 2,8; S 0,9; B 0,6). Talon je gladek. Na distalnem delu na dorzalni strani je izdelano atipično čelo praskala. Na srednjem delu levega lateralnega roba in na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 040; *t.* 6: 93.
94. Strgalce na fragmentu odbitka iz zelenkastega roženca (D 2,1; S 1,6; B 0,7). Na desnem lateralnem robu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 040; *t.* 7: 94.
95. Strgalo na odbitku iz temno rjavo-sivoga roženca (D 4,2; S 2,9; B 1). Talon je gladek. Na levem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 040; *t.* 7: 95.
96. Fragment retuširane kline iz sivoga roženca (D 3,2; S 1,2; B 0,7). Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. Na srednjem in distalnem delu levega lateralnega roba na ventralni strani se nahajajo drobtinčaste retuše. LZ II-04/N 042; *t.* 7: 96.
97. Klina z drobtinčasto retušo iz temno rjavega roženca (D 3,5; S 1,3; B 0,7). Talon je zdrobljen. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 042; *t.* 7: 97.
98. Praskalo na fragmentu retuširane kline iz temno rjavega roženca (D 2,5; S 1,5; B 0,5). Na distalnem delu na dorzalni strani se nahaja izdelano čelo praskala. Na proksimalnem delu, na levem in desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 042; *t.* 7: 98.
99. Klina z drobtinčasto retušo iz temno sivo rjavega roženca (D 2,9; S 1,4; B 0,3). Talon je ventralno stanjššan. Na srednjem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 042; *t.* 7: 99.
100. Klinica s hrbtom na fragmentu klinice iz sivoga roženca (D 2,3; S 0,7; B 0,3). Na levem lateralnem robu na dorzalni strani je s strmo retušo izdelan hrbet. LZ II-04/N 042; *t.* 7: 100.
90. Retouched flake of grey to greenish chert (L 2.6; W 2; Th 0.5). Striking platform is covered with cortex. Retouch is on the middle part of the left lateral edge on the dorsal side. LZ II-04/N 040; *Pl.* 6: 90.
91. Retouched blade of dark grey chert (L 3.4; W 1.5; Th 0.6). Striking platform is ventrally thinned. Retouch is on the middle part of the right lateral edge on the dorsal side. LZ II-04/N 040; *Pl.* 6: 91.
92. Flake with nibbling retouch of dark grey chert (L 2.7; W 2; Th 0.6). Striking platform is smooth. Nibbling retouch is on the right lateral edge on the dorsal side. LZ II-04/N 040; *Pl.* 6: 92.
93. Atypical end scraper on a fragmented retouched blade of dark grey chert (L 2.8; W 0.9; Th 0.6). Striking platform is smooth. End scraper is made on the distal part on the dorsal side. Retouch is on the middle part of the left lateral edge and on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 040; *Pl.* 6: 93.
94. Raclette on a flake fragment of greenish chert (L 2.1; W 1.6; Th 0.7). Scaliform retouch is on the right lateral edge on the dorsal side. LZ II-04/N 040; *Pl.* 7: 94.
95. Side scraper on a flake of dark brown-grey chert (L 4.2; W 2.9; Th 1). Striking platform is smooth. Retouch is on the left lateral edge on the dorsal side. LZ II-04/N 040; *Pl.* 7: 95.
96. Fragment of a retouched blade of grey chert (L 3.2; W 1.2; Th 0.7). Retouch is on the proximal part of the left lateral edge on the dorsal side. Nibbling retouch is on the middle and distal parts of the left lateral edge on ventral side. LZ II-04/N 042; *Pl.* 7: 96.
97. Blade with nibbling retouch of dark brown chert (L 3.5; W 1.3; Th 0.7). Striking platform is crushed. Nibbling retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 042; *Pl.* 7: 97.
98. End scraper on a fragment of a retouched blade of dark brown chert (L 2.5; W 1.5, Th 0.5). End scraper is made on the distal part on the dorsal side. Retouch is on the proximal part as well as on the left and right lateral edges on the dorsal side. LZ II-04/N 042; *Pl.* 7: 98.
99. Blade with nibbling retouch of dark grey-brown chert (L 2.9; W 1.4; Th 0.3). Striking platform is ventrally thinned. Nibbling retouch is on the middle part of the left lateral edge on the dorsal side. LZ II-04/N 042; *Pl.* 7: 99.
100. Backed bladelet on a bladelet fragment of grey chert (L 2.3; W 0.7; Th 0.3). Steep retouch is on the left lateral edge on the dorsal side. LZ II-04/N 042; *Pl.* 7: 100.
101. Fragment of a retouched flake of dark grey chert (L 1.5; W 1.9; Th 0.5). Retouch is on the distal part on the dorsal side. LZ II-04/N 044; *Pl.* 7: 101.
102. Raclette on a flake fragment of dark reddish-grey chert (L 1.4; W 2.5; Th 0.7). Retouch is on the distal part on the dorsal side. LZ II-04/N 044; *Pl.* 7: 102.
103. Flake fragment with nibbling retouch of grey chert (L 1.8; W 1.8; Th 0.7). Striking platform is smooth. Nibbling retouch is on the right lateral edge on the dorsal and the ventral sides. LZ II-04/N 044; *Pl.* 7: 103.
104. Blade with nibbling retouch of dark grey-brown chert (L 4.2; W 2.1; Th 0.7). Striking platform is smooth.

101. Fragment retuširanega odbitka iz temno sivega roženca (D 1,5; S 1,9; B 0,5). Na distalnem delu na dorzalni strani se nahajajo retuše. LZ II-04/N 044; *t.* 7: 101.
102. Strgalce na fragmentu odbitka iz temno rdečkasto sivega roženca (D 1,4; S 2,5; B 0,7). Na distalnem delu na dorzalni strani se nahajajo retuše. LZ II-04/N 044; *t.* 7: 102.
103. Fragment odbitka z drobtinčasto retušo iz sivega roženca (D 1,8; S 1,8; B 0,7). Talon je gladek. Na desnem lateralnem robu na dorzalni in ventralni strani se nahajajo drobtinčaste retuše. LZ II-04/N 044; *t.* 7: 103.
104. Klina z drobtinčasto retušo iz temno sivo rjavega roženca (D 4,2; S 2,1; B 0,7). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 044; *t.* 7: 104.
105. Retuširan fragment odbitka iz temno rjavo sivega roženca (D 3,6; S 1,6; B 0,8). Na proksimalnem in srednjem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 044; *t.* 7: 105.
106. Strgalo na jedru iz temno rjavo sivega roženca (D 5; S 3,2; B 2,1). Jedro je unipolarno. Na srednjem delu levega in desnega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 044; *t.* 7: 106.
107. Strgalo na fragmentu dobitka iz temno sivega roženca (D 2,2; S 1,5; B 0,7). Na desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 045; *t.* 7: 107.
108. Praskalo in vbadalo na fragmentu odbitka iz zelenkaste roženca (D 2,7; S 2,1; B 0,6). Na distalnem delu na dorzalni strani je izdelano čelo praskala. Na proksimalnem delu levega lateralnega roba na dorzalni strani je izdelano vbadalo. LZ II-04/N 046; *t.* 8: 108.
109. Retuširan fragment odbitka iz temno sivo rjavega roženca (D 2,8; S 2; B 0,8). Na distalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 046; *t.* 8: 109.
110. Klina z drobtinčasto retušo iz sivo rjavega roženca (D 4,1; S 1,4; B 0,7). Talon je gladek. Na distalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 046; *t.* 8: 110.
111. Retuširan odbitek (D 3,5; S 4,3; B 1,4). LZ II-04/N 046.
112. Atipično praskalo na fragmentu odbitka iz sivega prosojnega roženca (D 1,7; S 2,3; B 1,1). Na levem lateralnem robu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 047; *t.* 8: 112.
113. Atipično praskalo na fragmentiranem odbitku iz temno rjavo sivega roženca (D 2,7; S 2,2; B 1,4). Talon je gladek. Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 047; *t.* 8: 113.
114. Del strgala na odbitku iz temno sivega do črnega roženca (D 2,3; S 1,2; B 1). Talon je gladek. Na dorzalni strani na grebenu se nahajajo retuše. LZ II-04/N 047; *t.* 8: 114.
115. Retuširan odbitek iz temno sivega roženca (D 2; S 3,1; B 0,4). Talon je fasetiran. Na levem lateralnem robu na ventralni strani se nahajajo retuše. LZ II-04/N 047; *t.* 8: 115.
116. Fragmentiran odbitek z drobtinčasto retušo. LZ II-04/N 047.
117. Odbitek z izjedo iz sivega roženca (D 2,4; S 1,5; B 0,4). Talon je fasetiran. Na distalnem delu desnega lateralnega roba na dorzalni strani je izdelana retuširana izjeda. LZ II-04/N 047; *t.* 8: 117.
- Nibbling retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 044; *Pl.* 7: 104.
105. Retouched flake fragment of dark brown-grey chert (L 3.6; W 1.6; Th 0.8). Retouch is on the proximal and the middle part of the left lateral edge on the dorsal side. LZ II-04/N 044; *Pl.* 7: 105.
106. Side scraper on a core of dark brown-grey chert (L 5; W 3.2; Th 2.1). The core is unipolar. Retouch is on the middle part of the left and the right lateral edges on the ventral side. LZ II-04/N 044; *Pl.* 7: 106.
107. Side scraper on flake fragment of dark grey chert (L 2.2; W 1.5; Th 0.7). Retouch is on the right lateral edge on the dorsal side. LZ II-04/N 045; *Pl.* 7: 107.
108. End scraper and burin on a flake fragment of greenish chert (L 2.7; W 2.1; Th 0.6). End scraper is made on the distal part on the dorsal side. Burin is made on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 046; *Pl.* 8: 108.
109. Retouched flake fragment of dark grey-brown chert (L 2.8; W 2; Th 0.8). Retouch is on the distal part of the left lateral edge on the dorsal side. LZ II-04/N 046; *Pl.* 8: 109.
110. Blade with nibbling retouch of grey-brown chert (L 4.1; W 1.4; Th 0.7). Striking platform is smooth. Nibbling retouch is on the distal part of the left lateral edge on the dorsal side. LZ II-04/N 046; *Pl.* 8: 110.
111. Retouched flake. LZ II-04/N 046.
112. Atypical end scraper on a flake fragment of translucent grey chert (L 1.7; W 2.3; Th 1.1). End scraper is made on the left lateral edge on the dorsal side. LZ II-04/N 047; *Pl.* 8: 112.
113. Atypical end scraper on a fragmented flake of dark brown-grey chert (L 2.7; W 2.2; Th 1.4). Striking platform is smooth. End scraper is made on the distal part on the dorsal side. LZ II-04/N 047; *Pl.* 8: 113.
114. Part of a side scraper on a flake of dark grey to black chert (L 2.3; W 1.2; Th 1). Striking platform is smooth. Retouch is on the dorsal side on the ridge. LZ II-04/N 047; *Pl.* 8: 114.
115. Retouched flake of dark grey chert (L 2; W 3.1; Th 0.4). Striking platform is faceted. Retouch is on the left lateral edge on the ventral side. LZ II-04/N 047; *Pl.* 8: 115.
116. Fragmented flake with nibbling retouch. LZ II-04/N 047.
117. Notched flake of grey chert (L 2.4; W 1.5; Th 0.4). Striking platform is faceted. A retouched notch is made on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 047; *Pl.* 8: 117.
118. Notched flake of dark brown chert (L 3.8; W 4.6; Th 0.7). Striking platform is smooth. A retouched notch is made on the distal part of the right lateral edge on the ventral side. LZ II-04/N 055; *Pl.* 8: 118.
119. Fragmented retouched flake of dark brown chert (L 2.4; W 2.4; Th 0.6). Striking platform is smooth. Retouch is on the left lateral edge on the dorsal side. LZ II-04/N 055; *Pl.* 8: 118.
120. Flake with nibbling retouch of dark grey to black chert (L 3; W 1.7; Th 0.9). Striking platform is crushed. Nibbling retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 055; *Pl.* 8: 120.

118. Odbitek z izjedo iz temno rjavega roženca (D 3,8; S 4,6; B 0,7). Talon je gladek. Na distalnem delu desnega lateralnega roba na ventralni strani je izdelana reširana izjeda. LZ II-04/N 055; *t.* 8: 118.
119. Fragmentiran retuširan odbitek iz temno rjavega roženca (D 2,4; S 2,4; B 0,6). Talon je gladek. Na levem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 055; *t.* 8: 118.
120. Odbitek z drobtinčasto retušo iz temno sivega do črnega roženca (D 3; S 1,7; B 0,9). Talon je zdrobljen. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 055; *t.* 8: 120.
121. Strgalo na unipolarnem jedru iz zelenkasto sivega roženca (D 3,4; S 3,7; B 1,8). Udarna površina je fasetirana. Na levem lateralnem robu in na distalnem delu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 055; *t.* 8: 121.
122. Strgalo na fragmentu odbitka iz sivega do temno sivega roženca (D 2,2; S 3,1; B 0,8). Na levem in desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 056; *t.* 9: 122.
123. Strgalo na odbitku iz sivega do rjavkastega roženca (D 3,6; S 2,8; B 1,5). Talon je gladek. Na levem lateralnem robu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 056; *t.* 9: 123.
124. Strgalce na fragmentu odbitka iz sivega roženca (D 2,4; S 2; B 0,5). Na vseh lateralnih robovih na dorzalni strani se nahajajo retuše. LZ II-04/N 058; *t.* 9: 124.
125. Strgalo na fragmentu odbitka iz zelenkasto sivega do rjavega roženca (D 3,4; S 3,1; B 1,5). Na desnem lateralnem robu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 058; *t.* 9: 125.
126. Retuširan odbitek (D 3,5; S 2,8; B 1,4). LZ II-04/N 058.
127. Fragment odbitka z izjedami iz temno sivega do temno rjavega roženca (D 3,4; S 3; B 1,2). Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajta izjedi. Na proksimalnem delu desnega lateralnega roba na dorzalni strani se nahaja izjeda. LZ II-04/N 059; *t.* 9: 127.
128. Odbitek z drobtinčasto retušo iz temno rjavega roženca (D 3,9; S 3,2; B 1). Talon je gladek. Na desnem lateralnem robu na dorzalni in ventralni strani se nahajajo drobtinčaste retuše. LZ II-04/N 059; *t.* 9: 128.
129. Strgalo na unipolarnem jedru iz zelenkastega roženca (D 3,8; S 1,8; B 1,5). Udarna površina je pokrita s korteksom. Na levem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 059; *t.* 9: 129.
130. Odbitek z drobtinčasto retušo iz temno sivega roženca (D 1,8; S 1,3; B 0,3). Talon je gladek. Na desnem lateralnem robu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 060; *t.* 10: 130.
131. Fragmentiran retuširan odbitek (D 3,3; S 2,7; B 1). LZ II-04/N 060.
132. Retuširan odbitek iz rjavega roženca (D 2,5; S 2; B 0,2). Talon je pokrit s korteksom. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 061; *t.* 9: 132.
133. Fragment retuširanega odbitka iz zelenkastega roženca (D 1,5; S 2,7; B 0,8). Na desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 061; *t.* 9: 133.
121. Side scraper on a unipolar core of greenish-grey chert (L 3.4; W 3.7; Th 1.8). Striking platform is faceted. Scaliform retouch is on the left lateral edge and on the distal part on the dorsal side. LZ II-04/N 055; *Pl.* 8: 121.
122. Side scraper on a flake fragment of grey to dark grey chert (L 2.2; W 3.1; Th 0.8). Retouch is on the left and right lateral edges on the dorsal side. LZ II-04/N 056; *Pl.* 9: 122.
123. Side scraper on a flake of grey to brownish chert (L 3.6; W 2.8; Th 1.5). Striking platform is smooth. Scaliform retouch is on the left lateral edge on the dorsal side. LZ II-04/N 056; *Pl.* 9: 123.
124. Raclette on a flake fragment of grey chert (L 2.4; W 2; Th 0.5). Retouch is on all lateral edges on the dorsal side. LZ II-04/N 058; *Pl.* 9: 124.
125. Side scraper on a flake fragment of greenish-grey to brown chert (L 3.4; W 3.1; Th 1.5). Scaliform retouch is on the right lateral edge on the dorsal side. SE 058; *Pl.* 9: 125.
126. Retouched flake. LZ II-04/N 058.
127. Fragment of a notched flake of dark grey to dark brown chert (L 3.4; W 3; Th 1.2). Notches are on the proximal part of the left lateral edge on the dorsal side. A notch is made on the proximal part of the right lateral edge on the dorsal side. LZ II-04/N 059; *Pl.* 9: 127.
128. Flake with nibbling retouch of dark brown chert (L 3.9; W 3.2; Th 1). Striking platform is smooth. Nibbling retouch is on right lateral edge on the dorsal and the ventral sides. LZ II-04/N 059; *Pl.* 9: 128.
129. Side scraper on a unipolar core of greenish chert (L 3.8; W 1.8; Th 1.5). Striking platform is covered with cortex. Retouch is on the left lateral edge on the dorsal side. LZ II-04/N 059; *Pl.* 9: 129.
130. Flake with nibbling retouch of dark grey chert (L 1.8; W 1.3; Th 0.3). Striking platform is smooth. Nibbling retouch is on the right lateral edge on the dorsal side. LZ II-04/N 060; *Pl.* 10: 130.
131. Fragmented retouched flake. LZ II-04/N 060.
132. Retouched flake of brown chert (L 2.5; W 2; Th 0.2). Striking platform is covered with cortex. Retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 061; *Pl.* 9: 132.
133. Fragment retouched flake of greenish chert (L 1.5; W 2.7; Th 0.8). Retouch is on the right lateral edge on the dorsal side. LZ II-04/N 061; *Pl.* 9: 133.
134. Raclette on a flake fragment of dark brown chert (L 2.8; W 1.2; Th 0.3). Retouch is on the distal part of the left lateral edge on the dorsal side. LZ II-04/N 062; *Pl.* 9: 134.
135. Flake with nibbling retouch. LZ II-04/N 062.
136. Atypical end scraper on a flake fragment of dark grey chert (L 1.5; W 1.4; Th 0.5). End scraper is made on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 062; *Pl.* 9: 136.
137. Raclette on a flake of dark brown chert (L 2.5; W 1.7; Th 0.7). Striking platform is faceted. Retouch is on the right lateral edge on the dorsal side. LZ II-04/N 062; *Pl.* 9: 137.
138. Fragment of a retouched flake of dark greyish-brown chert with a purple coating (L 4.8; W 3.4; Th 0.9). Retouch is on the distal part of the left lateral edge on the dorsal side. LZ II-04/N 062; *Pl.* 10: 138.

134. Strgalce na fragmentu odbitka iz temno rjavega roženca (D 2,8; S 1,2; B 0,3). Na distalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 062; *t.* 9: 134.
135. Odbitek z drobtinčasto retušo (D 2,3; S 1,9; B 0,3). LZ II-04/N 062.
136. Atipično praskalo na fragmentu odbitka iz temno sivega roženca (D 1,5; S 1,4; B 0,5). Na distalnem delu desnega lateralnega roba na dorzalni strani je izdelano čelo praskala. LZ II-04/N 062; *t.* 9: 136.
137. Strgalce na odbitku iz temno rjavega roženca (D 2,5; S 1,7; B 0,7). Talon je fasetiran. Na desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 062; *t.* 9: 137.
138. Fragment retuširanega odbitka iz temno sivo rjavega roženca z vijolično oblogo (D 4,8; S 3,4; B 0,9). Na distalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 062; *t.* 10: 138.
139. Praskalo na fragmentirani klini iz temno sivega roženca (D 2,2; S 0,8; B 0,3). Talon je gladek. Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 063; *t.* 10: 139.
140. Strgalce na fragmentu odbitka iz temno rjavega roženca (D 2,5; S 1,5; B 0,6). Na desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 063; *t.* 10: 140.
141. Fragmentiran odbitek z izjedo (D 2; S 1,4; B 0,7). LZ II-04/N 063.
142. Strgalo na fragmentiranem odbitku iz temno rjavega roženca (D 3,1; S 2,7; B 0,8). Talon je fasetiran. Na desnem lateralnem robu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 063; *t.* 10: 142.
143. Strgalo na odbitku (D 4,2; S 2,5; B 2). LZ II-04/N 063.
144. Retuširan odbitek (delavni rob strgala) na odbitku iz temno rjavega roženca (D 3; S 0,7; B 0,5). Talon je gladek. Na desnem lateralnem robu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 064; *t.* 10: 144.
145. Strgalce na odbitku iz svetlo rjavega roženca (D 2,6; S 2; B 0,7). Talon je gladek. Na levem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 064; *t.* 10: 145.
146. Odbitek z drobtinčasto retušo iz zelenkasto sivega roženca (D 2,7; S 2,6; B 0,7). Talon je fasetiran. Na proksimalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 064; *t.* 10: 146.
147. Odbitek z drobtinčasto retušo iz temno sivega roženca (D 2,8; S 1,4; B 0,8). Talon je gladek. Na proksimalnem in srednjem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 064; *t.* 10: 147.
148. Fragment retuširanega odbitka iz temno sivega roženca (D 3,7; S 3,5; B 0,7). Na proksimalnem delu levega lateralnega roba na dorzalni strani in na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 070; *t.* 10: 148.
149. Odbitek z drobtinčasto retušo iz zelenkasto sivega roženca (D 1,8; S 1,5; B 0,3). Talon je gladek. Na proksimalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 070; *t.* 11: 149.
139. End scraper on a fragmented blade of dark grey chert (L 2.2; W 0.8; Th 0.3). Striking platform is smooth. End scraper is made on the distal part on the dorsal side. LZ II-04/N 063; *Pl.* 10: 139.
140. Raclette on a flake fragment of dark brown chert (L 2.5; W 1.5; Th 0.6). Retouch is on the right lateral edge on the dorsal side. LZ II-04/N 063; *Pl.* 10: 140.
141. Fragmented notched flake. LZ II-04/N 063.
142. Side scraper on a fragmented flake of dark brown chert (L 3.1; W 2.7; Th 0.8). Striking platform is faceted. Scaliform retouch is on the right lateral edge on the dorsal side. LZ II-04/N 063; *Pl.* 10: 142.
143. Side scraper on a flake. LZ II-04/N 063.
144. Retouched flake (working edge of a side scraper) on a flake of dark brown chert (L 3; W 0.7; Th 0.5). Striking platform is smooth. Scaliform retouch is on the right lateral edge on the dorsal side. LZ II-04/N 064; *Pl.* 10: 144.
145. Raclette on a flake of light brown chert (L 2.6; W 2; Th 0.7). Striking platform is smooth. Retouch is on the left lateral edge on the dorsal side. LZ II-04/N 064; *Pl.* 10: 145.
146. Flake with nibbling retouch of greenish-grey chert (L 2.7; W 2.6; Th 0.7). Striking platform is faceted. Nibbling retouch is on the proximal part of the right lateral edge on the dorsal side. LZ II-04/N 064; *Pl.* 10: 146.
147. Flake with nibbling retouch of dark grey chert (L 2.8; W 1.4; Th 0.8). Striking platform is smooth. Nibbling retouch is on the proximal and the middle parts of the right lateral edge on the dorsal side. LZ II-04/N 064; *Pl.* 10: 147.
148. Fragment of a retouched flake of dark grey chert (L 3.7; W 3.5; Th 0.7). Retouch is on the proximal part of the left lateral edge on the dorsal side and on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 070; *Pl.* 10: 148.
149. Flake with nibbling retouch of greenish grey chert (L 1.8; W 1.5; Th 0.3). Striking platform is smooth. Nibbling retouch is on the proximal part of the right lateral edge on the dorsal side. LZ II-04/N 070; *Pl.* 11: 149.
150. Retouched blade of dark grey to light brown chert (L 3.7; W 1.5; Th 0.5). Striking platform is crushed. Retouch is on the distal part of the right lateral edge on the ventral side. LZ II-04/N 070; *Pl.* 10: 150.
151. Flake with nibbling retouch of greenish chert (L 1.8; W 1.7; Th 0.4). Striking platform is covered with cortex. Nibbling retouch is on the distal part on the dorsal side. LZ II-04/N 070; *Pl.* 11: 151.
152. Flake fragment with nibbling retouch of dark grey chert (L 3; W 2.4; Th 0.8). Nibbling retouch is on the distal part of the left lateral edge on the dorsal side. LZ II-04/N 070; *Pl.* 11: 152.
153. Side scraper on a flake of dark grey to dark brown chert (L 2.7; W 3; Th 1). Striking platform is faceted. Scaliform retouch is on the left lateral edge on the dorsal side. Retouch is on the right lateral edge on the dorsal side. LZ II-04/N 070; *Pl.* 11: 153.
154. Retouched flake of grey to brown chert (L 2.2; W 3.5; Th 1.1). Striking platform is covered with cortex. Retouch is on the distal part of the left lateral edge on the ventral side. LZ II-04/N 072; *Pl.* 11: 154.

150. Retuširana klina iz temno sivega do svetlo rjavega roženca (D 3,7; S 1,5; B 0,5). Talon je zdrobljen. Na distalnem delu desnega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 070; *t. 10*: 150.
151. Odbitek z drobtinčasto retušo iz zelenkastega roženca (D 1,8; S 1,7; B 0,4). Talon je pokrit s korteksom. Na distalnem delu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 070; *t. 11*: 151.
152. Fragment odbitka z drobtinčasto retušo iz temno sivega roženca (D 3; S 2,4; B 0,8). Na distalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 070; *t. 11*: 152.
153. Strgalo na odbitku iz temno sivega do temno rjavega roženca (D 2,7; S 3; B 1). Talon je fasetiran. Na levem lateralnem robu na dorzalni strani se nahajajo stopnjevite retuše. Na desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 070; *t. 11*: 153.
154. Retuširan odbitek iz sivega do rjavega roženca (D 2,2; S 3,5; B 1,1). Talon je pokrit s korteksom. Na distalnem delu levega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 072; *t. 11*: 154.
155. Fragment retuširane kline (D 2,2; S 1,4; B 0,4). LZ II-04/N 072.
156. Retuširana klina iz temno sivega do rjavega roženca (D 3,5; S 1,8; B 0,6). Talon je zdrobljen. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. Na distalnem delu levega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 072; *t. 11*: 156.
157. Fragment retuširane kline iz sivega roženca (D 2,4; S 1,3; B 0,4). Na levem in desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 072; *t. 11*: 157.
158. Fragment klinice z izjedo iz rdečkastega roženca (D 2,2; S 1,3; B 0,3). Na distalnem delu desnega lateralnega roba na dorzalni strani je izdelana retuširana izjeda. LZ II-04/N 072; *t. 11*: 158.
159. Odbitek z drobtinčasto retušo iz temno sivega roženca (D 1,7; S 1,4; B 0,3). Talon je fasetiran. Na distalnem delu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 072; *t. 11*: 159.
160. Retuširan fragment odbitka (D 2,6; S 1,7; B 0,4). LZ II-04/N 072.
161. Odbitek z drobtinčasto retušo iz zelenkastega roženca (D 2,2; S 1,7; B 0,7). Talon je zdrobljen. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 072; *t. 11*: 161.
162. Praskalo na fragmentiranem odbitku iz temno rjavega roženca (D 2,3; S 2; B 0,6). Talon je gladek. Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 072; *t. 11*: 162.
163. Klina z izjedo iz temno sivega do rjavega roženca (D 4; S 1,3; B 0,7). Talon je pokrit s korteksom. Na srednjem delu desnega lateralnega roba na ventralni strani je izdelan retuširana izjeda. LZ II-04/N 073; *t. 11*: 163.
164. Retuširan odbitek iz temno rjavega roženca (D 3,5; S 3,4; B 1,2). Talon je fasetiran. Na distalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. Na distalnem delu na ventralni strani se nahajajo retuše. LZ II-04/N 073; *t. 11*: 164.
165. Fragmentiran odbitek z izjedo in drobtinčasto retušo
155. Fragment of a retouched blade. LZ II-04/N 072.
156. Retouched blade of dark grey to brown chert (L 3.5; W 1.8; Th 0.6). Striking platform is crushed. Retouch is on the proximal part of the left lateral edge on the dorsal side as well as on the distal part of the left lateral edge on the ventral side. LZ II-04/N 072; *Pl. 11*: 156.
157. Fragment of a retouched blade of grey chert (L 2.4; W 1.3; Th 0.4). Retouch is on the left and right lateral edge on the dorsal side. LZ II-04/N 072; *Pl. 11*: 157.
158. Fragment of a notched bladelet of reddish chert (L 2.2; W 1.3; Th 0.3). A retouched notch is made on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 072; *Pl. 11*: 158.
159. Flake with nibbling retouch of dark grey chert (L 1.7; W 1.4; Th 0.3). Striking platform is faceted. Nibbling retouch is on the distal part on the dorsal side. LZ II-04/N 072; *Pl. 11*: 159.
160. Retouched flake fragment. LZ II-04/N 072.
161. Flake with nibbling retouch of greenish chert (L 2.2; W 1.7; Th 0.7). Striking platform is crushed. Nibbling retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 072; *Pl. 11*: 161.
162. End scraper on a fragmented flake of dark brown chert (L 2.3; W 2; Th 0.6). Striking platform is smooth. End scraper is made on the distal part on the dorsal side. LZ II-04/N 072; *Pl. 11*: 162.
163. Notched blade of dark grey to brown chert (L 4; W 1.3; Th 0.7). Striking platform is covered with cortex. A retouched notch is made on the middle part of the right lateral edge on the ventral side. LZ II-04/N 073; *Pl. 11*: 163.
164. Retouched flake of dark brown chert (L 3.5; W 3.4; Th 1.2). Striking platform is faceted. Retouch is on the distal part of the left lateral edge on the dorsal side as well as on the distal part on the ventral side. LZ II-04/N 073; *Pl. 11*: 164.
165. Fragmented notched flake with nibbling retouch of dark brown chert (L 3.2; W 4.5; Th 1.7). Striking platform is smooth. A retouched notch is made on the proximal part on the ventral side. Nibbling retouch is on the right lateral edge on the dorsal side. LZ II-04/N 073; *Pl. 12*: 165.
166. Notched flake. LZ II-04/N 073.
167. Fragmented flake with nibbling retouch of grey chert (L 1.6; W 1.2; Th 0.2). Striking platform is smooth. Nibbling retouch is on the right lateral edge on the dorsal side. LZ II-04/N 074; *Pl. 12*: 167.
168. Flake with nibbling retouch. LZ II-04/N 074.
169. Fragment of a retouched flake of dark brown chert (L 1.3; W 2.5; Th 0.7). Retouch is on the distal part on the dorsal side as well as on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 074; *Pl. 12*: 169.
170. Raclette on a flake fragment of grey chert (L 1.2; W 2; Th 0.4). Retouch is on the left and the right lateral edges on the dorsal side. Flake was exposed to high temperatures. LZ II-04/N 074; *Pl. 12*: 170.
171. End scraper on a fragmented flake of dark brown chert (L 2.1; W 2.3; Th 0.8). Striking platform is covered with cortex. End scraper is made on the distal part on the dorsal side. Retouch is on the proximal part of the left lateral edge on the ventral side as well as on the

- iz temno rjavega roženca (D 3,2; S 4,5; B 1,7). Talon je gladek. Na proksimalnem delu na ventralni strani je izdelana retuširana izjeda. Na desnem lateralnem robu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 073; *t. 12*: 165.
166. Odbitek z izjedo (D 2,3; S 2,2; B 1,1). LZ II-04/N 073.
167. Fragmentiran odbitek z drobtinčasto retušo iz sivega roženca (D 1,6; S 1,2; B 0,2). Talon je gladek. Na desnem lateralnem robu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 074; *t. 12*: 167.
168. Odbitek z drobtinčasto retušo (D 1,7; S 2,7; B 0,4). LZ II-04/N 074.
169. Fragment retuširanega odbitka iz temno rjavega roženca (D 1,3; S 2,5; B 0,7). Na distalnem delu na dorzalni strani se nahajajo retuše. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 074; *t. 12*: 169.
170. Strgalce na fragmentu odbitka iz sivega roženca (D 1,2; S 2; B 0,4). Na levem in desnem lateralnem robu na dorzalni strani se nahajajo retuše. Odbitek je bil izpostavljen visoki temperaturi. LZ II-04/N 074; *t. 12*: 170.
171. Praskalo na fragmentiranem odbitku iz temno rjavega roženca (D 2,1; S 2,3; B 0,8). Talon je pokrit s korteksom. Na distalnem delu na dorzalni strani je izdelano čelo praskala. Na proksimalnem delu levega lateralnega roba na ventralni strani se nahajajo retuše. Na proksimalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 075; *t. 12*: 171.
172. Praskalo na fragmentiranem odbitku iz temno rjavega roženca (D 2,7; S 2,8; B 0,8). Talon je gladek. Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 075; *t. 12*: 172.
173. Odbitek z drobtinčasto retušo iz temno sivega roženca (D 3,2; S 1,6; B 0,7). Talon je gladek. Na proksimalnem delu desnega lateralnega roba na ventralni strani se nahajajo drobtinčaste retuše. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 077; *t. 12*: 173.
174. Odbitek z drobtinčasto retušo iz temno sivega do rjavega roženca (D 2,8; S 2,2; B 0,5). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 077; *t. 12*: 174.
175. Fragment retuširanega odbitka iz sivega roženca (D 2,8; S 1,5; B 0,4). Na desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 077; *t. 12*: 175.
176. Del strgala na odbitku (D 2,4; S 1,2; B 1). LZ II-04/N 077.
177. Del strgala na odbitku iz sivega do temno rjavega roženca (D 1,4; S 2,8; B 1). Talon je gladek. Na distalnem delu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 077; *t. 12*: 177.
178. Fragment kline z drobtinčasto retušo iz sivega roženca prekrita z vijolično oblogo (D 2,4; S 1,8; B 0,5). Na srednjem delu levega in desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 078; *t. 12*: 178.
179. Fragmentiran odbitek z izjedo iz zelenkastega roženca (D 2,2; S 1,4; B 0,4). Talon je gladek. Na distalnem proximal part of the right lateral edge on the dorsal side. LZ II-04/N 075; *Pl. 12*: 171.
172. End scraper on a fragmented flake of dark brown chert (L 2.7; W 2.8; Th 0.8). Striking platform is smooth. End scraper is made on the distal part on the dorsal side. LZ II-04/N 075; *Pl. 12*: 172.
173. Flake with nibbling retouch of dark grey chert (L 3.2; W 1.6; Th 0.7). Striking platform is smooth. Nibbling retouch is on the proximal part of the right lateral edge on the ventral side as well as on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 077; *Pl. 12*: 173.
174. Flake with nibbling retouch of dark grey to brown chert (L 2.8; W 2.2; Th 0.5). Striking platform is smooth. Nibbling retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 077; *Pl. 12*: 174.
175. Fragment of a retouched flake of grey chert (L 2.8; W 1.5; Th 0.4). Retouch is on the right lateral edge on the dorsal side. LZ II-04/N 077; *Pl. 12*: 175.
176. Part of a side scraper on a flake. LZ II-04/N 077.
177. Part of a side scraper on a flake of grey to dark brown chert (L 1.4; W 2.8; Th 1). Striking platform is smooth. Scaliform retouch is on the distal part on the dorsal side. LZ II-04/N 077; *Pl. 12*: 177.
178. Blade fragment with nibbling retouch of grey chert with a purple coating (L 2.4; W 1.8; Th 0.5). Nibbling retouch is on the middle part of the left and the right lateral edges on the dorsal side. LZ II-04/N 078; *Pl. 12*: 178.
179. Fragmented notched flake of greenish chert (L 2.2; W 1.4; Th 0.4). Striking platform is smooth. A retouched notch is made on the distal part on the dorsal side. LZ II-04/N 080; *Pl. 12*: 179.
180. End scraper on a fragment of a retouched flake of black chert (L 2.6; W 1.8; Th 1). End scraper is made on the distal part on the dorsal side. Scaliform retouch is on the left lateral edge on the dorsal side. LZ II-04/N 082; *Pl. 12*: 180.
181. Atypical end scraper. LZ II-04/N 082.
182. Truncated bladelet on a fragmented blade of dark grey chert (L 2.1; W 1.2; Th 0.3). Striking platform is crushed. A point is made with an oblique steep truncation on the distal part on the dorsal side. LZ II-04/N 083; *Pl. 12*: 182.
183. Bladelet fragment with nibbling retouch of dark grey chert (L 2.2; W 1.1; Th 0.3). Nibbling retouch is on the proximal part of the left lateral edge on the ventral side. LZ II-04/N 084; *Pl. 12*: 183.
184. Retouched bladelet of dark brown chert (L 3.3; W 0.8; Th 0.4). Striking platform is smooth. Retouch is on the right lateral edge on the dorsal side. LZ II-04/N 084; *Pl. 12*: 184.
185. Flake with nibbling retouch of dark grey-brown chert (L 3.2; W 3.1; Th 0.7). Striking platform is smooth. Nibbling retouch is on the left lateral edge on the dorsal side. LZ II-04/N 084; *Pl. 13*: 185.
186. Retouched fragmented flake of grey chert (L 2.3; S 2.1; Th 0.4). Striking platform is smooth. Retouch is on the distal part of the left and the right lateral edges on the dorsal side as well as on the proximal part of the right lateral edge on the ventral side. LZ II-04/N 084; *Pl. 13*: 186.

- delu na dorzalni strani je izdelana retuširana izjeda. LZ II-04/N 080; *t. 12*: 179.
180. Praskalo na fragmentu retuširanega odbitka iz črnega roženca (D 2,6; S 1,8; B 1). Na distalnem delu na dorzalni strani je izdelano čelo praskala. Na levem lateralnem robu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 082; *t. 12*: 180.
181. Atipično praskalo (D 2; S 1,8; B 0,4). LZ II-04/N 082.
182. Klinica s prečno retušo na fragmentirani klini iz temno sivega roženca (D 2,1; S 1,2; B 0,3). Talon je zdrobljen. Na distalnem delu na dorzalni strani je s poševno strmo prečno retušo izdelana konica. LZ II-04/N 083; *t. 12*: 182.
183. Fragment klinice z drobtinčasto retušo iz temno sivega roženca (D 2,2; S 1,1; B 0,3). Na proksimalnem delu levega lateralnega roba na ventralni strani se nahajajo drobtinčaste retuše. LZ II-04/N 084; *t. 12*: 183.
184. Retuširana klinica iz temno rjavega roženca (D 3,3; S 0,8; B 0,4). Talon je gladek. Na desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 084; *t. 12*: 184.
185. Odbitek z drobtinčasto retušo iz temno sivo rjavega roženca (D 3,2; S 3,1; B 0,7). Talon je gladek. Na levem lateralnem robu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 084; *t. 13*: 185.
186. Retuširan fragmentiran odbitek iz sivega roženca (D 2,3; S 2,1; B 0,4). Talon je gladek. Na distalnem delu levega in desnega lateralnega roba na dorzalni strani se nahajajo retuše. Na proksimalnem delu desnega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 084; *t. 13*: 186.
187. Fragmentiran odbitek z drobtinčasto retušo (D 2,3; S 2,2; B 0,7). LZ II-04/N 084.
188. Retuširan ostanek bipolarnega jedra (okrcan odbitek) (D 4; S 2,7; B 0,8). LZ II-04/N 084.
189. Fragment odbitka z drobtinčasto retušo iz sivega plastovitega roženca (D 4,8; S 3,3; B 1). Na srednjem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 084; *t. 13*: 189.
190. Retuširan odbitek (D 2,2; S 3,2; B 1,2). LZ II-04/N 084.
191. Fragment retuširanega odbitka (D 2,5; S 1,7; B 0,7). LZ II-04/N 084.
192. Fragment kline z drobtinčasto retušo iz temno sivega roženca (D 2,6; S 1,8; B 0,4). Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 085; *t. 13*: 192.
193. Klinica z izjedo iz temno rjavega roženca (D 2,5; S 1,1; B 0,7). Talon je gladek. Na srednjem delu levega lateralnega roba na ventralni strani je izdelana retuširana izjeda. LZ II-04/N 085; *t. 13*: 193.
194. Okrcan fragment odbitka iz temno rjavega roženca (D 3,2; S 1,8; B 0,6). Na proksimalnem in distalnem delu na dorzalni in ventralni strani je odbitek okrcan. Na distalnem desnem lateralnem robu na dorzalni strani se nahajajo retuše. Na proksimalnem delu desnega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 085; *t. 13*: 194.
195. Retuširan odbitek (D 2,3; S 1,7; B 0,5). LZ II-04/N 085.
196. Strgalo na odbitku iz temno rjavega do sivega roženca (D 5,2; S 6,8; B 1,6). Talon je gladek. Na desnem
187. Fragmented flake with nibbling retouch. LZ II-04/N 084.
188. Retouched part of a bipolar core (splintered flake). LZ II-04/N 084.
189. Flake fragment with nibbling retouch of grey layered chert (L 4.8; W 3.3; Th 1). Nibbling retouch is on the middle part of the left lateral edge on the dorsal side. LZ II-04/N 084; *Pl. 13*: 189.
190. Retouched flake. LZ II-04/N 084.
191. Fragment of a retouched flake. LZ II-04/N 084.
192. Blade fragment blade with nibbling retouch of dark grey chert (L 2.6; W 1.8; Th 0.4). Nibbling retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 085; *Pl. 13*: 192.
193. Notched bladelet of dark brown chert (L 2.5; W 1.1; Th 0.7). Striking platform is smooth. A retouched notch is made on the middle part of the left lateral edge on the ventral side. LZ II-04/N 085; *Pl. 13*: 193.
194. Splintered flake fragment of dark brown chert (L 3.2; W 1.8; Th 0.6). Flake is splintered on the proximal and the distal parts on the dorsal and the ventral sides. Retouch is on distal part of the right lateral edge on the dorsal side as well as on the proximal part of the right lateral edge on the ventral side. LZ II-04/N 085; *Pl. 13*: 194.
195. Retouched flake. LZ II-04/N 085.
196. Side scraper on a flake of dark brown to grey chert (L 5.2; W 6.8; Th 1.6). Striking platform is smooth. Scalliform retouch is on the right lateral edge on the dorsal side. LZ II-04/N 085; *Pl. 13*: 196.
197. Notched retouched blade of grey chert (L 3.1; W 1.7; Th 0.3). Striking platform is crushed. Retouch is on the proximal part of the left lateral edge on the dorsal side. A retouched notch is made on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 087; *Pl. 13*: 197.
198. Blade with nibbling retouch of dark brown chert (L 4; W 1.4; Th 0.4). Striking platform is smooth. Nibbling retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 087; *Pl. 13*: 198.
199. Blade with nibbling retouch. LZ II-04/N 087.
200. Flake with nibbling retouch of dark brown chert (L 3.3; W 3.5; Th 0.8). Striking platform is smooth. Nibbling retouch is on the middle part of the left lateral edge on the ventral side. LZ II-04/N 087; *Pl. 14*: 200.
201. Retouched fragmented flake. LZ II-04/N 087.
202. Retouched flake of grey chert (L 2; W 1.5; Th 0.8). Striking platform is smooth. Retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 087; *Pl. 14*: 202.
203. Flake with nibbling retouch of dark brown chert (L 1.8; W 2.4; Th 0.7). Striking platform is covered with cortex. Nibbling retouch is on the middle part of the left lateral edge on the dorsal side. LZ II-04/N 088; *Pl. 14*: 203.
204. Flake fragment with notches of dark grey chert (L 2.3; W 2.2; Th 1). Retouched notches are made on the distal part of the left and the right lateral edges on the dorsal side. LZ II-04/N 088; *Pl. 14*: 204.
205. Denticulated flake of greenish chert (L 2.3; W 1; Th 0.4). Striking platform is crushed. Retouched notches are made on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 089; *Pl. 14*: 205.

- lateralnem robu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 085; *t. 13*: 196.
197. Retuširana klina z izjedo iz sivega roženca (D 3,1; S 1,7; B 0,3). Talon je zdobljen. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. Na distalnem delu desnega lateralnega roba na dorzalni strani je izdelana retuširana izjeda. LZ II-04/N 087; *t. 13*: 197.
198. Klina z drobtinčasto retušo iz temno rjavega roženca (D 4; S 1,4; B 0,4). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 087; *t. 13*: 198.
199. Klina za drobtinčasto retušo (D 3,6; S 1; B 0,5). LZ II-04/N 087.
200. Odbitek z drobtinčasto retušo iz temno rjavega roženca (D 3,3; S 3,5; B 0,8). Talon je gladek. Na srednjem delu levega lateralnega roba na ventralni strani se nahajajo drobtinčaste retuše. LZ II-04/N 087; *t. 14*: 200.
201. Retuširan fragmentiran odbitek (D 2,8; S 1,4; B 0,8). LZ II-04/N 087.
202. Retuširan odbitek iz sivega roženca (D 2; S 1,5; B 0,8). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 087; *t. 14*: 202.
203. Odbitek z drobtinčasto retušo iz temno rjavega roženca (D 1,8; S 2,4; B 0,7). Talon je pokrit s korteksom. Na srednjem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 088; *t. 14*: 203.
204. Fragment odbitka z izjedama iz temno sivega roženca (D 2,3; S 2,2; B 1). Na distalnem delu levega in desnega lateralnega roba na dorzalni strani se nahajata izdelani retuširani izjedi. LZ II-04/N 088; *t. 14*: 204.
205. Nazobčan odbitek iz zelenkastega roženca (D 2,3; S 1; B 0,4). Talon je zdobljen. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuširane izjede. LZ II-04/N 089; *t. 14*: 205.
206. Klina s poševno prečno retušo iz zelenkasto sivega roženca (D 3,3; S 1,4; B 0,4). Talon je fasetiran. Na distalnem delu levega lateralnega roba na dorzalni strani je s strmo retušo izdelana prečna retuša. LZ II-04/N 089; *t. 14*: 206.
207. Strgalo na odbitku iz temno sivega roženca (D 2,5; S 2; B 1,2). Talon je pokrit s korteksom. Na levem lateralnem robu na ventralni strani se nahajajo drobtinčaste retuše. LZ II-04/N 089; *t. 14*: 207.
208. Strgalo na odbitku (D 4; S 3,3; B 1,4). LZ II-04/N 089.
209. Klina z drobtinčasto retušo iz sivega roženca (D 2,8; S 1,1; B 0,7). Talon je zdobljen. Na proksimalnem delu levega lateralnega roba in na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 090; *t. 14*: 209.
210. Retuširan odbitek (D 2,8; S 2,7; B 1,4). LZ II-04/N 090.
211. Odbitek z izjedo iz temno rjavega roženca (D 2,6; S 2; B 0,9). Talon je gladek. Na distalnem delu desnega lateralnega roba na dorzalni strani je izdelana retuširana izjeda. LZ II-04/N 090; *t. 14*: 211.
212. Fragmentiran retuširan odbitek iz svetlo rjavega roženca (D 2; S 2; B 0,5). Talon je zdobljen. Na desnem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 090; *t. 14*: 212.
206. Obliquely truncated blade of greenish-grey chert (L 3.3; W 1.4; Th 0.4). Striking platform is faceted. A truncation is made with a steep retouch on the distal part of the left lateral edge on the dorsal side. LZ II-04/N 089; *Pl. 14*: 206.
207. Side scraper on a flake of dark grey chert (L 2.5; W 2; Th 1.2). Striking platform is covered with cortex. Retouch is on the left lateral edge on the ventral side. LZ II-04/N 089; *Pl. 14*: 207.
208. Side scraper on a flake. LZ II-04/N 089.
209. Blade with nibbling retouch of grey chert (L 2.8; W 1.1; Th 0.7). Striking platform is crushed. Nibbling retouch is on the proximal part of the left lateral edge and on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 090; *Pl. 14*: 209.
210. Retouched flake. LZ II-04/N 090.
211. Notched flake of dark brown chert (L 2.6; W 2; Th 0.9). Striking platform is smooth. A retouched notch is made on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 090; *Pl. 14*: 211.
212. Fragmented retouched flake of light brown chert (L 2; W 2; Th 0.5). Striking platform is crushed. Retouch is on the right lateral edge on the dorsal side. LZ II-04/N 090; *Pl. 14*: 212.
213. Atypical end scraper. LZ II-04/N 090.
214. End scraper on a retouched flake of dark grey chert (L 2.1; W 1.9; Th 0.6). Striking platform is smooth. End scraper is made on the distal part of the right lateral edge on the dorsal side. Retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 090; *Pl. 14*: 214.
215. Denticulated retouched blade of grey chert (L 2.6; W 1.2; Th 0.4). Striking platform is smooth. Retouched notches are on the proximal and the middle part of the left lateral edge on the dorsal side. Retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 091; *Pl. 14*: 215.
216. Denticulated flake fragment of dark grey to light grey brown chert (L 6.2; W 9.8; Th 3.3). Notches are made on the middle part of the left lateral edge on the dorsal side. LZ II-04/N 091; *Pl. 15*: 216.
217. Flake with nibbling retouch of dark grey chert (L 2.2; W 3.3; Th 0.6). Striking platform is dihedral. Nibbling retouch is on the distal part on the dorsal side as well as on the proximal part of the left lateral edge on the ventral side. LZ II-04/N 092; *Pl. 14*: 217.
218. Fragment of backed bladelet of dark brown chert (L 2.1; W 0.4; Th 0.2). Steep retouch is on the right lateral edge on the dorsal side. LZ II-04/N 093; *Pl. 14*: 218.
219. Fragmented retouched flake of dark grey chert (L 1.5; W 1.2; Th 0.2). Striking platform is smooth. Retouch is on the proximal part of the left lateral edge on the dorsal side. Nibbling retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 093; *Pl. 14*: 219.
220. Retouched flake. LZ II-04/N 093.
221. Denticulated flake of dark grey chert (L 2.6; W 2; Th 0.5). Striking platform is smooth. Retouched notches are made on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 093; *Pl. 14*: 221.
222. Flake with nibbling retouch. LZ II-04/N 093.
223. Retouched blade. LZ II-04/N 093.

213. Atipično praskalo (D 1,9; S 1,8; B 0,6). LZ II-04/N 090.
214. Praskalo na retuširanem odbitku iz temno sivega roženca (D 2,1; S 1,9; B 0,6). Talon je gladek. Na distalnem delu desnega lateralnega rob na dorzalni strani je izdelano čelo praskala. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 090; *t. 14*: 214.
215. Nazobčana retuširana klina iz sivega roženca (D 2,6; S 1,2; B 0,4). Talon je gladek. Na proksimalnem in srednjem delu levega lateralnega roba na dorzalni strani so izdelane retuširane izjede. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 091; *t. 14*: 215.
216. Nazobčan fragment odbitka iz temno sivega do svetlo sivo rjavega roženca (D 6,2; S 9,8; B 3,3). Na srednjem delu levega lateralnega roba na dorzalni strani se nahajajo izdelane izjede. LZ II-04/N 091; *t. 15*: 216.
217. Odbitek z drobtinčasto retušo iz temno sivega roženca (D 2,2; S 3,3; B 0,6). Talon je diedričen. Na distalnem delu na dorzalni strani se nahajajo drobtinčaste retuše. Na proksimalnem delu levega lateralnega roba na ventralni strani se nahajajo drobtinčaste retuše. LZ II-04/N 092; *t. 14*: 217.
218. Fragment klinice s hrbtom iz temno rjavega roženca (D 2,1; B 0,4; 0,2). Na desnem lateralnem robu na dorzalni strani je s strmo retušo izdelan hrbet. LZ II-04/N 093; *t. 14*: 218.
219. Fragmentiran retuširan odbitek iz temno sivega roženca (D 1,5; S 1,2; B 0,2). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 093; *t. 14*: 219.
220. Retuširan odbitek (D 1,7; S 1,3; B 0,4). LZ II-04/N 093.
221. Nazobčan odbitek iz temno sivega roženca (D 2,6; S 2; B 0,5). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani sta izdelani retuširani izjedi. LZ II-04/N 093; *t. 14*: 221.
222. Odbitek z drobtinčasto retušo (D 2,3; S 1,8; B 0,5). LZ II-04/N 093.
223. Retuširana klina (D 2,7; S 1,3; B 0,7). LZ II-04/N 093.
224. Strgalo na fragmentu odbitka iz temno rjavega roženca (D 2,8; S 2,7; B 1,4). Na levem in desnem lateralnem robu na dorzalni strani in na distalnem delu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 093; *t. 15*: 224.
225. Strgalo na odbitku iz temno rjavega roženca (D 3,6; S 2,5; B 0,9). Talon je gladek. Na levem lateralnem robu in na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 093; *t. 15*: 225.
226. Nazobčano bipolarno jedro iz zelenkastega roženca (D 5,7; S 5,5; B 3,3). Udarna površina je retuširana. Na desnem lateralnem robu na dorzalni strani so izdelane izjede. LZ II-04/N 093; *t. 16*: 226.
227. Vbadalo na fragmentiranem odbitku z drobtinčasto retušo (D 3,2; S 1,9; B 0,7). LZ II-04/N 094.
228. Retuširan odbitek iz sivega do svetlo rjavega roženca (D 3,7; S 2,8; B 1,1). Talon je gladek. Na distalnem
224. Side scraper on a flake fragment of dark brown chert (L 2.8; W 2.7; Th 1.4). Scaliform retouch is on the left and the right lateral edges on the dorsal side and on the distal part on the dorsal side. LZ II-04/N 093; *Pl. 15*: 224.
225. Side scraper on a flake of dark brown chert (L 3.6; W 2.5; Th 0.9). Striking platform is smooth. Retouch is on the left lateral edge and on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 093; *Pl. 15*: 225.
226. Denticulated bipolar core of greenish chert (L 5.7; W 5.5; Th 3.3). Striking platform is retouched. Notches are made on the right lateral edge on the dorsal side. LZ II-04/N 093; *Pl. 16*: 226.
227. Burin on a fragmented flake with nibbling retouch. LZ II-04/N 094.
228. Retouched flake of grey to light brown chert (L 3.7; W 2.8; Th 1.1). Striking platform is smooth. Retouch is on the distal part on the dorsal side. LZ II-04/N 094; *Pl. 15*: 228.
229. Retouched blade of reddish chert (L 2.8; W 1.2; Th 0.4). Striking platform is smooth. Retouch is on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 095; *Pl. 15*: 229.
230. Denticulated flake (working edge fragment) of dark grey-brown chert (L 1.2; W 2.3; Th 0.6). Retouched notches are made on the distal part on the dorsal side. LZ II-04/N 095; *Pl. 15*: 230.
231. Retouched flake fragment. LZ II-04/N 095.
232. Denticulated blade of greenish chert (L 4; W 2.1; Th 0.4). Striking platform is crushed. Retouched notches are made on the middle part of the left lateral edge on the dorsal side. LZ II-04/N 095; *Pl. 16*: 232.
233. Fragment of a denticulated flake. LZ II-04/N 095.
234. Retouched blade of grey chert (L 5.2; W 2; Th 0.8). Striking platform is punctuated. Retouch is on the proximal and the middle parts of the left lateral edge on the dorsal side. LZ II-04/N 095; *Pl. 16*: 234.
235. Fragmented flake with nibbling retouch of dark grey chert (L 1.4; W 1.4; Th 0.2). Striking platform is punctuated. Nibbling retouch is on the right lateral edge on the dorsal side. LZ II-04/N 096; *Pl. 15*: 235.
236. Flake fragment with nibbling retouch. LZ II-04/N 096.
237. Retouched flake of dark grey to black chert (L 2.3; W 1.3; Th 0.5). Striking platform is smooth. Retouch is on the middle part of the right lateral edge on the dorsal side. LZ II-04/N 096; *Pl. 16*: 237.
238. Notched flake with nibbling retouch of grey chert (L 2.2; W 1.7; Th 0.4). Striking platform is smooth. A retouched notch is made on the distal part of the right lateral edge on the dorsal side. Nibbling retouch is on the distal part of the left lateral edge on the dorsal side. LZ II-04/N 096; *Pl. 16*: 238.
239. Fragmented retouched blade of grey chert (L 2.5; W 1.2; Th 0.4). Striking platform is smooth. Retouch is on the proximal part of the left and the right lateral edges on the dorsal side. LZ II-04/N 096; *Pl. 16*: 239.
240. Fragment of a backed bladelet of dark grey-brown chert (L 2.3; W 0.3; Th 0.2). Steep retouch is on the left lateral edge on the dorsal side. LZ II-04/N 096; *Pl. 16*: 240.

- delu na dorzalni strani se nahajajo retuše. LZ II-04/N 094; *t. 15*: 228.
229. Retuširana klina iz rdečkastega roženca (D 2,8; S 1,2; B 0,4). Talon je gladek. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 095; *t. 15*: 229.
230. Nazobčan odbitek (fragment delovnega roba) iz temno sivo rjavega roženca (D 1,2; S 2,3, B 0,6). Na distalnem delu na dorzalni strani so izdelane retuširane izjede. LZ II-04/N 095; *t. 15*: 230.
231. Retuširan fragment odbitka (D 2,7, S 1,4, B 0,5). LZ II-04/N 095.
232. Nazobčana klina iz zelenkastega roženca (D 4; S 2,1; B 0,4). Talon je zdrobljen. Na srednjem delu levega lateralnega roba na dorzalni strani so izdelane retuširane izjede. LZ II-04/N 095; *t. 16*: 232.
233. Fragment nazobčanega odbitka (D 3,5; S 1,9; B 1,5). LZ II-04/N 095.
234. Retuširana klina iz sivega roženca (D 5,2; S 2; B 0,8). Talon je točkovit. Na proksimalnem in srednjem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 095; *t. 16*: 234.
235. Fragmentiran odbitek z drobtinčasto retušo iz temno sivega roženca (D 1,4; S 1,4; B 0,2). Talon je točkovit. Na desnem lateralnem robu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 096; *t. 15*: 235.
236. Fragment odbitka z drobtinčasto retušo (D 2,8; S 2,4; B 1,1). LZ II-04/N 096.
237. Retuširan odbitek iz temno sivega do črnega roženca (D 2,3; S 1,3; B 0,5). Talon je gladek. Na srednjem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 096; *t. 16*: 237.
238. Odbitek z izjedo in drobtinčasto retušo iz sivega roženca (D 2,2; S 1,7; B 0,4). Talon je gladek. Na distalnem delu desnega lateralnega roba na dorzalni strani je izdelana retuširana izjeda. Na distalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 096; *t. 16*: 238.
239. Fragmentirana retuširana klina iz sivega roženca (D 2,5; S 1,2; B 0,4). Talon je gladek. Na proksimalnem delu levega in desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 096; *t. 16*: 239.
240. Fragment klinice s hrptom iz temno sivo rjavega roženca (D 2,3; S 0,3; B 0,2). Na levem lateralnem robu na dorzalni strani je s strmo retušo izdelan hrbet. LZ II-04/N 096; *t. 16*: 240.
241. Fragment kline s hrptom iz temno rjavega roženca (D 4; S 1; B 0,4). Na levem lateralnem robu na dorzalni strani je s strmo retušo izdelan hrbet. LZ II-04/N 096; *t. 16*: 241.
242. Fragment retuširanega odbitka iz temno sivega roženca (D 2,8; S 1,8; B 0,7). Na srednjem in distalnem delu levega in desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 096; *t. 16*: 242.
243. Nazobčan odbitek (fragment delovnega roba) iz sivega roženca (D 1,9; S 3,3; B 1). Na distalnem delu na dorzalni strani so izdelane retuširane izjede. LZ II-04/N 096; *t. 16*: 243.
244. Strgalo na fragmentu odbitka (D 3,6; S 2,5; B 1,4). LZ II-04/N 096.
245. Odbitek z drobtinčasto retušo (D 2,4; S 3,2; B 0,7). LZ II-04/N 098.
241. Fragment of a backed blade of dark brown chert (L 4; W 1; Th 0.4). Steep retouch is on the left lateral edge on the dorsal side. LZ II-04/N 096; *Pl. 16*: 241.
242. Fragment of a retouched flake of dark grey chert (L 2.8; W 1.8; Th 0.7). Retouch is on the middle and the distal parts of the left and the right lateral edges on the dorsal side. LZ II-04/N 096; *Pl. 16*: 242.
243. Denticulated flake (working edge fragment) of grey chert (L 1.9; W 3.3; Th 1). Retouched notches are made on the distal part on the dorsal side. LZ II-04/N 096; *Pl. 16*: 243.
244. Side scraper on a flake fragment. LZ II-04/N 096.
245. Flake with nibbling retouch. LZ II-04/N 098.
246. Retouched flake fragment. LZ II-04/N 098.
247. Retouched flake of dark grey to dark brown chert (L 3; W 1.7; Th 1.2). Striking platform is smooth. Retouch is on the middle part of the left lateral edge on the dorsal side as well as on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 098; *Pl. 16*: 247.
248. Rabot on a fragmented flake. LZ II-04/N 098.
249. Atypical end scraper on a flake fragment of greenish chert (L 1.3; W 1.3; Th 0.6). End scraper is made on the distal part on the dorsal side. LZ II-04/N 099; *Pl. 16*: 249.
250. End scraper on a fragmented flake of light grey-greenish chert (L 2.3; W 2; Th 0.5). Striking platform is crushed. End scraper is made on the right lateral edge on the dorsal side. LZ II-04/N 099; *Pl. 17*: 250.
251. Circular end scraper on a flake fragment of grey chert (L 1.3; W 1.7; Th 0.5). End scraper is made on all lateral edges on the dorsal side. LZ II-04/N 101; *Pl. 16*: 251.
252. Flake fragment with steep retouch of brown to black chert (L 2.2; W 1.2; Th 0.4). Steep retouch is on the right lateral edge on the dorsal side. LZ II-04/N 103; *Pl. 16*: 252.
253. Retouched flake. LZ II-04/N 103.
254. Splintered flake fragment of grey chert (L 3.5; W 2.1; Th 1). Left lateral edge on the dorsal and the ventral sides is splintered. LZ II-04/N 103; *Pl. 17*: 254.
255. End scraper on a flake fragment of grey chert (L 1.6; W 1.7; Th 0.4). End scraper is made on the distal part on the dorsal side. LZ II-04/N 103; *Pl. 17*: 255.
256. Retouched flake (part of a working edge) of grey chert (L 2.9; W 1.2; Th 0.3). Striking platform is smooth. Retouch is on the proximal part of the left lateral edge on the ventral side. LZ II-04/N 105; *Pl. 17*: 256.
257. Flake with nibbling retouch of dark grey chert (L 1.4; W 1.8; Th 0.4). Striking platform is smooth. Nibbling retouch is on the distal part on the dorsal side. LZ II-04/N 106; *Pl. 17*: 257.
258. Flake with nibbling retouch. LZ II-04/N 106.
259. Flake with nibbling retouch of dark brown chert (L 1.3; W 1.8; Th 0.3). Striking platform is smooth. Nibbling retouch is on the distal part on the dorsal side. LZ II-04/N 106; *Pl. 17*: 259.
260. Notched flake. LZ II-04/N 106.
261. Side scraper on a flake fragment of dark brown chert (L 3.3; W 2.7; Th 0.8). Scaliform retouch is on the right lateral edge on the dorsal side. LZ II-04/N 106; *Pl. 17*: 261.
262. Flake with nibbling retouch of grey chert (L 3.3; W

246. Fragment retuširanega odbitka (D 2,5; S 3,3; B 1,4). LZ II-04/N 098.
247. Retuširan odbitek iz temno sivega do temno rjavega roženca (D 3; S 1,7; B 1,2). Talon je gladek. Na srednjem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. Na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 098; *t. 16*: 247.
248. Oblič na fragmentiranem odbitku (D 4,5; S 2,4; B 2,3). LZ II-04/N 098.
249. Atipično praskalo na fragmentu odbitka iz zelenkaste roženca (D 1,3; S 1,3; B 0,6). Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 099; *t. 16*: 249.
250. Praskalo na fragmentiranem odbitku iz svetlo sivo zelenkaste roženca (D 2,3; S 2; B 0,5). Talon je zdrobljen. Na desnem lateralnem robu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 099; *t. 17*: 250.
251. Krožno praskalo na fragmentu odbitka iz sivega roženca (D 1,3; S 1,7; B 0,5). Na vseh lateralnih robovih na dorzalni strani je izdelano čelo praskala. LZ II-04/N 101; *t. 16*: 251.
252. Fragment odbitka s strmo retušo iz rjavega do črnega roženca (D 2,2; S 1,2; B 0,4). Na desnem lateralnem robu na dorzalni strani je s strmo retušo izdelan hrbet. LZ II-04/N 103; *t. 16*: 252.
253. Retuširan odbitek (D 2; S 2,9; B 0,5). LZ II-04/N 103.
254. Okrcan fragment odbitka iz sivega roženca (D 3,5; S 2,1; B 1). Levi lateralni rob na dorzalni in ventralni strani je okrcan. LZ II-04/N 103; *t. 17*: 254.
255. Praskalo na fragmentu odbitka iz sivega roženca (D 1,6; S 1,7; B 0,4). Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 103; *t. 17*: 255.
256. Retuširan odbitek (del delovnega rob) iz sivega roženca (D 2,9; S 1,2; B 0,3). Talon je gladek. Na proksimalnem delu levega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 105; *t. 17*: 256.
257. Odbitek z drobtinčasto retušo iz temno sivega roženca (D 1,4; S 1,8; B 0,4). Talon je gladek. Na distalnem delu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 106; *t. 17*: 257.
258. Odbitek z drobtinčasto retušo (D 1,8; S 1; B 0,4). LZ II-04/N 106.
259. Odbitek z drobtinčasto retušo iz temno rjavega roženca (D 1,3; S 1,8; B 0,3). Talon je gladek. Na distalnem delu na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 106; *t. 17*: 259.
260. Odbitek z izjedo (D 1,5; S 3,7; B 0,7). LZ II-04/N 106.
261. Strgalo na fragmentu odbitka iz temno rjavega roženca (D 3,3; S 2,7; B 0,8). Na desnem lateralnem robu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 106; *t. 17*: 261.
262. Odbitek z drobtinčasto retušo iz sivega roženca (D 3,3; S 1,6; B 0,5). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 109; *t. 17*: 262.
263. Retuširan fragmentiran odbitek iz temno sivega roženca (D 2,6; S 2; B 0,4). Talon je fasetiran. Na desnem lateralnem robu na ventralni strani je s strmo retušo izdelan hrbet. LZ II-04/N 109; *t. 17*: 263.
- 1,6; Th 0,5). Striking platform is smooth. Nibbling retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 109; *Pl. 17*: 262.
263. Retouched fragmented flake of dark grey chert (L 2,6; W 2; Th 0,4). Striking platform is faceted. Steep retouch is on the right lateral edge on the ventral side. LZ II-04/N 109; *Pl. 17*: 263.
264. Retouched blade of dark brown-grey chert (L 4,4; W 1,3; Th 0,4). Striking platform is smooth. Retouch is on the middle part of the right lateral edge on the ventral side and on the distal part of the left lateral edge on the ventral side. LZ II-04/N 109; *Pl. 17*: 264.
265. Flake with nibbling retouch of grey chert (L 2,1; W 1,5; Th 0,7). Striking platform is smooth. Nibbling retouch is on the proximal part of the right lateral edge on the ventral side. LZ II-04/N 113; *Pl. 17*: 265.
266. Flake with nibbling retouch of greenish-grey chert (L 4,1; W 2,4; Th 0,7). Striking platform is punctuated. Nibbling retouch is on the proximal part of the left lateral edge on the ventral side and on the middle part of the left lateral edge on the dorsal side. LZ II-04/N 115; *Pl. 18*: 266.
267. Flake with nibbling retouch of greenish-grey chert (L 3,5; W 2,7; Th 0,5). Striking platform is covered with cortex. Nibbling retouch is on the left lateral edge on the dorsal and the ventral sides as well as on the proximal part of the right lateral edge on the ventral side and on the distal part of the right lateral edge on the dorsal side. LZ II-04/N 115; *Pl. 18*: 267.
268. Fragment of a denticulated flake. LZ II-04/N 115.
269. Flake with nibbling retouch. LZ II-04/N 117.
270. Retouched blade of dark brown chert (L 3,3; W 1,4; Th 0,6). Striking platform is smooth. Retouch is on the distal part of the right lateral edge on the dorsal side and on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 118; *Pl. 17*: 270.
271. Side scraper on a unipolar core of dark to light brown chert (L 5,8; W 5,7; Th 2,6). Striking platform is covered with cortex. Scaliform retouch is on the distal part on the dorsal side. LZ II-04/N 118; *Pl. 18*: 271.
272. Flake fragment with nibbling retouch of dark brown chert (L 1,7; W 2,1; Th 0,6). Nibbling retouch is on the distal part on the dorsal side. LZ II-04/N 119; *Pl. 17*: 272.
273. Flake with nibbling retouch of reddish-brown chert (L 2,1; W 3,1; Th 1). Striking platform is covered with cortex. Nibbling retouch is on the middle part of the right lateral edge on the dorsal side. LZ II-04/N 119; *Pl. 17*: 273.
274. Flake with nibbling retouch of grey chert (L 2,1; W 1,6; Th 0,4). Striking platform is smooth. Nibbling retouch is on the left lateral edge on the dorsal and the ventral sides. LZ II-04/N 119; *Pl. 18*: 274.
275. Fragment flake with nibbling retouch. LZ II-04/N 119.
276. Fragment retouched flake of greenish chert (L 2,4; W 1,3; Th 0,4). Retouch is on the left lateral edge on the dorsal side. LZ II-04/N 119; *Pl. 18*: 276.
277. Retouched flake of dark grey chert (L 2,6; W 1,5; Th 0,4). Striking platform faceted. Retouch is on the middle part of the right lateral edge and on the distal part on the dorsal side as well as on the proximal part of

264. Retuširana klina iz temno rjavo sivega roženca (D 4,4; S 1,3; B 0,4). Talon je gladek. Na srednjem delu desnega lateralnega roba na ventralni strani in na distalnem delu levega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 109; *t. 17*: 264.
265. Odbitek z drobtinčasto retušo iz sivega roženca (D 2,1; S 1,5; B 0,7). Talon je gladek. Na proksimalnem delu desnega lateralnega roba na ventralni strani se nahajajo drobtinčaste retuše. LZ II-04/N 113; *t. 17*: 265.
266. Odbitek z drobtinčasto retušo iz zelenkasto sivega roženca (D 4,1; S 2,4; B 0,7). Talon je točkovit. Na proksimalnem delu levega lateralnega roba na ventralni strani in na srednjem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 115; *t. 18*: 266.
267. Odbitek z drobtinčasto retušo iz zelenkasto sivega roženca (D 3,5; S 2,7; B 0,5). Talon je pokrit s korteksom. Na levem lateralnem robu na dorzalni in ventralni strani se nahajajo drobtinčaste retuše. Na proksimalnem delu desnega lateralnega roba na ventralni strani in na distalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 115; *t. 18*: 267.
268. Fragment nazobčanega odbitka (D 3,5; S 3,3; B 1,8). LZ II-04/N 115.
269. Odbitek z drobtinčasto retušo (D 1,7; S 1,6; B 0,6). LZ II-04/N 117.
270. Retuširana klina iz temno rjavega roženca (D 3,3; S 1,4; B 0,6). Talon je gladek. Na distalnem delu desnega lateralnega roba na dorzalni strani in na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 118; *t. 17*: 270.
271. Strgalo na unipolarnem jedru iz temno do svetlo rjavega roženca (D 5,8; S 5,7; B 2,6). Udarna površina je pokrita s korteksom. Na distalnem delu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 118; *t. 18*: 271.
272. Fragment odbitka z izjedo iz temno rjavega roženca (D 1,7; S 2,1; B 0,6). Na distalnem delu na dorzalni strani se nahaja drobtinčasta retuša. LZ II-04/N 119; *t. 17*: 272.
273. Odbitek z drobtinčasto retušo iz rdečkasto rjavega roženca (D 2,1; S 3,1; B 1). Talon je pokrit s korteksom. Na srednjem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 119; *t. 17*: 273.
274. Odbitek z drobtinčasto retušo iz sivega roženca (D 2,1; S 1,6; B 0,4). Talon je gladek. Na levem lateralnem robu na dorzalni in ventralni strani se nahajajo drobtinčaste retuše. LZ II-04/N 119; *t. 18*: 274.
275. Fragment odbitka z drobtinčasto retušo (D 1,6; S 0,8; B 0,2). LZ II-04/N 119.
276. Fragment retuširanega odbitka iz zelenkastega roženca (D 2,4; S 1,3; B 0,4). Na levem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 119; *t. 18*: 276.
277. Retuširan odbitek iz temno sivega roženca (D 2,6; S 1,5; B 0,4). Talon fasetiran. Na srednjem delu desnega lateralnega roba in na distalnem delu na dorzalni strani se nahajajo retuše. Na proksimalnem delu desnega lateralnega roba in na distalnem delu levega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 119; *t. 18*: 277.
278. End scraper on a fragmented flake of grey chert (L 1.5; W 1.7; Th 0.9). Striking platform is crushed. End scraper is made on the distal part on the dorsal side. LZ II-04/N 120; *Pl. 18*: 278.
279. Side scraper on a flake fragment of dark brown chert (L 1.4, W 3.1; Th 0.9). Scaliform retouch is on the right lateral edge on the dorsal side. LZ II-04/N 120; *Pl. 18*: 279.
280. Retouched polypolar core of dark grey to dark brown chert (L 3.5; W 3.1; Th 1.2). Striking platforms so retouched. Retouch is on the proximal part of the left lateral edge on the ventral side. LZ II-04/N 120; *Pl. 19*: 280.
281. Bladelet with nibbling retouch of dark grey to brown chert (L 2.8; W 1.2; Th 0.3). Striking platform is crushed. Nibbling retouch is on the proximal part of the right lateral edge on the dorsal side. LZ II-04/N 120; *Pl. 19*: 281.
282. Fragment flake with nibbling retouch. LZ II-04/N 120.
283. Flake with nibbling retouch of greenish to light brown chert (L 2.2; W 1.8; Th 0.4). Striking platform is covered with cortex. Nibbling retouch is on the right lateral edge on the dorsal side as well as on the distal part of the left lateral edge on the dorsal side. LZ II-04/N 120; *Pl. 18*: 283.
284. Fragment of a backed bladelet of dark grey chert (L 2.2; W 0.3; Th 0.2). Steep retouch is on the right lateral edge on the dorsal side. LZ II-04/N 120; *Pl. 19*: 284.
285. Retouched flake (part of a working edge). LZ II-04/N 120.
286. Circular end scraper on a flake fragment of grey chert (L 0.9; W 0.9; Th 0.4). End scraper is made on all lateral edges on the dorsal side. LZ II-04/N 120; *Pl. 18*: 286.
287. End scraper on a blade fragment of light grey chert (L 1.1; W 1.1; Th 0.5). End scraper is made on the distal part on the dorsal side. LZ II-04/N 120; *Pl. 18*: 287.
288. Fragment of a retouched blade of dark grey to black chert (L 2.3; W 1.2; Th 0.5). Retouch is on the proximal and the middle parts of the right lateral edge on the ventral side. LZ II-04/N 121; *Pl. 19*: 288.
289. Fragment retouched flake (part of a working edge). LZ II-04/N 122.
290. Fragment retouched flake (part of a working edge). LZ II-04/N 122.
291. Retouched flake fragment. LZ II-04/N 122.
292. End scraper on a fragmented flake. LZ II-04/N 122.
293. Fragment of a notched flake of dark brown to dark grey chert (L 4; W 2.7; Th 0.8). A retouched notch is made on the distal part on the dorsal side. LZ II-04/N 128; *Pl. 19*: 293.
294. Fragment of a backed bladelet of grey chert (L 1.6; W 0.7; Th 0.2). Steep retouch is on the right lateral edge on the dorsal side. LZ II-04/N 130; *Pl. 19*: 294.
295. Borer on a flake fragment of grey chert (L 2.2; W 0.7; Th 0.5). Borer is made with a steep retouch on the distal part of the left and the right lateral edges on the dorsal side. LZ II-04/N 130; *Pl. 19*: 295.

- nega roba na ventralni strani se nahajajo retuše. LZ II-04/N 119; *t. 18*: 277.
278. Praskalo na fragmentiranem odbitku iz sivega roženca (D 1,5; S 1,7; B 0,9). Talon je zdrobljen. Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 120; *t. 18*: 278.
279. Strgalo na fragmentu odbitka iz temno rjavega roženca (D 1,4, S 3,1; B 0,9). Na desnem lateralnem robu na dorzalni strani se nahajajo stopnjevite retuše. LZ II-04/N 120; *t. 18*: 279.
280. Retuširano polipolarno jedro iz temno sivega do temno rjavega roženca (D 3,5; S 3,1; B 1,2). Udarne površine so retuširane. Na proksimalnem delu levega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 120; *t. 19*: 280.
281. Klinica z drobtinčasto retušo iz temno sivega do rjavega roženca (D 2,8; S 1,2; B 0,3). Talon je zdrobljen. Na proksimalnem delu desnega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 120; *t. 19*: 281.
282. Fragment odbitka z drobtinčasto retušo (D 3; S 1,5; B 0,3). LZ II-04/N 120.
283. Odbitek z drobtinčasto retušo iz zelenkastega do svetlo rjavega roženca (D 2,2; S 1,8; B 0,4). Talon je pokrit s korteksom. Na desnem lateralnem robu na dorzalni strani se nahajajo drobtinčaste retuše. Na distalnem delu levega lateralnega roba na dorzalni strani se nahajajo drobtinčaste retuše. LZ II-04/N 120; *t. 18*: 283.
284. Fragment klinice s hrbtom iz temno sivega roženca (D 2,2; S 0,3; B 0,2). Na desnem lateralnem robu na dorzalni strani je s strmo retušo izdelan hrbet. LZ II-04/N 120; *t. 19*: 284.
285. Retuširan odbitek (del delovnega roba) (D 0,8; S 0,8; B 0,2). LZ II-04/N 120.
286. Krožno praskalo na fragmentu odbitka iz sivega roženca (D 0,9; S 0,9; B 0,4). Na vseh lateralnih robovih na dorzalni strani je izdelano čelo praskala. LZ II-04/N 120; *t. 18*: 286.
287. Praskalo na fragmentu kline iz svetlo sivega roženca (D 1,1; S 1,1; B 0,5). Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 120; *t. 18*: 287.
288. Fragment retuširane kline iz temno sivega do črnega roženca (D 2,3; S 1,2; B 0,5). Na proksimalnem in srednjem delu desnega lateralnega roba na ventralni strani se nahajajo retuše. LZ II-04/N 121; *t. 19*: 288.
289. Fragment retuširanega odbitka (del delovnega roba) (D 1,2; S 1; B 0,4). LZ II-04/N 122.
290. Fragment retuširanega odbitka (del delovnega roba) (D 2,1; S 0,8; B 0,5). LZ II-04/N 122.
291. Retuširan fragment odbitka (D 2,8; S 0,7; B 0,5). LZ II-04/N 122.
292. Praskalo na fragmentiranem odbitku (D 1,9; S 1,7; B 0,5). LZ II-04/N 122.
293. Fragment odbitka z izjedo iz temno rjavega do temno sivega roženca (D 4; S 2,7; B 0,8). Na distalnem delu na dorzalni strani je izdelana retuširana izjeda. LZ II-04/N 128; *t. 19*: 293.
294. Fragment klinice s hrbtom iz sivega roženca (D 1,6; S 0,7; B 0,2). Na desnem lateralnem robu na dorzalni strani je s strmo retušo izdelan hrbet. LZ II-04/N 130; *t. 19*: 294.
295. Sveder na fragmentu odbitka iz sivega roženca (D 296. Retouched fragmented blade of dark grey chert (L 3.5; W 1.3; Th 0.6). Striking platform is dihedral. Steep retouch is on the right lateral edge on the dorsal side. Retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 130; *Pl. 19*: 296.
297. End scraper on a fragmented blade of dark brown chert (L 2.5; W 1.5; Th 0.6). Striking platform is covered with cortex. End scraper is made on the distal part on the dorsal side. LZ II-04/N 130; *Pl. 19*: 297.
298. Notched flake of grey chert (L 2.5; W 2.3; Th 0.5). Striking platform is dihedral. A retouched notch is made on the distal part of the left lateral edge on the dorsal side. LZ II-04/N 130; *Pl. 19*: 298.
299. Flake with nibbling retouch. LZ II-04/N 130.
300. Retouched flake of dark brown to reddish chert (L 3.4; W 2.7; Th 0.8). Striking platform is smooth. Retouch is on the proximal part of the left lateral edge on the dorsal side. LZ II-04/N 130; *Pl. 19*: 300.
301. Fragmented retouched flake of greenish-grey chert (L 3.2; W 2.8; Th 1). Striking platform is smooth. Retouch is on the left lateral edge on the dorsal side. LZ II-04/N 130; *Pl. 19*: 301.
302. Atypical end scraper on a flake fragment of dark grey-brown chert (L 1.7; W 2.4; Th 0.7). End scraper is made on the right lateral edge on the dorsal side. LZ II-04/N 130; *Pl. 19*: 302.
303. Atypical end scraper on a flake fragment of grey chert (L 2.1; W 1.9; Th 1.2). End scraper is made on the left lateral edge on the dorsal side. LZ II-04/N 130; *Pl. 19*: 303.

- 2,2; S 0,7; B 0,5). Na distalnem delu levega in desnega lateralnega roba na dorzalni strani je s strmo retušo izdelan sveder. LZ II-04/N 130; *t. 19*: 295.
296. Retuširana fragmentirana klina iz temno sivega roženca (D 3,5; S 1,3; B 0,6). Talon je diedričen. Na desnem lateralnem robu na dorzalni strani je s strmo retušo izdelan hrbet. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 130; *t. 19*: 296.
297. Praskalo na fragmentirani klini iz temno rjavega roženca (D 2,5; S 1,5; B 0,6). Talon je pokrit s korteksom. Na distalnem delu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 130; *t. 19*: 297.
298. Odbitek z izjedo iz sivega roženca (D 2,5; S 2,3; B 0,5). Talon je diedričen. Na distalnem delu levega lateralnega roba na dorzalni strani je izdelana retuširana izjeda. LZ II-04/N 130; *t. 19*: 298.
299. Odbitek z drobtinčasto retušo (D 2,3; S 1,3; B 0,3). LZ II-04/N 130.
300. Retuširan odbitek iz temno rjavega do rdečkastega roženca (D 3,4; S 2,7; B 0,8). Talon je gladek. Na proksimalnem delu levega lateralnega roba na dorzalni strani se nahajajo retuše. LZ II-04/N 130; *t. 19*: 300.
301. Fragmentiran retuširan odbitek iz zelenkasto sivega roženca (D 3,2; S 2,8; B 1). Talon je gladek. Na levem lateralnem robu na dorzalni strani se nahajajo retuše. LZ II-04/N 130; *t. 19*: 301.
302. Atipično praskalo na fragmentu odbitka iz temno sivo rjavega roženca (D 1,7; S 2,4; B 0,7). Na desnem lateralnem robu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 130; *t. 19*: 302.
303. Atipično praskalo na fragmentu odbitka iz sivega roženca (D 2,1; S 1,9; B 1,2). Na levem lateralnem robu na dorzalni strani je izdelano čelo praskala. LZ II-04/N 130; *t. 19*: 303.

6.2 Jedra

304. Polipolarno diskasto jedro na odbitku iz temno rjavega do sivega roženca (D 4,7; S 4,3; B 1,8). Udarne površine so retuširane. Jedro je močno preperelo. LZ II-04/N 005; *t. 20*: 304.
305. Unipolarno jedro iz temno rjavega do sivega roženca (D 3,2; S 2,2; B 3,2). LZ II-04/N 007.
306. Polipolarno diskasto jedro iz sivega do temno sivega roženca (D 2,4; S 2,1; B 1,2). Udarne površine so pokrite s korteksom. Jedro je močno preperelo. LZ II-04/N 007; *t. 20*: 306.
307. Bipolarno jedro iz sivega do rjavega roženca (D 2,7; S 1,7; B 1,5). LZ II-04/N 007.
308. Bipolarno jedro iz sivega roženca (D 1,8; S 2,2; B 1,8). LZ II-04/N 009.
309. Bipolarno jedro iz temno sivega roženca (D 2,6; S 3,5; B 2,2). LZ II-04/N 011.
310. Polipolarno jedro iz sivega roženca (D 2,5; S 2,3; B 1,7) LZ II-04/N 011.
311. Bipolarno jedro iz sivega roženca (D 3,6; S 2,3; B 1,8). Udarne površine so retuširane. LZ II-04/N 011; *t. 20*: 311.
312. Polipolarno jedro iz rjavega roženca (D 2,5; S 2,1; B 1,5). LZ II-04/N 014.
313. Bipolarno jedro iz rdečkastega do črnega roženca (D 1,8; S 1,5; B 0,7). LZ II-04/N 018.

6.2 Cores

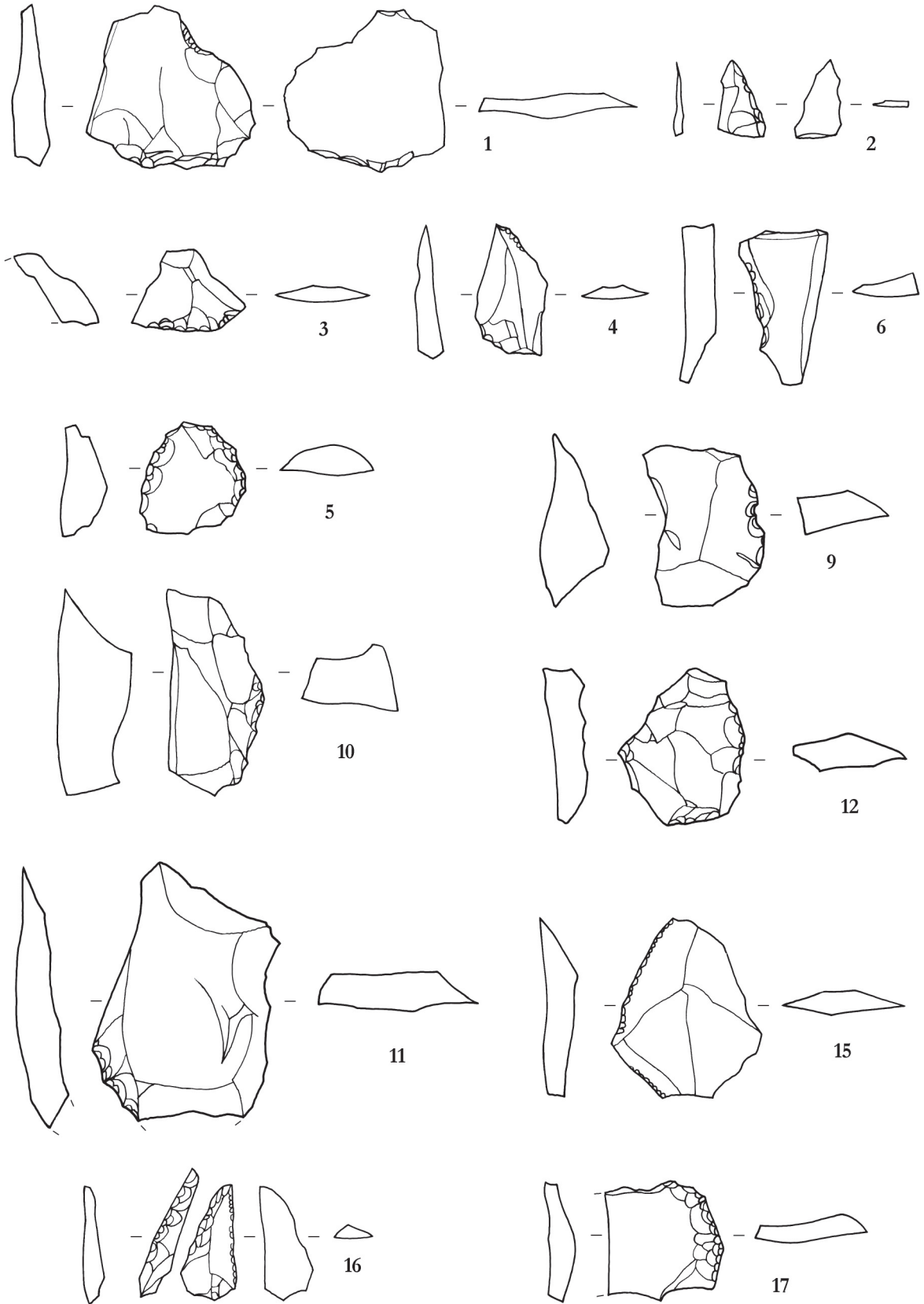
304. Polypolar discoid core on a flake of dark brown to grey chert (L 4.7; W 4.3; Th 1.8). Striking platforms are retouched. Core is heavily weathered. LZ II-04/N 005; *Pl. 20*: 304.
305. Unipolar core of dark brown to grey chert (L 3.2; W 2.2; Th 3.2). Striking platform is retouched. LZ II-04/N 007.
306. Polypolar discoid core of grey to dark grey chert (L 2.4; W 2.1; Th 1.2). Striking platforms are covered with cortex. Core is heavily weathered. LZ II-04/N 007; *Pl. 20*: 306.
307. Bipolar core of grey to brown chert (L 2.7; W 1.7; Th 1.5). LZ II-04/N 007.
308. Bipolar core of grey chert with a purple coating (L 1.8; W 2.2; Th 1.8). LZ II-04/N 009.
309. Bipolar core of dark grey chert (L 2.6; W 3.5; Th 2.2). LZ II-04/N 011.
310. Polypolar core of grey chert (L 2.5; W 2.3; Th 1.7). LZ II-04/N 011.
311. Bipolar core of grey chert (L 3.6; W 2.3; Th 1.8). Striking platforms are retouched. LZ II-04/N 011; *Pl. 21*: 311.
312. Polypolar core of brown chert (L 2.5; W 2.1; Th 1.5). LZ II-04/N 014.
313. Bipolar core of reddish to black chert (L 1.8; W 1.5; Th 0.7). LZ II-04/N 018.

314. Bipolarno jedro iz temno rjavega roženca (D 2,7; S 3,2; B 1,3). LZ II-04/N 020.
315. Unipolarno jedro iz svetlo rjavega do sivega roženca (D 2,5; S 1,8; B 1,2). LZ II-04/N 020.
316. Unipolarno jedro iz sivo rjavega roženca (D 3,3; S 2,4; B 2,7). LZ II-04/N 021.
317. Unipolarno jedro iz sivega roženca (D 2,8; S 2,3; B 1). LZ II-04/N 023.
318. Unipolarno jedro iz temno sivo rjavega roženca (D 1,9; S 1,9; B 1,1). LZ II-04/N 024.
319. Bipolarno jedro iz sivega roženca (D 2,2; S 1,9; B 1,3). LZ II-04/N 024.
320. Polipolarno jedro iz zelenkastega roženca (D 2,2; S 1,8; B 1,4). LZ II-04/N 026.
321. Polipolarno diskasto jedro iz temno rjavega roženca (D 3,2; S 2,9; B 1,3). LZ II-04/N 028.
322. Unipolarno jedro iz svetlo rjavega do sivega roženca (D 1,9; S 1,3; B 1,4). LZ II-04/N 028.
323. Bipolarno jedro iz temno sivo rjavega roženca (D 2,8; S 2,6; B 1,2). LZ II-04/N 028.
324. Polipolarno diskasto jedro iz sivega roženca (D 3,4; S 2,6; B 1,4). LZ II-04/N 028.
325. Bipolarno jedro iz sivega roženca (D 2; S 3,2; B 2,1). LZ II-04/N 028.
326. Bipolarno jedro iz zelenkasto sivega roženca (D 3,2; S 2,2; B 1,3). LZ II-04/N 030.
327. Polipolarno jedro iz temno rjavega do sivega roženca (D 3,8; S 1,7; B 1,8). LZ II-04/N 031.
328. Unipolarno jedro iz črnega roženca (D 2,7; S 1,8; B 1). LZ II-04/N 031.
329. Bipolarno jedro iz temno sivega roženca (D 2,8; S 1,1; B 1,6). LZ II-04/N 041.
330. Bipolarno jedro iz sivega pasovitega roženca (D 2,8; S 2,5; B 1,1). Udarne površine so retuširane. LZ II-04/N 042; *t. 20*: 330.
331. Polipolarno jedro iz temno sivega roženca (D 2,2; S 1,8; B 1). LZ II-04/N 044.
332. Bipolarno jedro iz temno sivega roženca (D 2,8; S 2,6; B 1,5). LZ II-04/N 046.
333. Unipolarno jedro iz temno sivega roženca (D 2,4; S 1; B 1,4). Udarne površine je retuširana. LZ II-04/N 047; *t. 20*: 333.
334. Bipolarno jedro iz zelenkastega roženca (D 3; S 2,6; B 1,3). Udarne površine so retuširane. LZ II-04/N 047; *t. 20*: 334.
335. Bipolarno diskasto jedro iz temno rjavega do temno sivega roženca (D 3,5; S 3,7; B 1,2). LZ II-04/N 054.
336. Bipolarno jedro iz zelenkasto sivega do rjavega roženca (D 2; S 1,2; B 2,6). LZ II-04/N 055.
337. Polipolarno diskasto jedro iz temno sivega roženca (D 4,3; S 3,8; B 1,8). Udarne površine so retuširane. LZ II-04/N 056; *t. 21*: 304.
338. Polipolarno jedro iz sivega do rjavega roženca (D 4; S 2,8; B 1,8). LZ II-04/N 058.
339. Polipolarno diskasto jedro iz sivega roženca (D 3,4; S 3,2; B 1,2). Udarne površine so retuširane. LZ II-04/N 059; *t. 21*: 339.
340. Bipolarno jedro iz sivega roženca (D 3,7; S 1,8; B 2,3). Udarne površine sta retuširani. LZ II-04/N 060; *t. 21*: 340.
341. Bipolarno jedro iz temno sivega do temno rjavega roženca (D 3,1; S 2,4; B 2). LZ II-04/N 060.
314. Bipolar core of dark brown chert (L 2.7; W 3.2; Th 1.3). LZ II-04/N 020.
315. Unipolar core of light brown to grey chert (L 2.5; W 1.8; Th 1.2). LZ II-04/N 020.
316. Unipolar core of greyish brown chert (L 3.3; W 2.4; Th 2.7). LZ II-04/N 021.
317. Unipolar core of grey chert (L 2.8; W 2.3; Th 1). LZ II-04/N 023.
318. Unipolar core of dark greyish brown chert (L 1.9; W 1.9; Th 1.1). LZ II-04/N 024.
319. Bipolar core of grey chert (L 2.2; W 1.9; Th 1.3). LZ II-04/N 024.
320. Polypolar core of greenish chert (L 2.2; W 1.8; Th 1.4). LZ II-04/N 026.
321. Polypolar discoid core of dark brown chert (L 3.2; W 2.9; Th 1.3). LZ II-04/N 028.
322. Unipolar core of light brown to grey chert (L 1.9; W 1.3; Th 1.4). LZ II-04/N 028.
323. Bipolar core of dark greyish brown chert (L 2.8; W 2.6; Th 1.2). LZ II-04/N 028.
324. Polypolar discoid core of grey chert (L 3.4; W 2.6; Th 1.4). LZ II-04/N 028.
325. Bipolar core of grey chert (L 2; W 3.2; Th 2.1). LZ II-04/N 028.
326. Bipolar core of greenish grey chert (L 3.2; W 2.2; Th 1.3). LZ II-04/N 030.
327. Polypolar core of dark brown to grey chert (L 3.8; W 1.7; Th 1.8). LZ II-04/N 031.
328. Unipolar core of black chert (L 2.7; W 1.8; Th 1). LZ II-04/N 031.
329. Bipolar core of dark grey chert (L 2.8; W 1.1; Th 1.6). LZ II-04/N 041.
330. Bipolar core of grey chert (L 2.8; W 2.5; Th 1.1). Striking platforms are retouched. LZ II-04/N 042; *Pl. 20*: 330.
331. Polypolar core of dark grey chert (L 2.2; W 1.8; Th 1). LZ II-04/N 044.
332. Bipolar core of dark grey chert (L 2.8; W 2.6; Th 1.5). LZ II-04/N 046.
333. Unipolar core of dark grey chert (L 2.4; W 1; Th 1.4). Striking platform is retouched. LZ II-04/N 047; *Pl. 20*: 333.
334. Bipolar core of greenish chert (L 3; W 2.6; Th 1.3). Striking platforms are retouched. LZ II-04/N 047; LZ II-04/N 054.
335. Bipolar discoid core of dark brown to dark grey chert (L 3.5; W 3.7; Th 1.2). LZ II-04/N 054.
336. Bipolar core of greenish-grey to brown chert (L 2; W 1.2; Th 2.6). LZ II-04/N 055.
337. Polypolar discoid core of dark grey chert (L 4.3; W 3.8; Th 1.8). Striking platforms are retouched. LZ II-04/N 056; *Pl. 21*: 304.
338. Polypolar core of grey to brown chert (L 4; W 2.8; Th 1.8). LZ II-04/N 058.
339. Polypolar discoid core of grey chert. (L 3.4; W 3.2; Th 1.2). Striking platforms are retouched. LZ II-04/N 059; *Pl. 21*: 339.
340. Bipolar core of grey chert. (L 3.7; W 1.8; Th 2.3). Striking platforms are retouched. LZ II-04/N 060; *Pl. 21*: 340.
341. Bipolar core of dark grey to dark brown chert (L 3.1; W 2.4; Th 2). LZ II-04/N 060.

342. Polipolarno jedro iz sivega roženca (D 4,1; S 1,5; B 2,1). LZ II-04/N 060.
343. Bipolarno jedro iz rdečkastega roženca (D 1,7; S 1,6; B 1,2). LZ II-04/N 062.
344. Bipolarno jedro iz temno sivega roženca (D 1,7; S 2,7; B 1,9). LZ II-04/N 062.
345. Polipolarno jedro iz zelenkasto sivega roženca (D 3; S 2,5; B 1,8). LZ II-04/N 062.
346. Bipolarno jedro iz sivega roženca (D 3,9; S 4,5; B 2,1). LZ II-04/N 062.
347. Polipolarno jedro iz temno rjavega roženca (D 2,8; S 3,2; B 1,8). LZ II-04/N 070.
348. Bipolarno jedro iz zelenkastega roženca (D 2,4; S 1; B 1,1). LZ II-04/N 072.
349. Unipolarno jedro iz rdečkasto rjavega roženca (D 1,2; S 2; B 1,6). LZ II-04/N 072.
350. Polipolarno jedro iz sivega do rjavega roženca (D 1,4; S 1,9; B 1). LZ II-04/N 072.
351. Bipolarno jedro iz temno sivo rjavega roženca (D 3,7; S 3,5; B 2,1). Udarni površini sta retuširani. LZ II-04/N 073; *t. 21*: 351.
352. Polipolarno jedro iz zelenkastega roženca (D 2,2; S 2; B 1,3). LZ II-04/N 073.
353. Polipolarno jedro iz sivega roženca (D 2,7; S 2,2; B 1,4). LZ II-04/N 073.
354. Polipolarno jedro iz sivega do rjavega roženca (D 1,8; S 2,3; B 2). LZ II-04/N 075.
355. Bipolarno jedro iz črnega roženca (D 1,8; S 1,3; B 1,1). LZ II-04/N 075.
356. Bipolarno jedro iz temno sivega roženca (D 3,2; S 3; B 1,8). Udarni površini sta retuširani. LZ II-04/N 083; *t. 22*: 356.
357. Polipolarno diskasto jedro iz sivega do temno rjavega roženca (D 3,4; S 2,8; B 1,7). LZ II-04/N 083.
358. Bipolarno jedro iz sivega roženca (D 2; S 2,8; B 1,8). LZ II-04/N 084.
359. Polipolarno jedro iz zelenkastega kremena (D 2,3; S 1,7; B 1,3). LZ II-04/N 084.
360. Unipolarno jedro iz sivega roženca (D 2,8; S 2,5; B 1). Udarna površina je retuširana. LZ II-04/N 084; *t. 22*: 360.
361. Bipolarno jedro iz svetlo rjavega do temno rjavega roženca (D 2,5; S 4,6; B 1,9). LZ II-04/N 085.
362. Polipolarno diskasto jedro iz sivega roženca (D 2,4; S 3; B 1,2). LZ II-04/N 085.
363. Polipolarno jedro iz temno sivega roženca (D 1,9; S 2,1; B 1,9). LZ II-04/N 085.
364. Unipolarno jedro iz temno rjavega roženca (D 2,8; S 2,5; B 2,2). LZ II-04/N 086.
365. Unipolarno jedro iz svetlo sivega roženca (D 2,5; S 2; B 1). Udarna površina je retuširana. LZ II-04/N 087; *t. 22*: 365.
366. Polipolarno jedro iz sivega roženca (D 2,5; S 1,8; B 1,3). LZ II-04/N 087.
367. Bipolarno jedro iz sivega do rjavega roženca (D 2,4; S 1,9; B 1,2). LZ II-04/N 088.
368. Unipolarno jedro iz črnega roženca (D 1,4; S 3,1; B 1,8). LZ II-04/N 089.
369. Polipolarno jedro iz sivega roženca (D 2; S 2; B 1). LZ II-04/N 090.
370. Bipolarno jedro iz temno sivega roženca (D 2,6; S 1,1;
342. Polypolar core of grey chert (L 4.1; W 1.5; Th 2.1). LZ II-04/N 060.
343. Bipolar core of reddish chert (L 1.7; W 1.6; Th 1.2). LZ II-04/N 062.
344. Bipolar core of dark grey chert (L 1.7; W 2.7; Th 1.9). LZ II-04/N 062.
345. Polypolar core of greenish-grey chert (L 3; W 2.5; Th 1.8). LZ II-04/N 062.
346. Bipolar core of grey chert (L 3.9; W 4.5; Th 2.1). LZ II-04/N 062.
347. Polypolar core of dark brown chert (L 2.8; W 3.2; Th 1.8). LZ II-04/N 070.
348. Bipolar core of greenish chert (L 2.4; W 1; Th 1.1). LZ II-04/N 072.
349. Unipolar core of reddish brown chert (L 1.2; W 2; Th 1.6). LZ II-04/N 072.
350. Polypolar core of grey to brown chert (L 1.4; W 1.9; Th 1). LZ II-04/N 072.
351. Bipolar core of dark greyish-brown chert. (L 3.7; W 3.5; Th 2.1). Striking platforms are retouched. LZ II-04/N 073; *Pl. 21*: 351.
352. Polypolar core of greenish chert (L 2.2; W 2; Th 1.3). LZ II-04/N 073.
353. Polypolar core of grey chert (L 2.7; W 2.2; Th 1.4). LZ II-04/N 073.
354. Polypolar core of grey to brown chert (L 1.8; W 2.3; Th 2). LZ II-04/N 075.
355. Bipolar core of black chert (L 1.8; W 1.3; Th 1.1). LZ II-04/N 075.
356. Bipolar core of dark grey chert (L 3.2; W 3; Th 1.8). Striking platforms are retouched. LZ II-04/N 083; *Pl. 22*: 356.
357. Polypolar discoid core of grey to dark brown chert. (L 3.4; W 2.8; Th 1.7). LZ II-04/N 083.
358. Bipolar core of grey chert (L 2; W 2.8; Th 1.8). LZ II-04/N 084.
359. Polypolar core of greenish chert (L 2.3; W 1.7; Th 1.3). LZ II-04/N 084.
360. Unipolar core of grey chert (L 2.8; W 2.5; Th 1). Striking platform is retouched. LZ II-04/N 084; *Pl. 22*: 360.
361. Bipolar core of light brown to dark brown chert (L 2.5; W 4.6; Th 1.9). LZ II-04/N 085.
362. Polypolar discoid core of grey chert (L 2.4; W 3; Th 1.2). LZ II-04/N 085.
363. Polypolar core of dark grey chert (L 1.9; W 2.1; Th 1.9). LZ II-04/N 085.
364. Unipolar core of dark brown chert (L 2.8; W 2.5; Th 2.2). LZ II-04/N 087.
365. Unipolar core of light grey chert (L 2.5; W 2; Th 1). Striking platform is retouched. LZ II-04/N 087; *Pl. 22*: 365.
366. Polypolar core of grey chert (L 2.5; W 1.8; Th 1.3). LZ II-04/N 087.
367. Bipolar core of grey to brown chert (L 2.4; W 1.9; Th 1.2). LZ II-04/N 088.
368. Unipolar core of black chert (L 1.4; W 3.1; Th 1.8). LZ II-04/N 089.
369. Polypolar core of grey chert (L 2; W 2; Th 1). LZ II-04/N 090.
370. Bipolar core of dark grey chert. (L 2.6; W 1.1; Th 1.3).

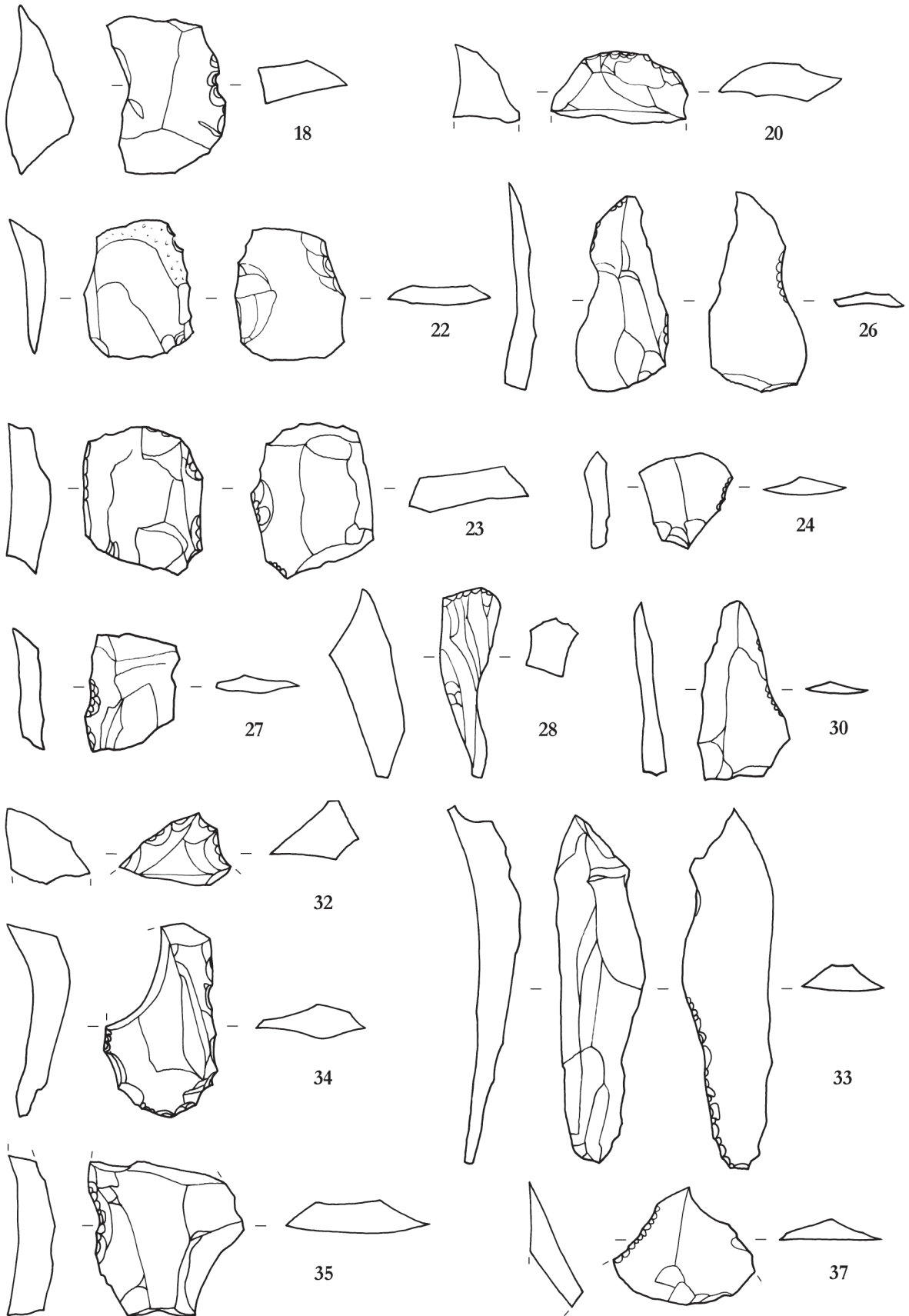
- B 1,3). Udarni površini sta retuširani. LZ II-04/N 090; *t.* 22: 370.
371. Bipolarno jedro iz svetlo rjavega roženca (D 1,7; S 1,9; B 1,2). Udarni površini sta retuširani. LZ II-04/N 093; *t.* 22: 371.
372. Unipolarno jedro iz temno rjavega roženca (D 2,7; S 3,5; B 2,4). LZ II-04/N 094.
373. Bipolarno jedro iz zelenkastega roženca (D 1,8; S 1,7; B 1,6). Udarni površini sta retuširani. Udarna površina je retuširana. LZ II-04/N 094; *t.* 22: 373.
374. Unipolarno jedro iz temno rjavega roženca (D 2,3; S 3,5; B 2,7). LZ II-04/N 095.
375. Bipolarno jedro iz temno sivega roženca (D 2,7; S 1,5; B 1,8). LZ II-04/N 095.
376. Bipolarno jedro iz temno sivega roženca (D 2,4; S 2,5; B 1,5). Udarni površini sta retuširani. LZ II-04/N 095; *t.* 22: 376.
377. Polipolarno jedro iz zelenkasto sivega roženca (D 2,4; S 1,8; B 1,3). Udarne površine so retuširane. LZ II-04/N 095.
378. Bipolarno jedro iz temno sivega roženca (D 2,8; S 1,7; B 1,2). Udarni površini sta retuširani. LZ II-04/N 095; *t.* 22: 378.
379. Bipolarno jedro iz sivega roženca (D 2; S 1,5; B 1,6). LZ II-04/N 095.
380. Polipolarno jedro iz temno sivo rjavega roženca (D 2,7; S 3,3; B 1,6). Udarne površine so retuširane. LZ II-04/N 095; *t.* 22: 380.
381. Polipolarno jedro iz temno rjavega roženca (D 3,8; S 2,7; B 1,8). LZ II-04/N 095.
382. Polipolarno jedro iz svetlo sivega roženca (D 1,8; S 2,1; B 1,9). LZ II-04/N 096.
383. Bipolarno jedro iz temno sivega roženca (D 2,4; S 3,7; B 1,4). LZ II-04/N 096.
384. Polipolarno jedro iz sivega roženca (D 2,9; S 2,1; B 1,4). LZ II-04/N 096.
385. Bipolarno jedro iz zelenkasto sivega roženca (D 2,7; S 2,2; B 1,9). Nekaterne udarne površine so pokrite s korteksom. LZ II-04/N 097; *t.* 22: 385.
386. Bipolarno jedro iz temno sivega do rjavega roženca (D 2,5; S 2,2; B 1,3). Ena udarna površina je pokrita s korteksom. Udarna površina je retuširana. LZ II-04/N 097; *t.* 23: 386.
387. Bipolarno jedro iz zelenkastega roženca (D 3; S 1,9; B 1). LZ II-04/N 098.
388. Bipolarno jedro iz sivega roženca (D 2; S 1,3; B 1,3). Ena udarna površina je pokrita s korteksom. Ena udarna površina je retuširana. LZ II-04/N 098; *t.* 23: 388.
389. Bipolarno jedro iz sivega roženca (D 1,6; S 2,2; B 1,6). LZ II-04/N 098.
390. Bipolarno jedro iz temno sivo rjavega roženca (D 5,7; S 10,3; B 8,3). LZ II-04/N 100.
391. Bipolarno jedro iz svetlo sivega do zelenkastega roženca (D 1,7; S 2; B 1). Udarni površini sta retuširani. LZ II-04/N 103; *t.* 23: 391.
392. Polipolarno jedro iz črnega roženca (D 2,2; S 1,9; B 1,7). Udarne površine so retuširane. LZ II-04/N 106; *t.* 23: 392.
393. Unipolarno jedro iz svetli sivega prosojnega roženca (D 1,5; S 1,3; B 1). LZ II-04/N 106.
394. Unipolarno jedro iz sivega do rjavega roženca (D 2,4; Striking platforms are retouched. LZ II-04/N 090; *Pl.* 22: 370.
371. Bipolar core of grey to light brown chert. (L 1.7; W 1.9; Th 1.2). Striking platforms are retouched. LZ II-04/N 093; *Pl.* 22: 371.
372. Unipolar core of dark brown chert (L 2.7; W 3.5; Th 2.4). LZ II-04/N 094.
373. Bipolar core of greenish chert (L 1.8; W 1.7; Th 1.6). Striking platforms are retouched. LZ II-04/N 094; *Pl.* 22: 373.
374. Unipolar core of dark brown chert (L 2.3; W 3.5; Th 2.7). LZ II-04/N 095.
375. Bipolar core of dark grey chert (L 2.7; W 1.5; Th 1.8). LZ II-04/N 095.
376. Bipolar core of dark grey chert. (L 2.4; W 2.5; Th 1.5). Striking platforms are retouched. LZ II-04/N 095; *Pl.* 22: 376.
377. Polypolar core of greenish grey chert. (L 2.4; W 1.8; Th 1.3). Striking platforms are retouched. LZ II-04/N 095.
378. Bipolar core of dark grey chert (L 2.8; W 1.7; Th 1.2). Striking platforms are retouched. LZ II-04/N 095; *Pl.* 22: 378.
379. Bipolar core of grey chert (L 2; W 1.5; Th 1.6). LZ II-04/N 095.
380. Polypolar core of dark greyish-brown chert. (L 2.7; W 3.3; Th 1.6). Striking platforms are retouched. LZ II-04/N 095; *Pl.* 22: 380.
381. Polypolar core of dark brown chert (L 3.8; W 2.7; Th 1.8). LZ II-04/N 095.
382. Polypolar core of light grey chert (L 1.8; W 2.1; Th 1.9). LZ II-04/N 096.
383. Bipolar core of dark grey chert (L 2.4; W 3.7; Th 1.4). LZ II-04/N 096.
384. Polypolar core of grey chert (L 2.9; W 2.1; Th 1.4). LZ II-04/N 096.
385. Bipolar core of greenish-grey chert (L 2.7; W 2.2; Th 1.9). Striking platforms are retouched, some are covered with cortex. LZ II-04/N 097; *Pl.* 22: 385.
386. Bipolar core of dark grey to brown chert (L 2.5; W 2.2; Th 1.3). One striking platform is covered with cortex. One striking platform is retouched. LZ II-04/N 097; *Pl.* 23: 386.
387. Bipolar core of greenish chert (L 3; W 1.9; Th 1). LZ II-04/N 098.
388. Bipolar core of grey chert (L 2; W 1.3; Th 1.3). One striking platform is covered with cortex. One striking platform is retouched. LZ II-04/N 098; *Pl.* 23: 388.
389. Bipolar core of grey chert (L 1.6; W 2.2; Th 1.6). LZ II-04/N 098.
390. Bipolar core of dark greyish-brown chert (L 5.7; W 10.3; Th 8.3). LZ II-04/N 100.
391. Bipolar core of light grey to greenish chert. (L 1.7; W 2; Th 1). Striking platforms are retouched. LZ II-04/N 103; *Pl.* 23: 391.
392. Polypolar core of black chert (L 2.2; W 1.9; Th 1.7). Striking platforms are retouched. LZ II-04/N 106; *Pl.* 23: 392.
393. Unipolar core of light translucent grey chert (L 1.5; W 1.3; Th 1). LZ II-04/N 106.
394. Unipolar core of grey to brown chert. (L 2.4; W 2.2; Th 1.3). Striking platform is retouched. LZ II-04/N 110; *Pl.* 23: 394.

- S 2,2; B 1,3). Udarne površine so retuširane. LZ II-04/N 110; *t.* 23: 394.
395. Polipolarno diskasto jedro iz sive do rjave kamnine (D 5,6; S 5,8; B 1,3). Udarne površine so pokrite s korteksom. Jedro je močno preperelo. LZ II-04/N 111; *t.* 23: 395.
396. Del unipolarnega jedra iz zelenkastega roženca (D 0,9; S 3,4; B 2,7). LZ II-04/N 113.
397. Polipolarno diskasto jedro iz temno rjavega roženca (D 5,2; S 5,1; B 1,5). Nekatere udarne površine so pokrite s korteksom. Udarne površine so retuširane. LZ II-04/N 113; *t.* 24: 397.
398. Unipolarno jedro iz sivo rjavega roženca (D 2,5; S 2,7; B 1,7). LZ II-04/N 119.
399. Polipolarno jedro iz sivega roženca (D 2; S 1,8; B 1,2). LZ II-04/N 119.
400. Unipolarno jedro iz zelenkastega roženca (D 1,5; S 1,6; B 1,5). LZ II-04/N 119.
401. Bipolarno jedro iz črnega roženca (D 2,5; S 2,7; B 1,7). LZ II-04/N 119.
402. Bipolarno jedro iz sivega roženca (D 2,7; S 2,3; B 1,1). Udarne površine sta retuširani. LZ II-04/N 119; *t.* 24: 402.
403. Polipolarno diskasto jedro iz temno rjavega roženca (D 2,6; S 2,2; B 1,5). Udarne površine so retuširane. LZ II-04/N 122; *t.* 24: 403.
404. Bipolarno jedro iz temno sivega roženca (D 2,7; S 1,7; B 2,2). LZ II-04/N 122.
405. Polipolarno jedro iz sivega roženca (D 2,8; S 2,4; B 1,7). LZ II-04/N 130.
395. Polypolar discoid core of grey to brown rock (L 5.6; W 5.8; Th 1.3). Striking platforms are covered with cortex. The core is heavily weathered. LZ II-04/N 111; *Pl.* 23: 395.
396. Fragment of a unipolar core of greenish chert (L 0.9; W 3.4; Th 2.7). LZ II-04/N 113.
397. Polypolar discoid core of dark brown chert (L 5.2; W 5.1; Th 1.5). Striking platforms are retouched, some are covered with cortex. LZ II-04/N 113; *Pl.* 24: 397.
398. Unipolar core of greyish brown chert (L 2.5; W 2.7; Th 1.7). LZ II-04/N 119.
399. Polypolar core of grey (L 2; W 1.8; Th 1.2). LZ II-04/N 119.
400. Unipolar core of greenish chert (L 1.5; W 1.6; Th 1.5). LZ II-04/N 119.
401. Bipolar core of black chert (L 2.5; W 2.7; Th 1.7). LZ II-04/N 119.
402. Bipolar core of grey chert (L 2.7; W 2.3; Th 1.1). Striking platforms are retouched. LZ II-04/N 119; *Pl.* 24: 402.
403. Polypolar discoid core of dark brown chert (L 2.6; W 2.2; Th 1.5). Striking platforms are retouched. LZ II-04/N 122; *Pl.* 24: 403.
404. Bipolar core of dark grey chert (L 2.7; W 1.7; Th 2.2). LZ II-04/N 122.
405. Polypolar core of grey chert (L 2.8; W 2.4; Th 1.7). LZ II-04/N 130.



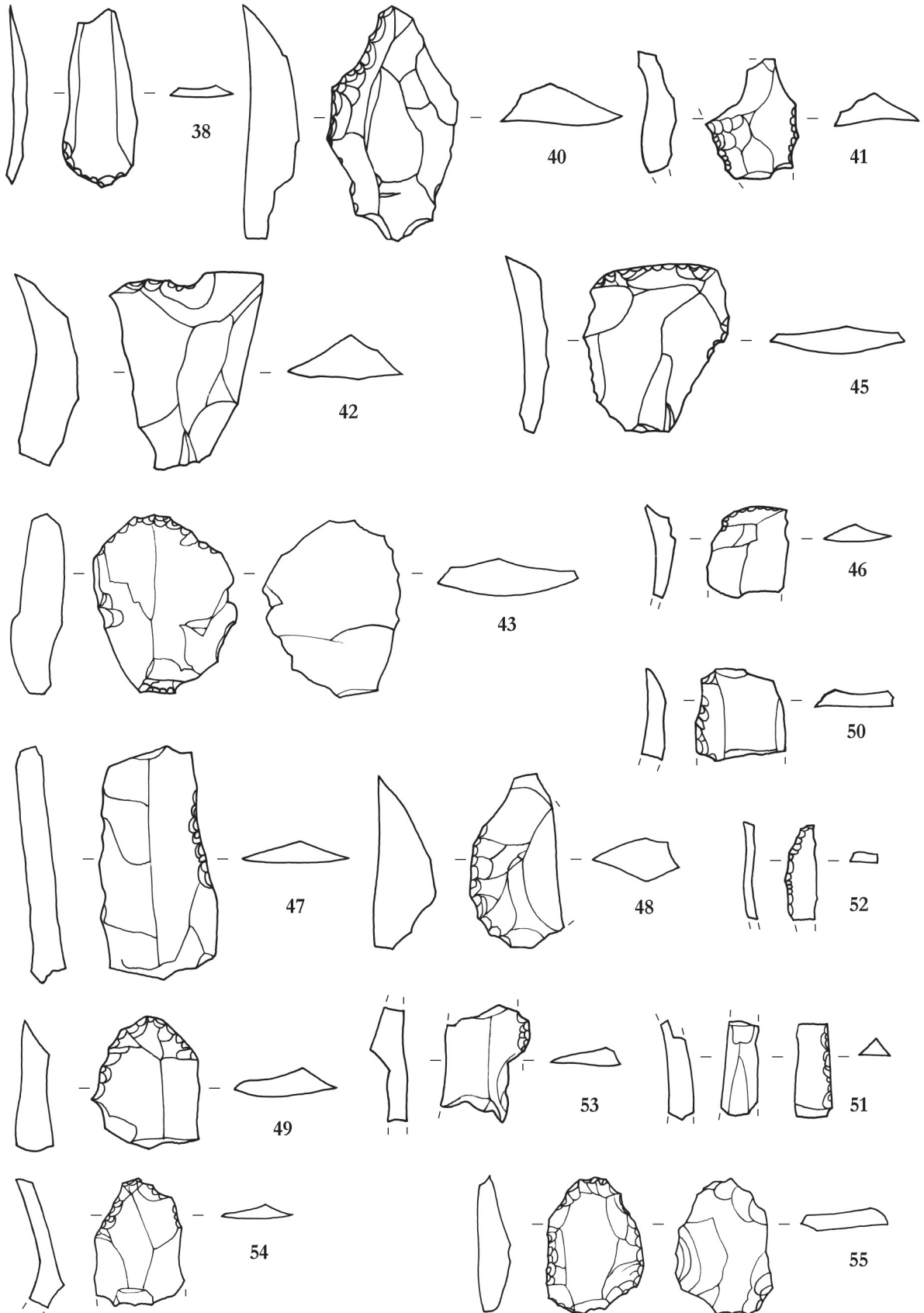
T. 1: Zalog pri Verdu. Kamen. M. = 1 : 1 (risba: Boris Kavur, Ida Murgelj).

Pl. 1: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



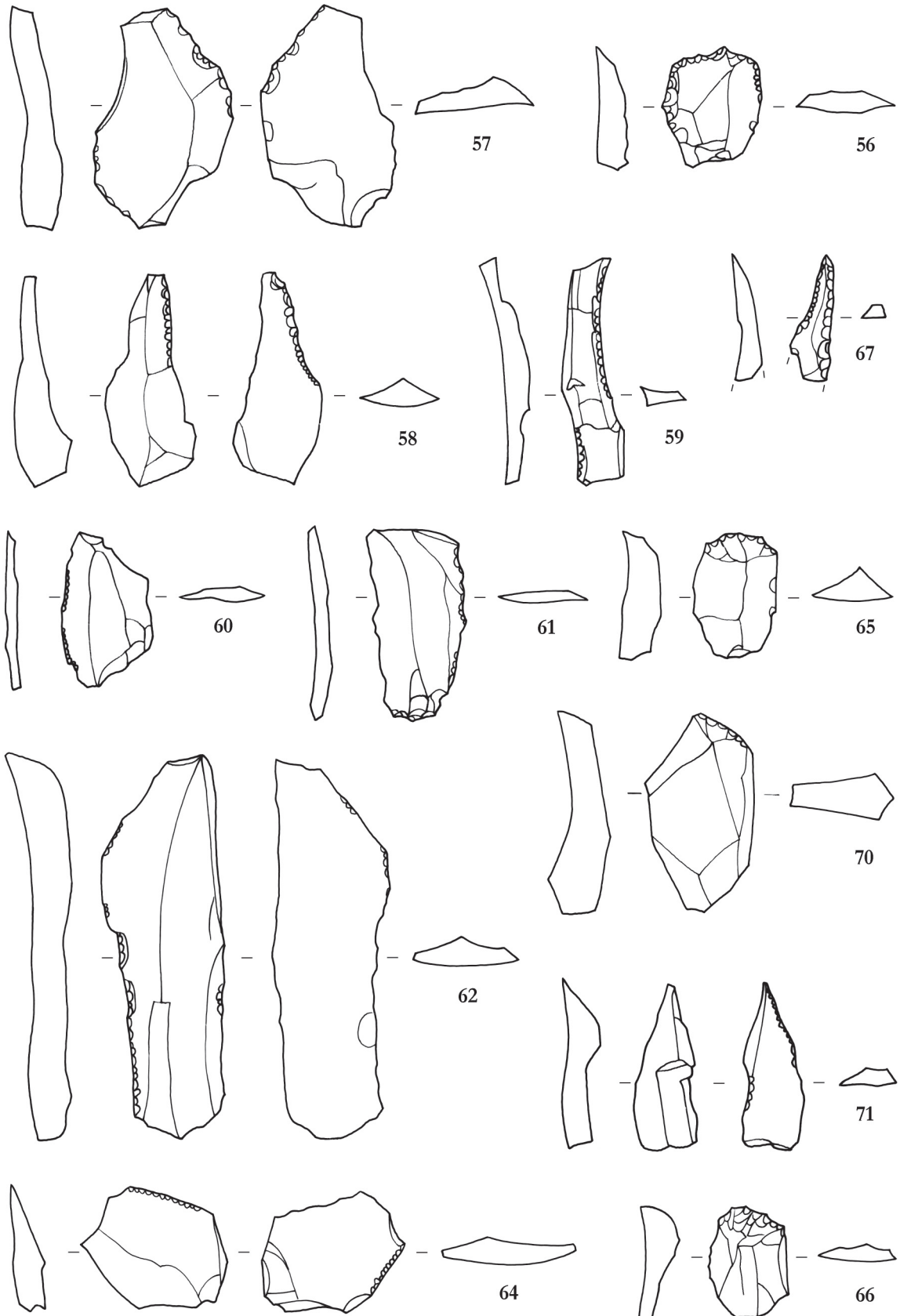
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Pl. 2: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



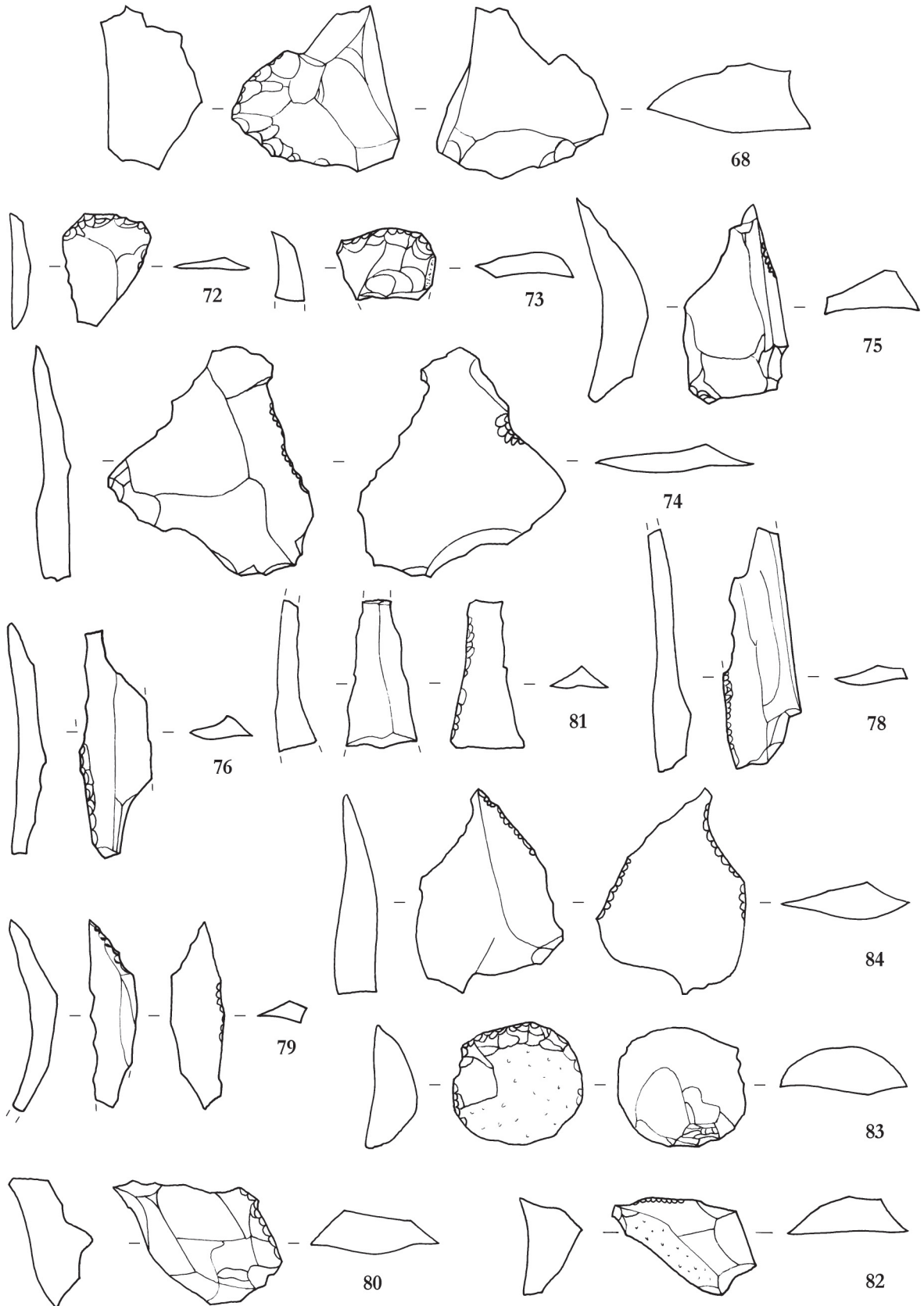
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Pl. 3: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



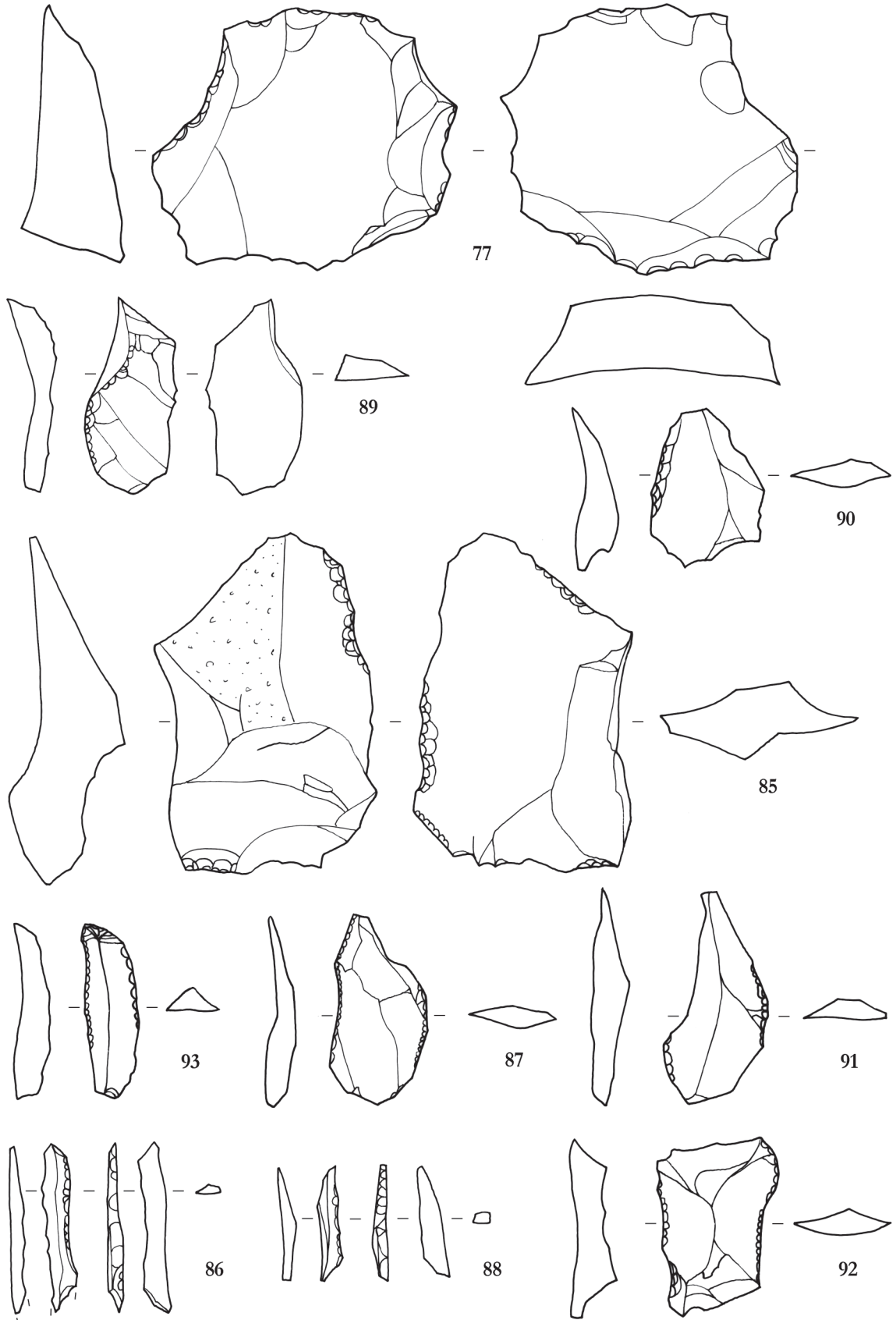
T. 4: Zalog pri Verdu. Kamen. M. = 1 : 1 (risba: Boris Kavur, Ida Murgelj).

Pl. 4: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



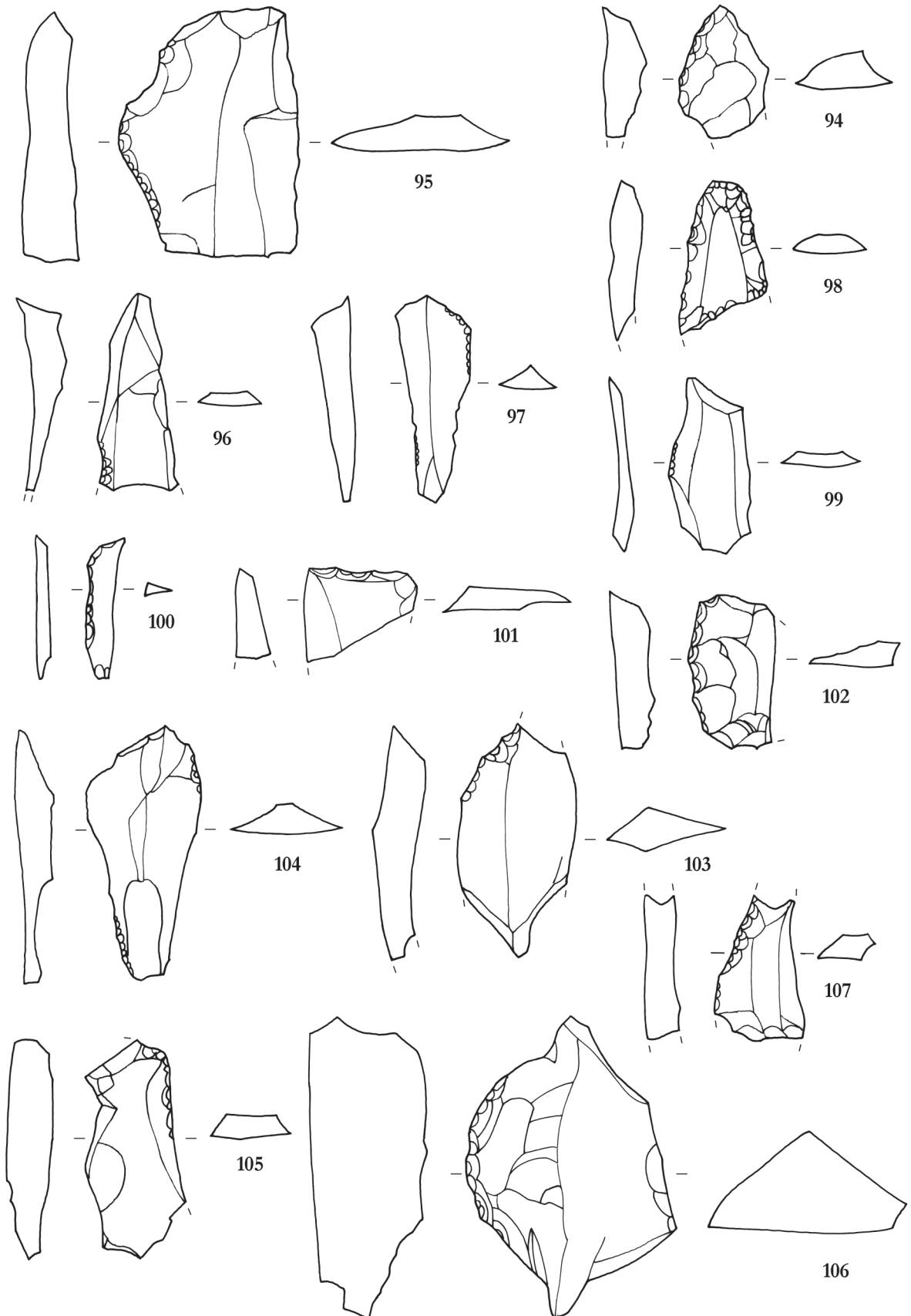
T. 5: Zalog pri Verdu. Kamen. M. = 1 : 1 (risba: Boris Kavur, Ida Murgelj).

Pl. 5: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



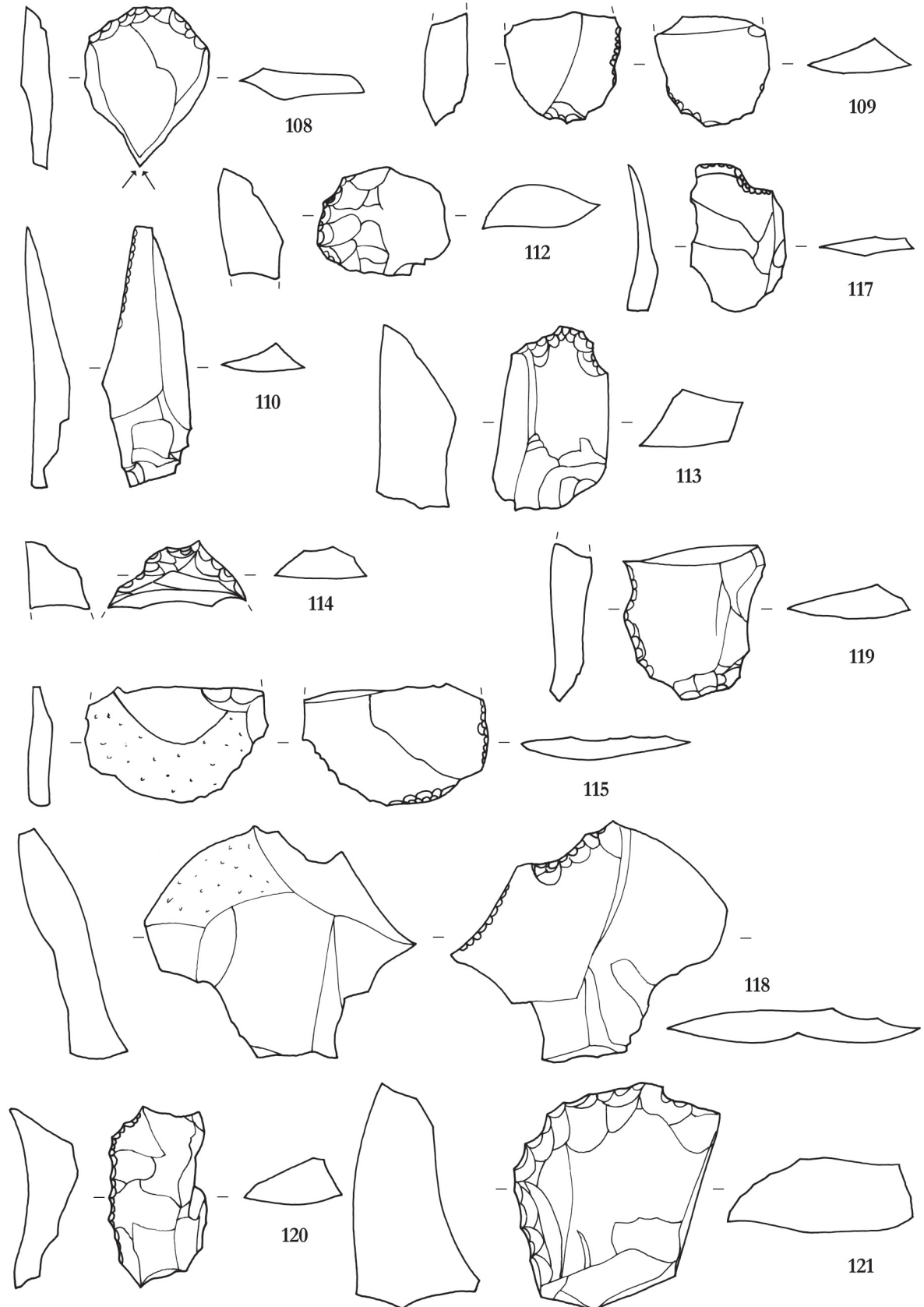
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Pl. 6: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



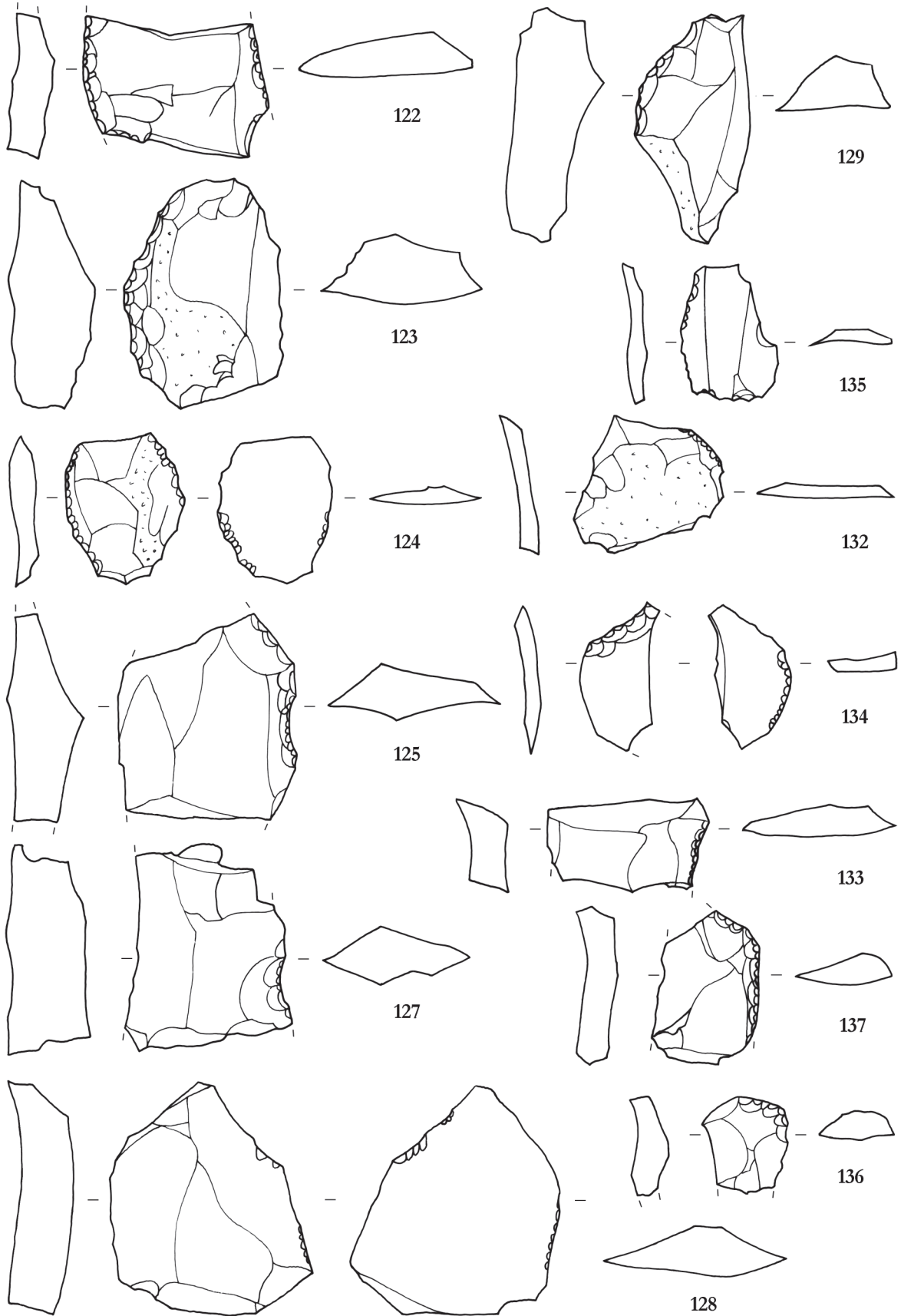
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Pl. 7: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



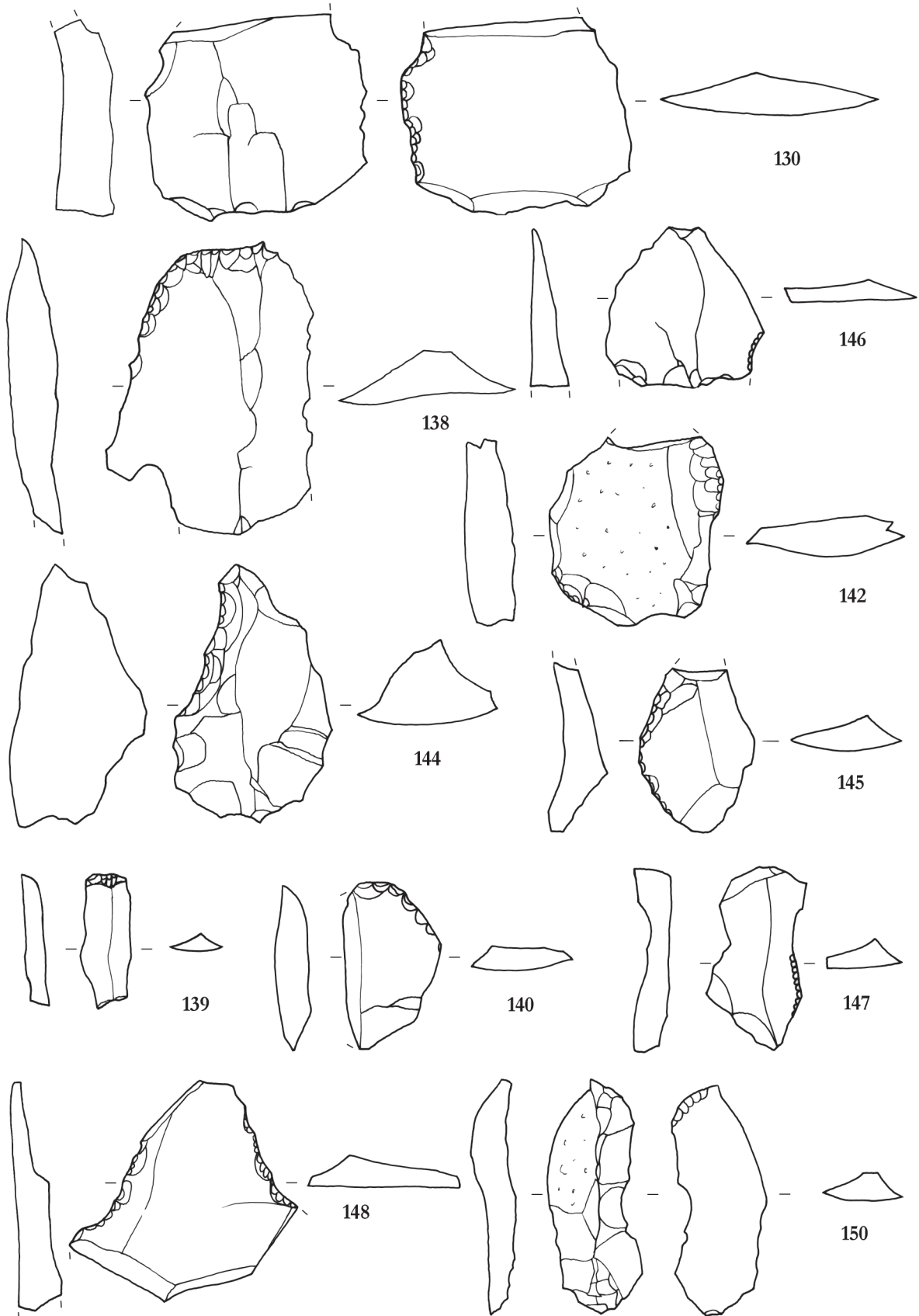
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Pl. 8: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



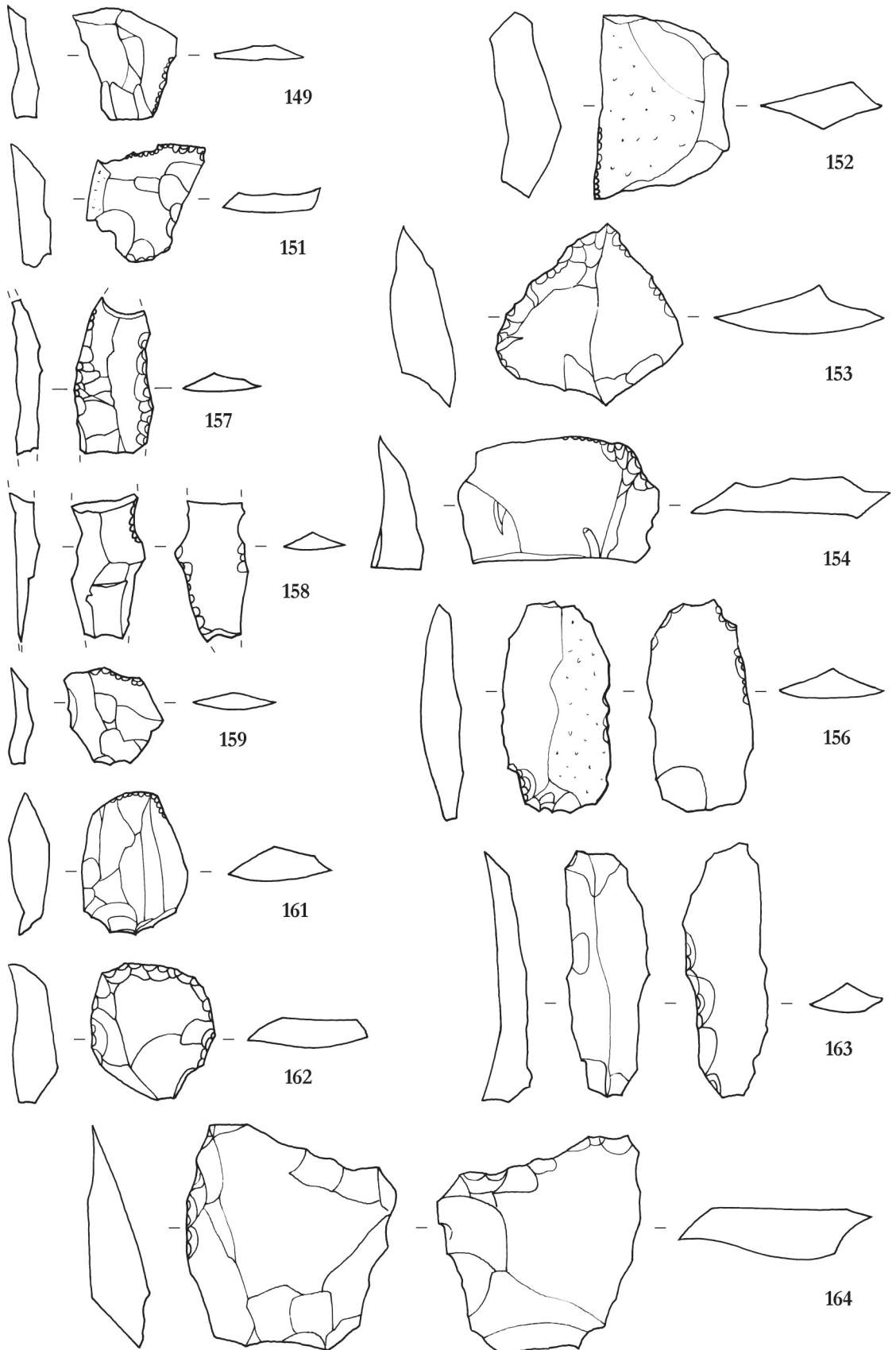
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Pl. 9: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



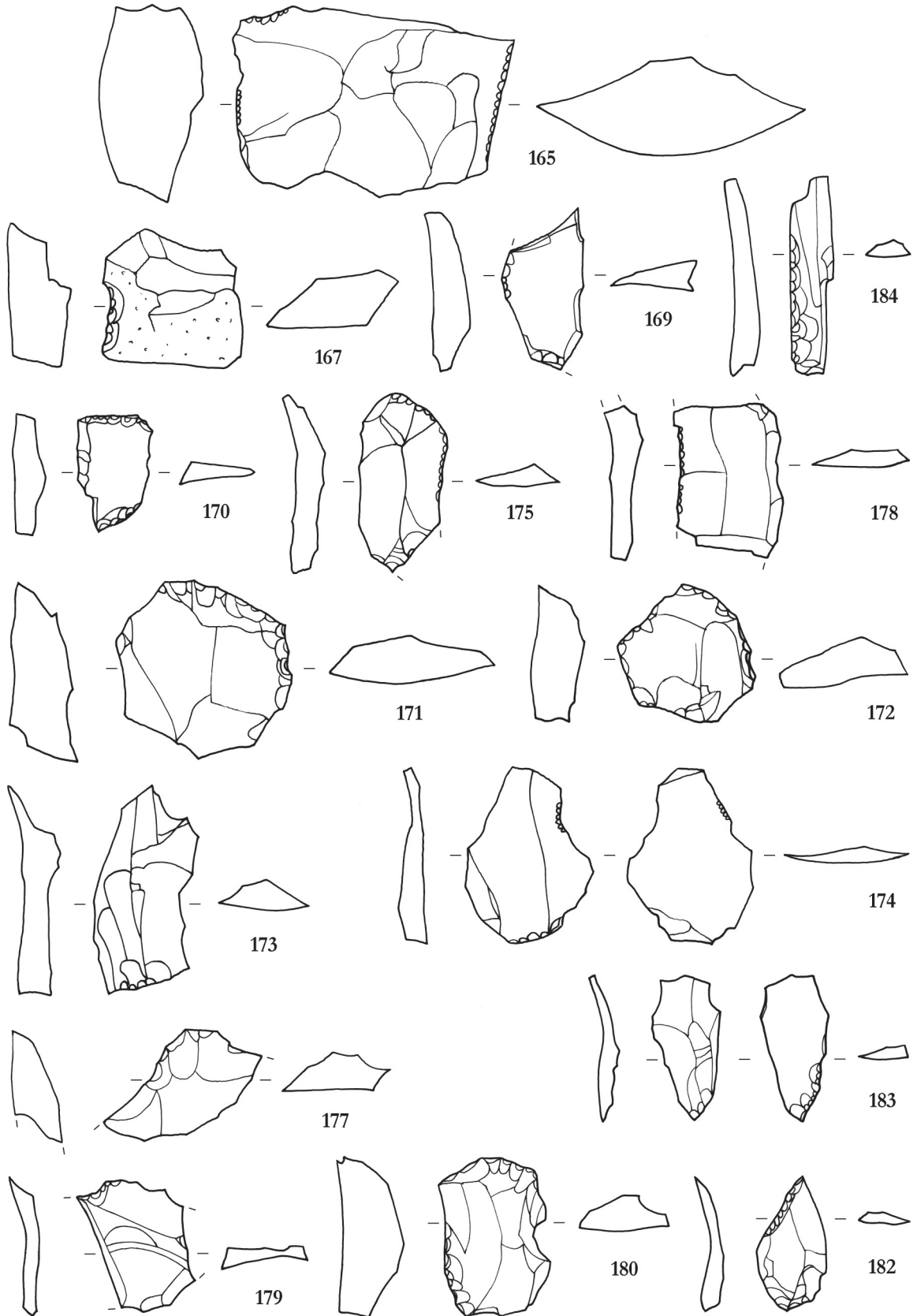
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Pl. 10: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



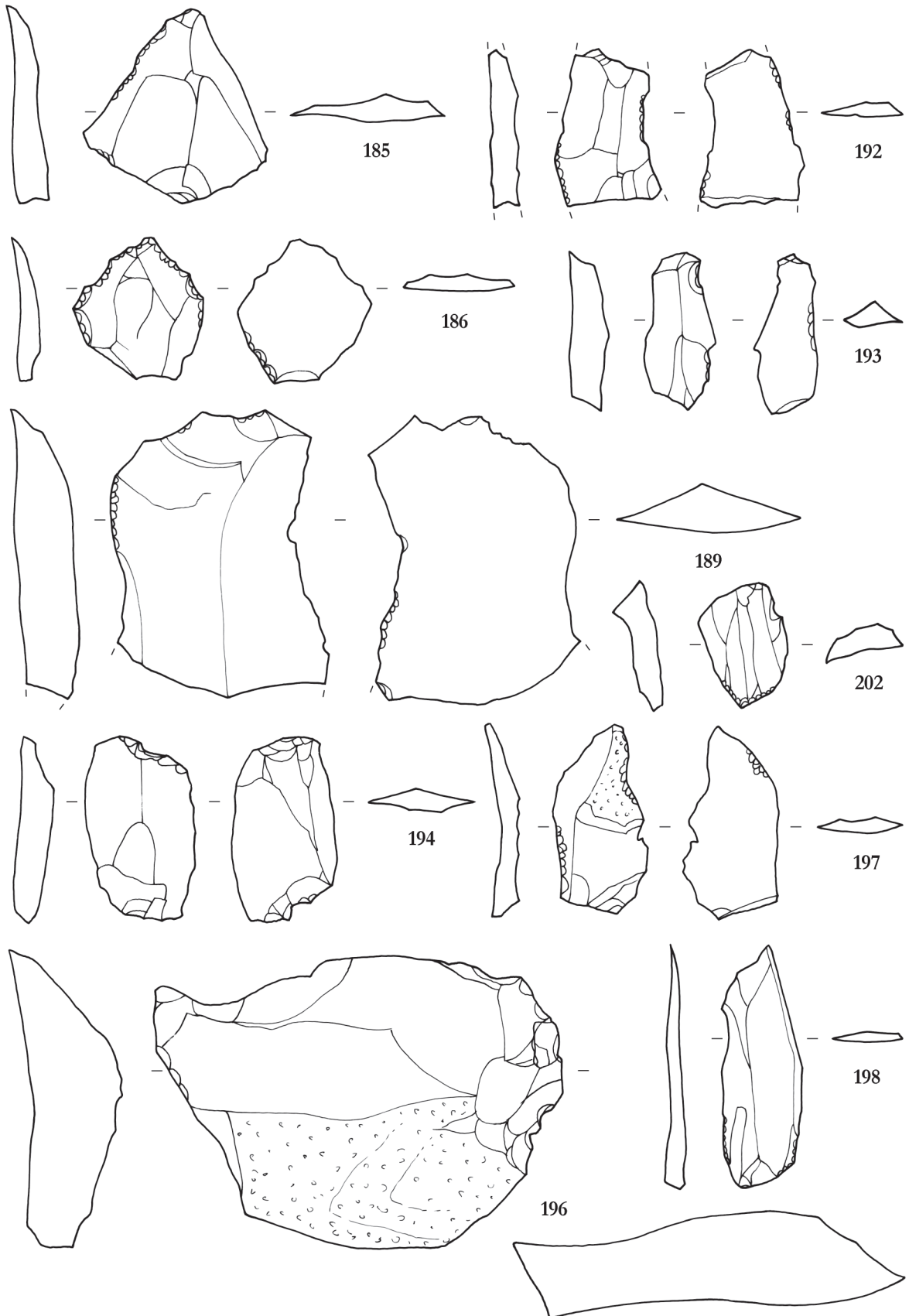
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Pl. 11: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



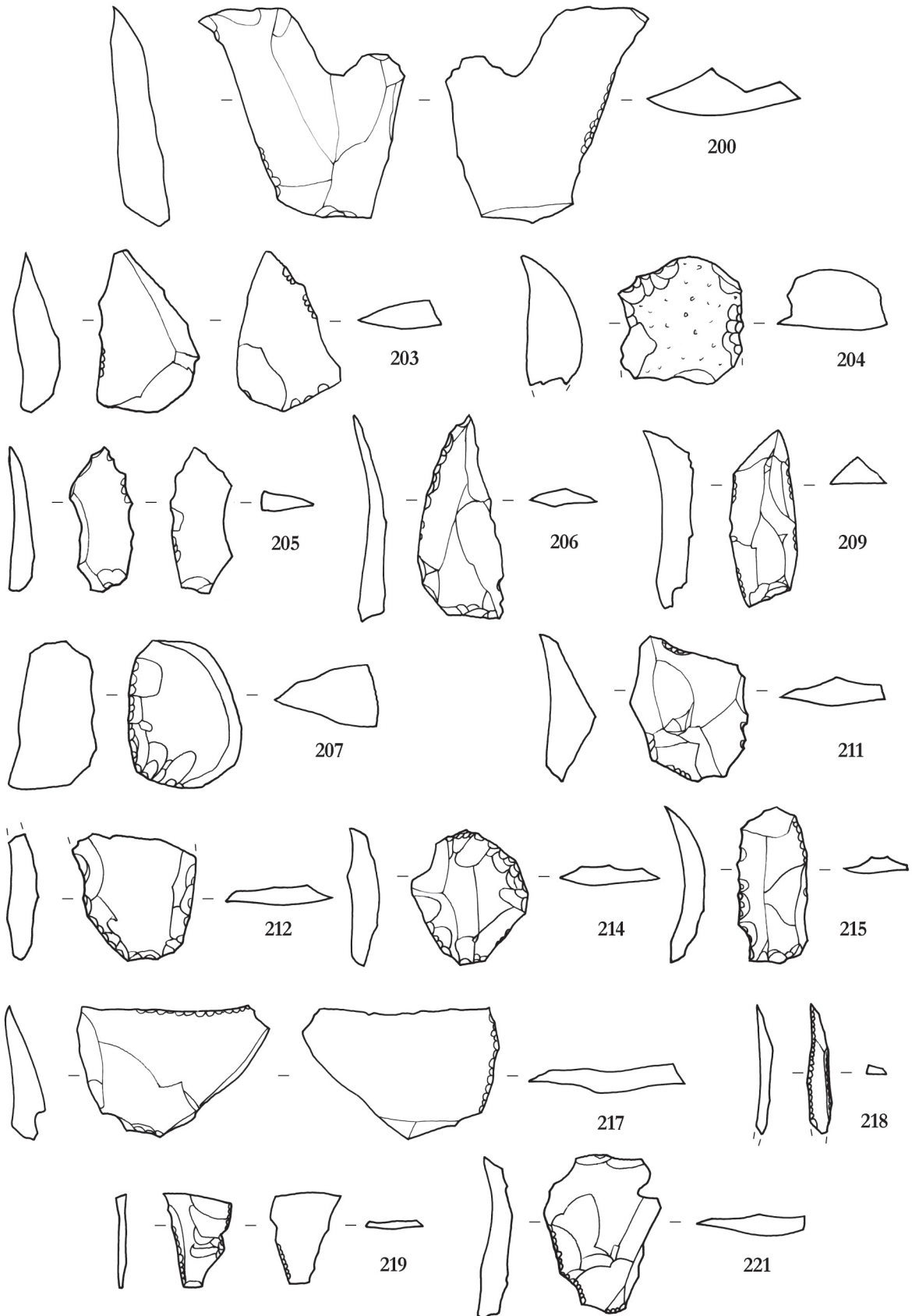
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Pl. 12: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



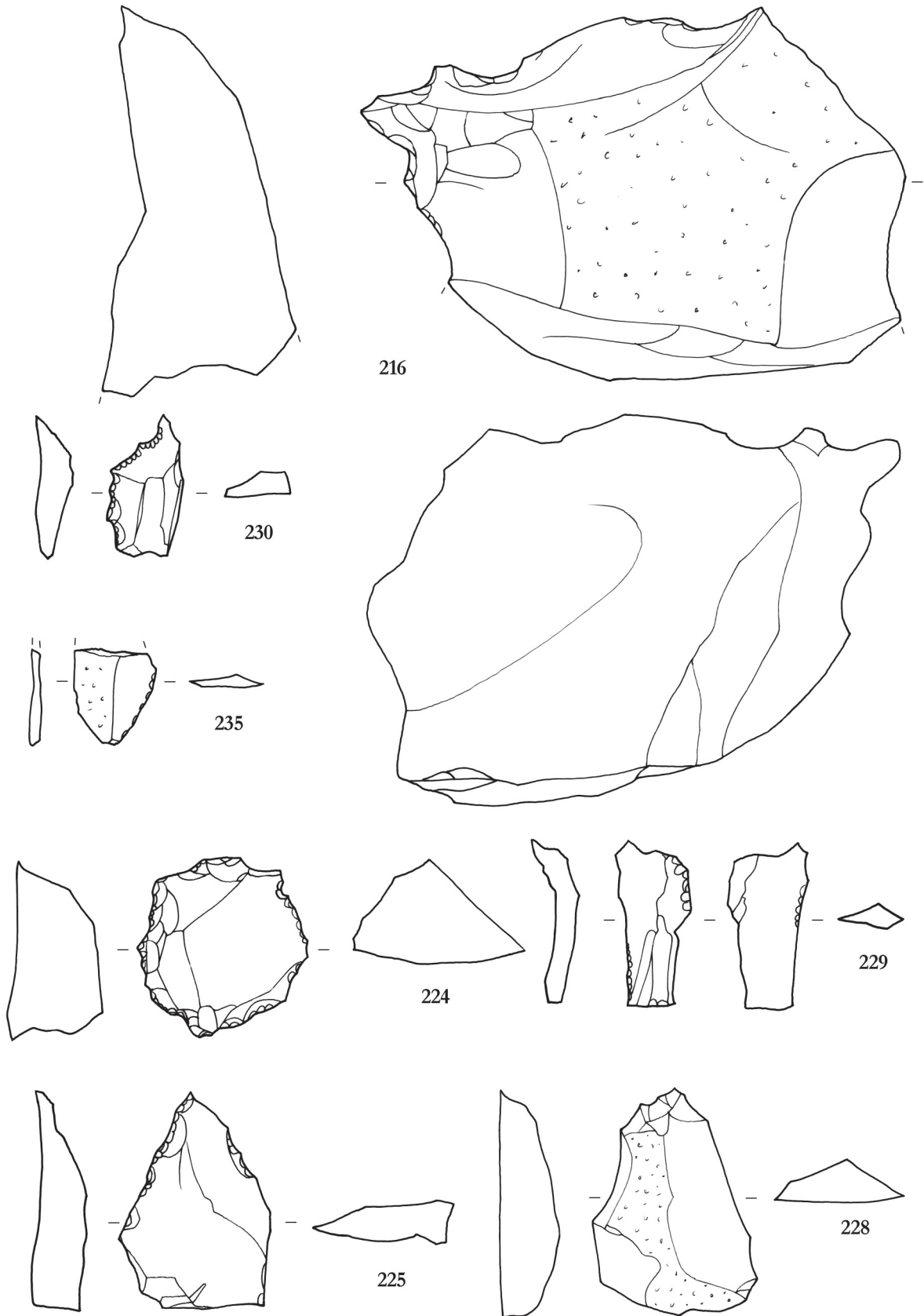
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Pl. 13: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



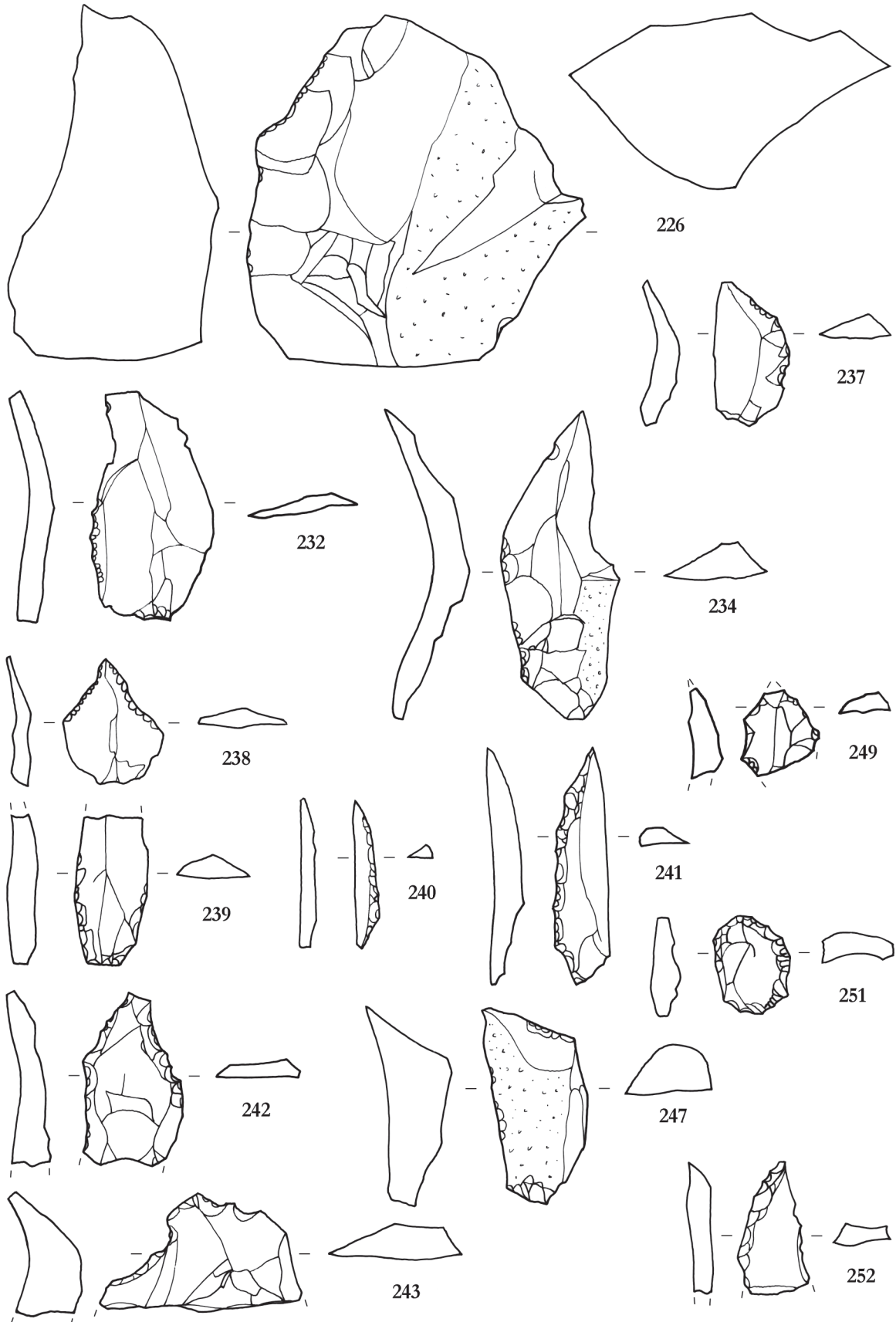
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Pl. 14: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



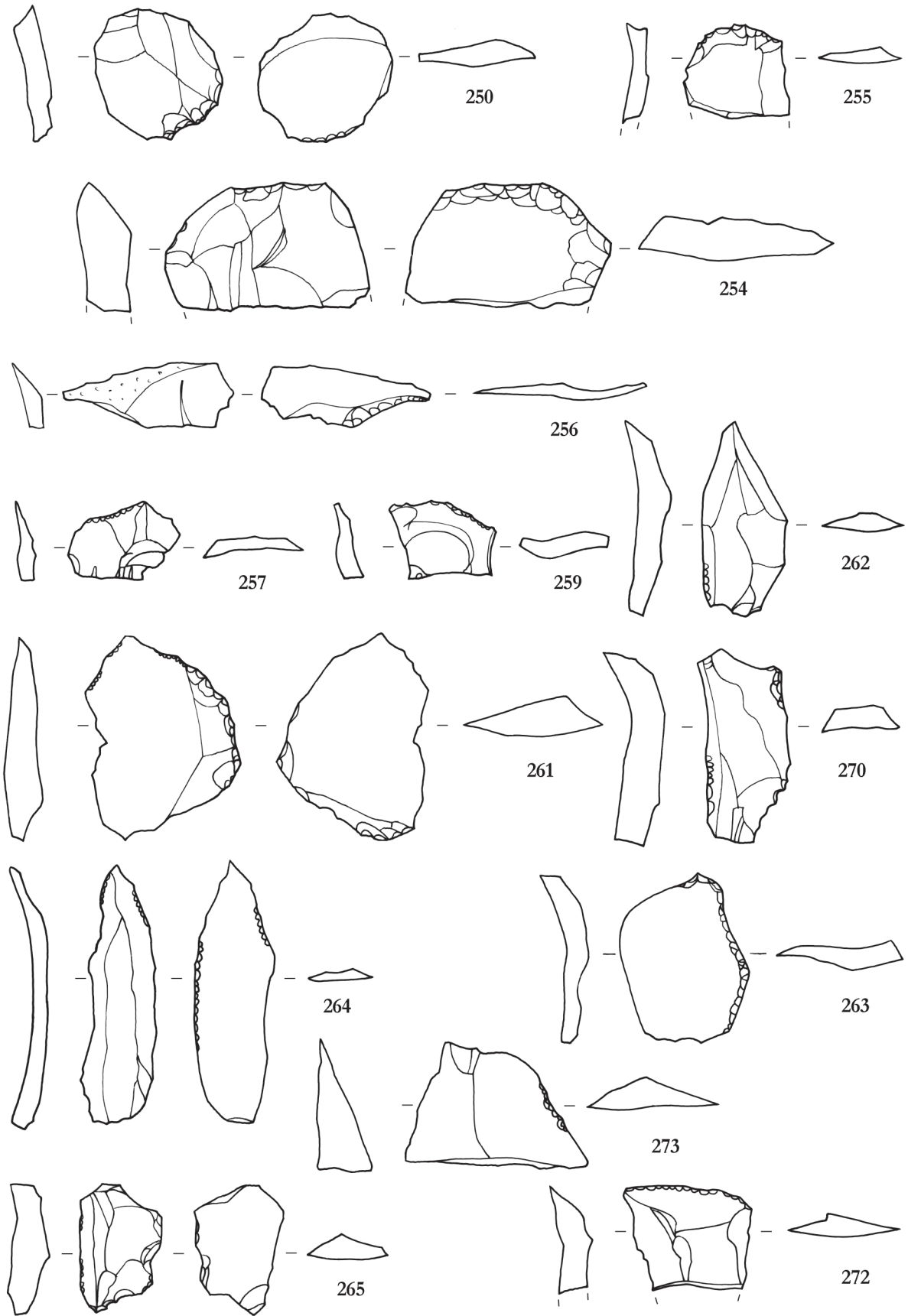
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Pl. 15: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



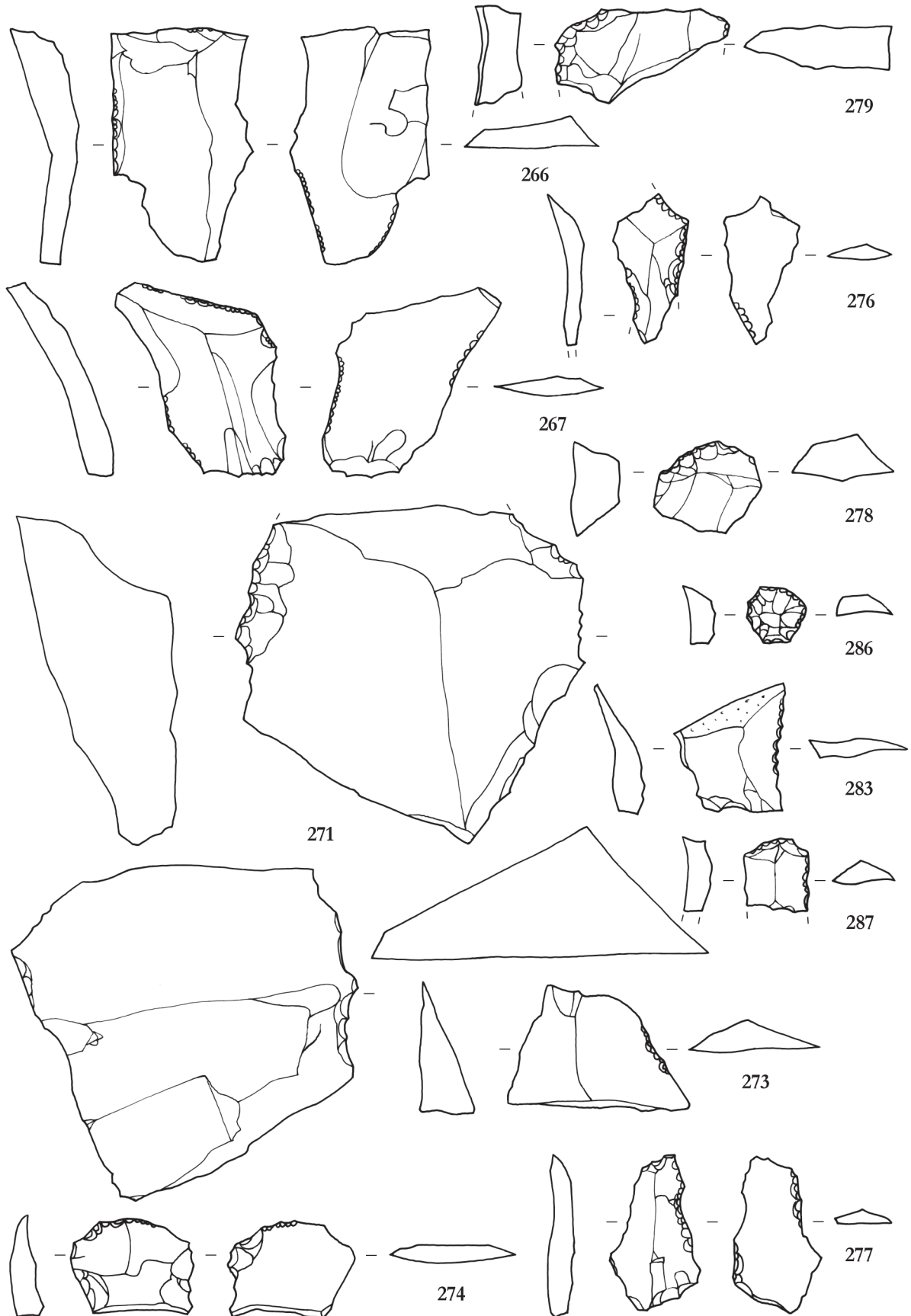
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Pl. 16: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



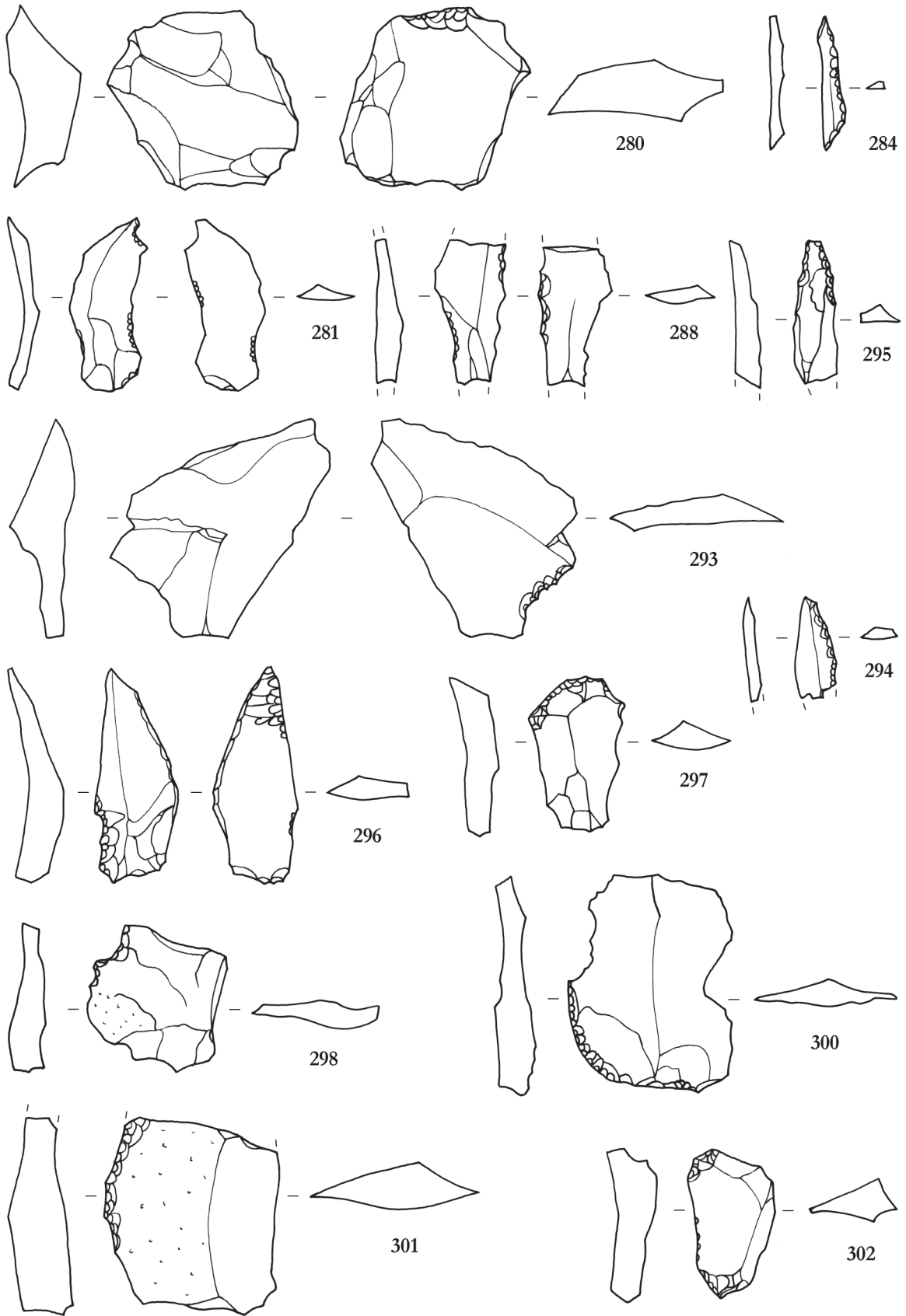
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Pl. 17: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



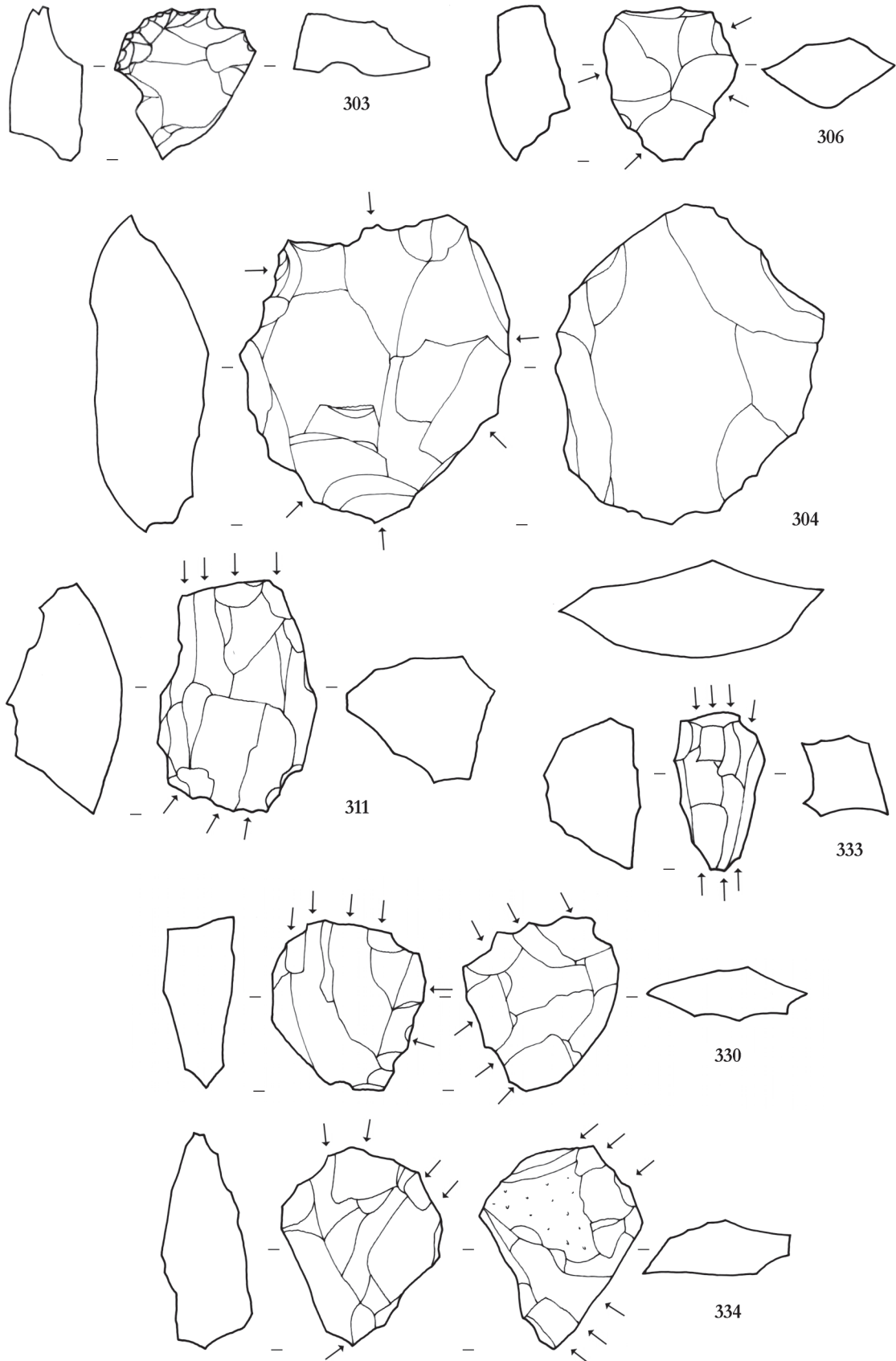
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Pl. 18: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



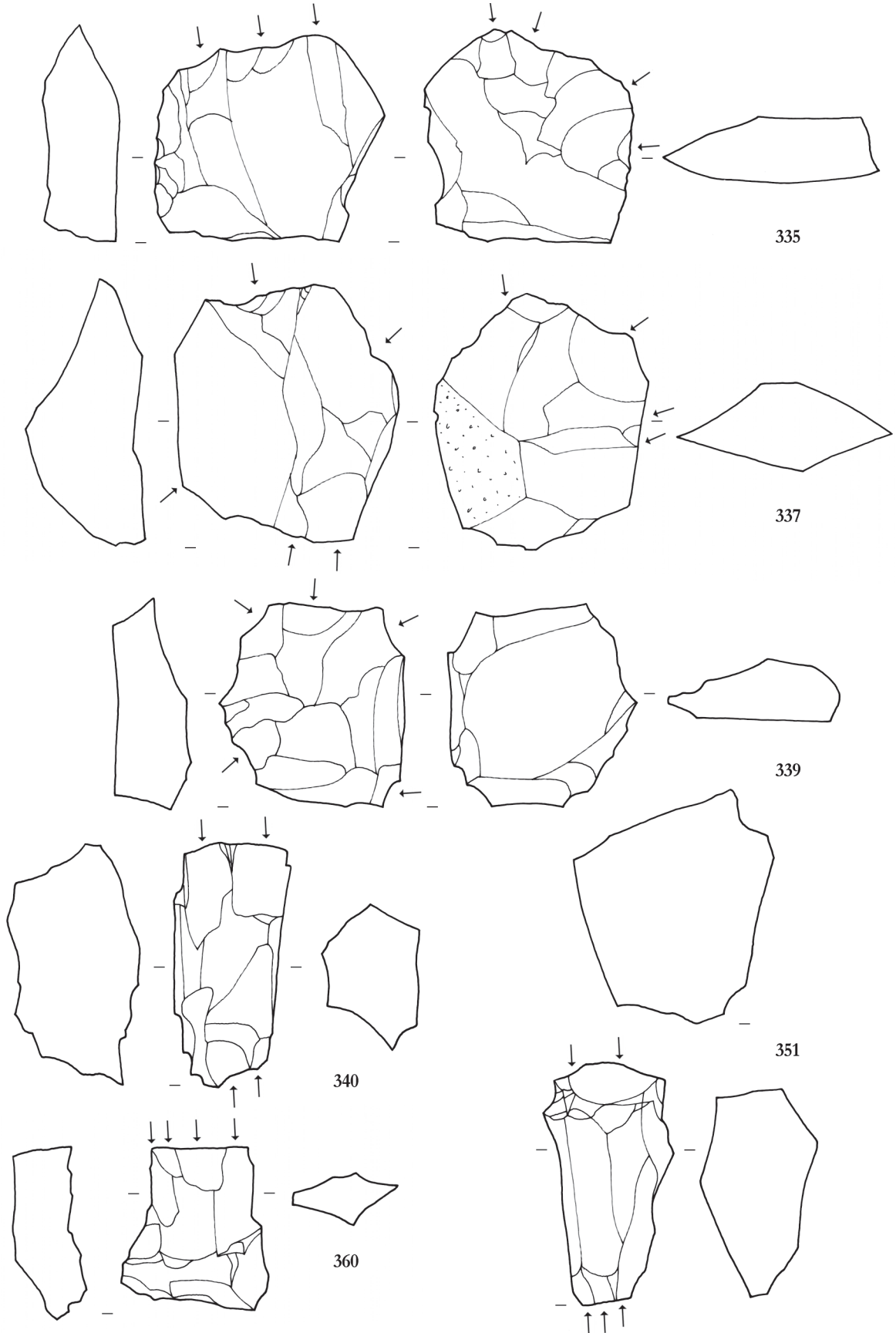
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Pl. 19: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



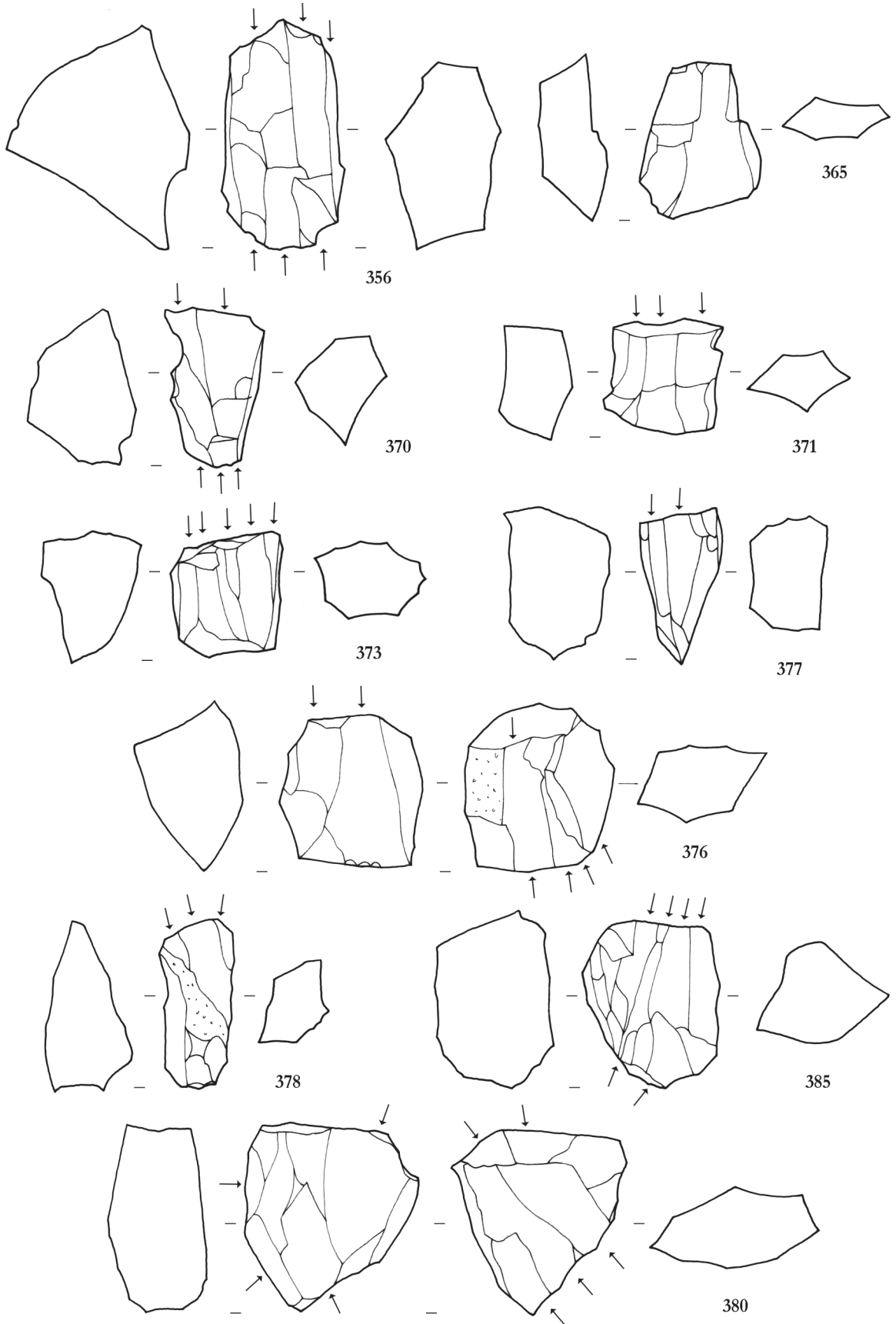
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Pl. 20: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



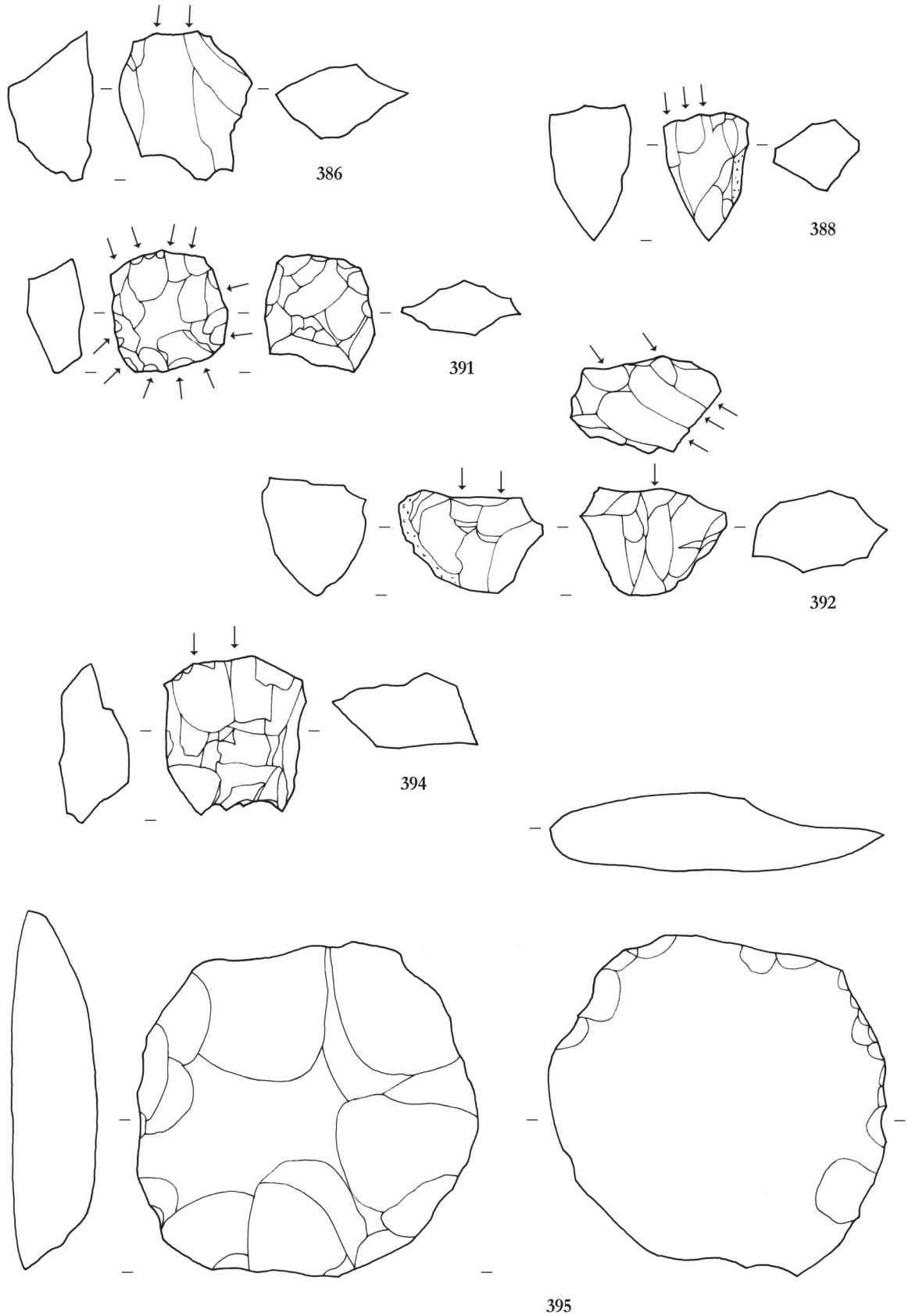
T. 21: Zalog pri Verdu. Kamen. M. = 1 : 1 (risba: Boris Kavur, Ida Murgelj).

Pl. 21: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



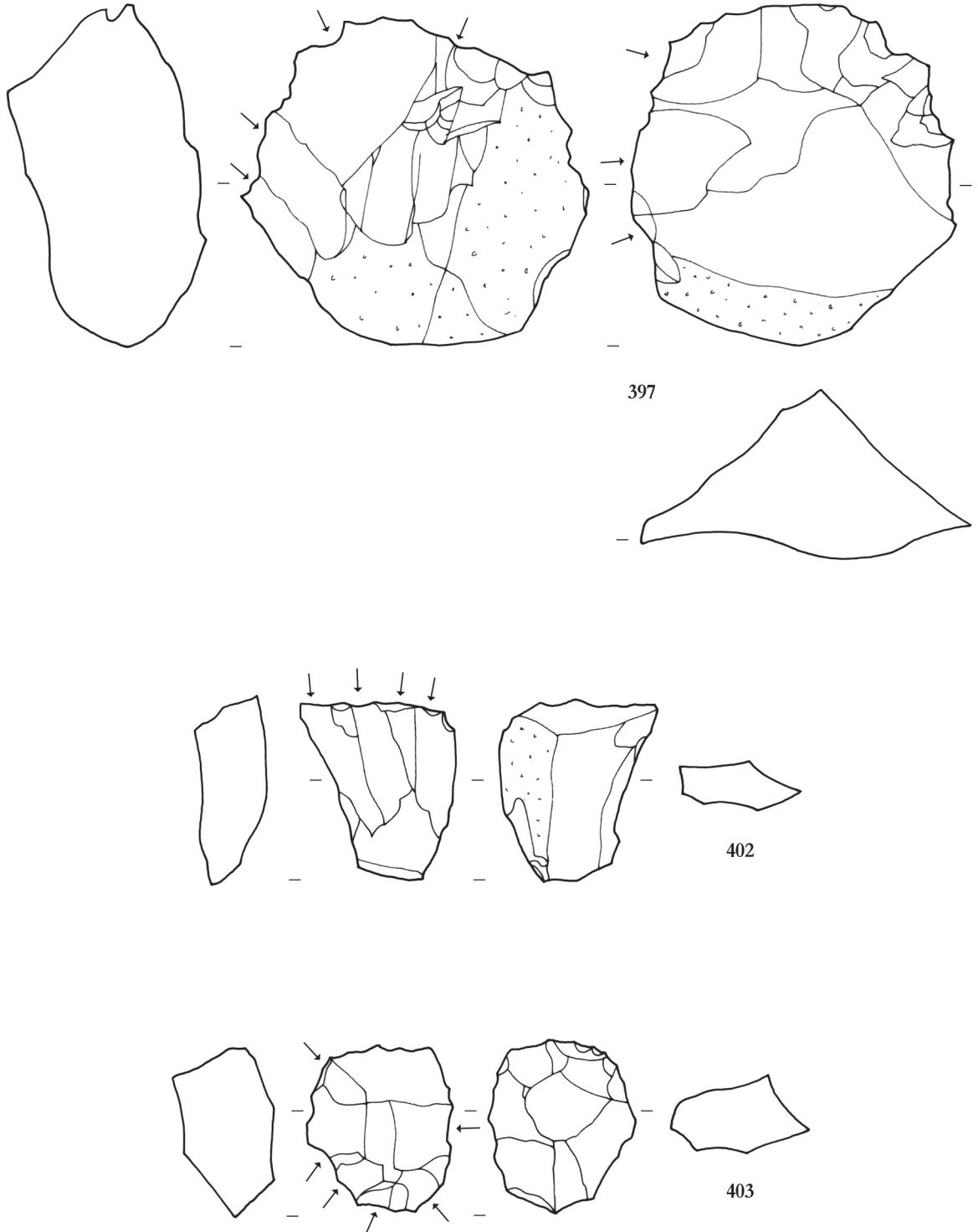
T. 22: Zalog pri Verdu. Kamen. M. = 1 : 1 (risba: Boris Kavur, Ida Murgelj).

Pl. 22: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



T. 23: Zalog pri Verdu. Kamen. M. = 1 : 1 (risba: Boris Kavur, Ida Murgelj).

Pl. 23: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).



T. 24: Zalog pri Verdu. Kamen. M. = 1 : 1 (risba: Boris Kavur, Ida Murgelj).

Pl. 24: Zalog near Verd. Stone. Scale = 1 : 1 (drawing: Boris Kavur, Ida Murgelj).

PETROLOŠKA SESTAVA IN PROVENIENCA KAMNITIH ARTEFAKTOV - I.

PETROLOGIC COMPOSITION AND PROVENANCE OF STONE ARTEFACTS - I.

Aleksander HORVAT

Izvleček

V prispevku so predstavljeni rezultati petrološke analize kamnitih odbitkov z arheološkega najdišča Zalog pri Verdu. Prevladujejo odbitki narejeni iz roženca, sledijo odbitki narejeni iz tufa, vsi ostali petrološki različki so manj pogosti in približno enakomerno zastopani.

Ključne besede: Slovenija, Ljubljansko barje, mezolitik, kamnita orodja, petrologija

Abstract

The article presents the results of the petrologic analysis of stone flakes from the archaeological site of Zalog near Verd. Flakes made of chert predominate, followed the flakes made of tuff, while all other petrologic variants are less frequent and approximately equally represented.

Key words: Slovenia, the Ljubljansko barje, Mesolithic, stone tools, petrology

1 UVOD

Pregledanih je bilo 134 vzorcev kamnitih odbitkov z arheološkega najdišča Zalog pri Verdu. Med vzorci kamnitih odbitkov lahko makroskopsko ločimo štiri različne petrološke tipe kamnin: roženec, tuf, kristalni kremen (kamena strela) in kalcedon (*tab. 5.1*).

2 REZULTATI

Petrološko prevladujejo odbitki narejeni iz roženca (87 %), sledijo odbitki narejeni iz tufa (4,5 %), vsi ostali petrološki različki so manj pogosti in približno enakomerno zastopani. Vzorcev, ki so bili premajhni ali preveč patinirani, nismo mogli petrološko opredeliti. Delež neopredeljenih artefaktov znaša 6 % (*sl. 5.1*).

Roženca lahko makroskopsko ločimo v pet skupin: sivozeleni roženci (roženec 1), zeleni roženci (roženec 2), marogasti rdeče-zeleni roženci (roženec 3), temno sivi roženci (roženec 4) in rdeči roženci (jaspisi) (*tab. 5.1*). Sivozeleni roženci so najsvetlejši, imajo značilno amorfnost strukturo in kažejo najmanjšo preperelost oziroma patiniranost. Zeleni roženci so enakomerno temno zeleni in nekoliko patinirani, kar se odraža v navidezno zrnati strukturi. Za skupino marogastih rdeče-zelenih rožencev je značilno prelihanje barv različnih temnordečih in temnozelenih odtenkov, kar

1 INTRODUCTION

The analysis included 134 samples of stone flakes from the archaeological site of Zalog near Verd. Macroscopically, the samples can be divided into four different petrologic rock types: chert, tuff, crystal quartz (rock crystal) and chalcedony (*Tab. 5.1*).

2 RESULTS

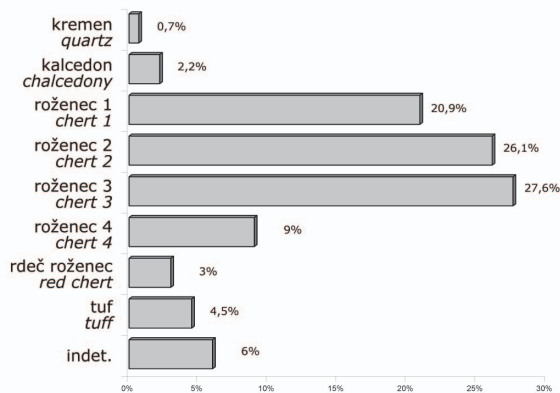
Petrologically, flakes made of chert predominate (87%), followed by the flakes made of tuff (4.5%), while all other petrologic variants are less frequent and approximately equally represented (*Fig. 5.1*). Some samples are too small or too patinated for accurate petrologic classification. The share of indeterminate artefacts is 6%.

Cherts can be macroscopically divided into five groups: grey-green cherts (chert 1), green cherts (chert 2), speckled red-green cherts (chert 3), dark-grey cherts (chert 4), and red cherts (jaspers) (*Tab. 5.1*). Grey-green cherts are the lightest in colour; they have a characteristic amorphous structure and appear to be the least weathered or patinated. Green cherts are evenly dark green in colour and slightly patinated, which is reflected in a seemingly granular structure. The group of speckled red-green cherts has a charac-

Tab. 5.1: Petrološki opis kamnitih odbitkov z arheološkega najdišča Zalog pri Verdu.

Tab. 5.1: Petrologic description of stone flakes from the archaeological site of Zalog near Verd.

| Vzorec / <i>Sample</i> | Petrologija / <i>Petrology</i> | Opis / <i>Description</i> |
|---------------------------|--|--|
| 122 - 1 | Kremen / Quartz | Luska odbita od kremenovega kristala (kamena strela) / Chip of a quartz crystal (rock crystal) |
| 122 - 2 | Roženec 1 / Chert 1 | Sivozelen roženec / Greyish-green chert |
| 122 - 3 | Roženec 3 / Chert 3 | Marogast rdeče-zelen roženec / Speckled red-green chert |
| 122 - 4 | Roženec 1 / Chert 1 | Sivozelen roženec / Greyish-green chert |
| LZ 122 - A | Rdeč roženec / Red chert | 4 vzorci rdečega roženca (jaspisa) / 4 samples of red chert (jaspis) |
| LZ 122 - B | Roženec 1 / Chert 1 | 25 odbitkov in lusk sivozelenega roženca / 25 flakes of greyish-green chert |
| LZ 122 - C | Roženec 3 / Chert 3 | Marogast rdeče-zelen roženec – 31 vzorcev / Speckled red-green chert – 31 samples |
| LZ 122 - D | Roženec 2 / Chert 2 | Zelen roženec – 29 vzorcev / Green chert – 29 samples |
| LZ 122 - E | Roženec 4 / Chert 4 | Temnosiv roženec – 12 vzorcev / Dark-grey chert – 12 samples |
| LZ 122 - F | Tuf / Tuff | Zelen preperel pelitski tuf - 5 vzorcev / Green weathered pelite tuff – 5 samples |
| LZ 122 - G | Kalcedon / Chalcedony | Dimast, prosojen / Smoky, translucent |
| LZ 122 - H | Indet. - ?roženec / Indet. - ? chert | Nedoločljivo - prepereli, patinirani vzorci in drobne luske (7 vzorcev), verjetno roženec / Indeterminable – weathered, patinated tinny scales (7 samples), probably chert |
| LZ 122 - 289 | Roženec 3 / Chert 3 | Marogast rdeče-zelen roženec / Speckled red-green chert |
| LZ 122 - 290 | Roženec 3 / Chert 3 | Marogast rdeče-zelen roženec / Speckled red-green chert |
| LZ 122 - 291 | Roženec 2 / Chert 2 | Zelen roženec / Green chert |
| LZ 122 - 292 | Roženec 2 / Chert 2 | Zelen roženec / Green chert |
| 119 - 1 | Roženec 3 / Chert 3 | Marogast rdeče-zelen roženec / Speckled red-green chert |
| 119 - 2 | Roženec 1 / Chert 1 | Sivozelen roženec / Greyish-green chert |
| 119 - 3 | Roženec 2 / Chert 2 | Zelen roženec / Green chert |
| 119 - 4 | Kalcedon / Chalcedony | Dimast, prosojen / Smoky, translucent |
| 026 - 1 | Roženec 3 / Chert 3 | Marogast rdeče-zelen roženec / Speckled red-green chert |
| 026 - 2 | Roženec 2 / Chert 2 | Zelen roženec / Green chert |
| 026 - 3 | Roženec 2 / Chert 2 | Zelen roženec / Green chert |
| 026 - 4 | Tuf / Tuff | Zelen preperel pelitski tuf / Green weathered pelite tuff |
| 064 - 1 | Roženec 3 / Chert 3 | Marogast rdeče-zelen roženec / Speckled red-green chert |
| 064 - 2 | Roženec 2 / Chert 2 | Zelen roženec / Green chert |
| 064 - 3 | Indet. - ?roženec / Indet. - ? chert | Nedoločljivo - preperel, patiniran vzorec, verjetno roženec; za natančnejšo opredelitev bi bil potreben svež prelom / Indeterminable – weathered, patinated sample, probably chert; for a more precise identification a fresh break would be needed |
| 066 - 4 | Kalcedon / Chalcedony | mlečni, prosojen / milky, translucent |



je najverjetneje posledica preperevanja, ki pa najbrž sledi osnovni strukturi kamnine. Po velikosti so največji artefakti oziroma odbitki narejeni iz marogastih rdeče-zelenih rožencev, medtem ko je največji delež majhnih odbitkov in lusk narejen iz sivozelenih rožencev.

Med deleži vseh makroskopsko določenih tipov rožencev so približno enakomerno zastopani sivozeleni roženci, zeleni roženci in marogasti rdeče-zeleni roženci, medtem ko je delež rdečih in temnosivih rožencev znatno nižji (sl. 5.1). Delitev rožencev je popolnoma subjektivna in je narejena izključno na osnovi barvnih odtenkov. Razlike v barvi so lahko tudi posledica prosojnosti oziroma debeline odbitkov, preperevanja in patiniranosti površin artefaktov. Prav tako so lahko roženci znotraj enega najdišča barvno različni. Zaradi tega opisana delitev rožencev ne odraža njihove provenience in ne pomeni, da različni tipi rožencev izvirajo iz različnih najdišč, ampak ima zgolj opisno vrednost. Za ugotavljanje dejanskih razlik med posameznimi tipi rožencev bi bile potrebne kemijske analize, predvsem analize slednih prvin in stabilnih izotopov. V matičnih kamninah podlage in okolice Ljubljanskega barja rožencev ne najdemo. Najdemo pa jih kot redke majhne prodnike (<2 cm) v različno starih kvartarnih fluvialnih sedimentih (Grimšičar, Ocepek 1967) barjanskih pritokov. Večjo količino roženčevih prodnikov, ki dosežejo tudi večje dimenzije, najdemo le v savskih prodnih zasipih. Sava je v srednjem in mlajšem pleistocenu odložila svoj prod tudi na vzhodnem obrobju Ljubljanskega barja.

3 SKLEPI

Med materialom za izdelavo kamnitih artefaktov močno prevladujejo roženci, katerih provenienca ni nedvoumna. Okolico barja, od koder se stekajo vodotoki, gradijo v glavnem platformni mezozojski karbonati, v katerih rožencev ne najdemo. Kot možen izvor rožencev bi lahko bili deloma le triasni klastiti. Po literarnih podatkih v prodju Ljubljanskega barja nastopajo

Sl. 5.1: Petrološka sestava kamnitih odbitkov iz arheološkega najdišča Zalog pri Verdu

Fig. 5.1: Petrologic composition of stone flakes from the archaeological site of Ljubija-Zalog

teristic speckled blending of colour of various dark red and dark green shades, which is most likely a consequence of weathering. The latter most probably follows the basic structure of the rock. The largest artefacts are made of the speckled red-green cherts while the largest share of small flakes and chips are made of grey-green chert.

Among the shares of all macroscopically identified types of cherts, the shares of grey-green, green and speckled red-green cherts are approximately equal, while the shares of dark-grey and red cherts are significantly lower (Fig. 5.1). The chert classification is completely subjective and is based solely on colour shades. The differences in colour, though, can also be the consequence of translucency and flake thickness, weathered and patinated artefact surfaces, since even chert fragments from a single site can differ in colour. Due to this, the above-described division of cherts neither reflects their provenance nor signify different site origin for different types of chert. The division thus has a purely descriptive value. In order to establish real differences among individual types of chert, chemical analyses would be needed, primarily those of trace elements and stable isotopes. Chert is not to be found in the bedrock in the outskirts of the Ljubljansko barje. It is, however, found as rare small pebbles (<2 cm) in Quaternary fluvial sediments of various ages (Grimšičar, Ocepek 1967) and various tributaries at the outskirts of the moor. A larger quantity of chert pebbles, that may even be larger in size, can be found in the gravel pack of the Sava River. The Sava deposited its gravel during the Middle and the Late Pleistocene also on the eastern edge of the Ljubljansko barje.

3 CONCLUSIONS

The material for the production of stone artefacts is predominantly chert, the provenance of which is not unambiguous. The surroundings of the Ljubljansko barje, whence the waterways flow, are predominantly made up of Mesozoic carbonates where chert cannot be found. A possible source of the latter can, in part, be the Triassic clastics. The data from the literature reveals

redki kosi rožencev in so majhnih dimenzij (Grimšičar, Ocepek 1967). Na vsaj deloma lokalno provenienco materiala lahko sklepamo na osnovi artefaktov narejenih iz rdečih rožencev. Rdeče rožence (jaspise) najdemo kot prodnike v srednjetriasnih konglomeratih na severnem obrobju Ljubljanskega barja. Vprašanje je, če so omenjeni lokalni pojavi roženčevih prodnikov edini vir materiala za izdelavo artefaktov. Verjetneje je, da je bil material prinešen, vendar dolžina transporta najbrž ni bila velika. Za boljše interpretacijo provenienc kamnitih artefaktov bi bilo potrebno analizirati več materiala z najdišča in na terenu pregledati petrološko sestavo barjanskega in savskega proda ter lokalno geologijo. Tako bi pridobili primerjalni material, ki bi omogočal direktno in bolj zanesljivo interpretacijo provenienc ter dolžine in vrste transporta. Za edino eksaktno metodo določitve pestrosti rožencev in njihove provenienc, pa bi bile potrebne že omenjene analize slednih prvin in stabilnih izotopov. Podobno velja tudi za ostale petrološke različke artefaktov, predvsem tufe, medtem ko kremen in kalcedon nista tako problematična, saj gre za drobne luske, za katere ne potrebujemo veliko surovine.

Kremen in kalcedon danes najdemo v žilah paleozojskih in triasnih sedimentov na širšem obrobju barja. Najbolj znana najdišča kremenovih kristalov in kalcedona različnih barv so v pasu od Sostrega proti Rašici in v okolici Cerknice. Redke majhne kremene prodnike omenjajo tudi v pleistocenskih prodnih zasipih Ljubljanskega barja (Grimšičar, Ocepek 1967).

Material za odbitke, narejene iz tufa, je najverjetneje lokalnega izvora. Tufske prodnike neredko najdemo v prodnih vršajih vodotokov z južnega obrobja Ljubljanskega barja, pa tudi v savskemrodu.

that only rare pieces of chert, small in size, appear in the gravel of the Ljubljansko barje (Grimšičar, Ocepek 1967). An at least partly local provenance can be deduced from the artefacts made of red cherts. Clasts of red cherts (jaspers) are known from the Middle Triassic conglomerates from the northern margin of the Ljubljansko barje. The question that arises is whether the above-mentioned local appearance of chert pebbles represents the only source of material for the production of the artefacts. A more probable explanation than that of a local origin is that the material was brought to the site. The transport distance, though, could not have been great. In order to give a more detailed interpretation of the provenance of the stone artefacts more material from the site would need to be analysed and, also, the petrologic composition of the moor and the Sava gravel as well as the local geology would need to be looked at. This would offer comparative material that would, in turn, enable a more direct and reliable interpretation of the provenance, the length and the type of transport. Methods that would help to identify the variety of the cherts and their provenance are the already mentioned analyses of trace elements and stable isotopes.

A similar observation can be made for other petrologic variants of artefacts, primarily tuffs. In that respect, quartz and chalcedony are not as problematic, since we are dealing with tiny chips for which not much raw material is needed.

Quartz and chalcedony can nowadays be found in the veins of the Palaeozoic and Triassic sediments on the outskirts of the Ljubljansko barje. The best known sites of quartz crystals and chalcedony of various colours stretch in a band from Sostro to Rašica and can also be found in the surroundings of Cerknica. Rare small quartz pebbles are mentioned in the Pleistocene gravel pack of the Ljubljansko barje (Grimšičar, Ocepek 1967). Material for flakes made of tuff is most probably of local origin.

Tuff pebbles are quite frequently found in the alluvial fans of the southern tributaries of the Ljubljansko barje (the Iška Stream and others) as well as in the gravel of the Sava.

ARTEFAKTI IZ KOSTI IN JELENOVIH ROGOVIJ

ARTEFACTS OF BONE AND RED DEER ANTLER

Andrej GASPARI

Izvleček

Na območju mezolitskega najdišča Zalog pri Verdu je bilo odkritih štirinajst orodij iz rogovja navadnega jelena ter devet koščenih predmetov, poleg tega pa še številni odpadki, ki so nastali pri izdelavi artefaktov. Posebej izstopajo masivna rogovinasta orodja z odprtino, ki imajo v mezolitiku Evrope številne funkcionalne in tehnološke primerjave, neposredne tipološke analogije pa med gradivom zgodnjeholocenskih najdišč na območju Železnih vrat.

Ključne besede: Slovenija, Ljubljansko barje, Mezolitik, rogovina, kost, orodje, orožje

Abstract

The Mesolithic site of Zalog near Verd yielded fourteen tools made of antler of red deer, nine bone objects and a large amount of waste made during tool production. Among these, the particularly outstanding group is that of solid antler tools with a perforation that fit numerous functional and technological analogies in the Mesolithic of Europe, while their direct typological analogies can be found within the Early Holocene material of the sites in the Iron Gates area.

Key words: Slovenia, the Ljubljansko barje, Mesolithic, antler, bone, tools, weapons

1 UVOD

Na območju kamenodobnega najdišča Zalog pri Verdu je bilo v strugi Ljubije odkritih štirinajst orodij iz rogovja navadnega jelena ter devet koščenih predmetov, poleg tega pa še številni odpadki, ki so nastali pri izdelavi artefaktov. Posebej izstopajo masivna rogovinasta orodja z odprtino, ki imajo v mezolitiku Evrope številne funkcionalne in tehnološke primerjave, neposredne tipološke analogije pa le med gradivom zgodnjeholocenskih najdišč na območju Železnih vrat. V njih lahko prepoznamo večnamenska orodja, ki so se domnevno uporabljala tako v obdelavi lesa kot manj trdih materialov. V literaturi so najpogosteje imenovana z izrazi sekira, tesla in kopača, ki se navezujejo na orientacijo rezil in predvidevajo nasaditev teh orodij na arheološko večkrat izpričana toporišča.

Zanimivost so tudi tri natančno izdelane koščene konice, ki jih lahko glede na obliko in kontekst nesporno obravnavamo kot osti kopij. Tudi pojav ostalih orodij iz kosti, dlet, gladil in šil se dobro vključuje v interpretacijo najdišča kot kraja razkosavanja uplenjenih živali ter nadaljnje obdelave rogovij, krzna in kože. Številni pojav orodij iz rogovine in ostankov procesa izdelave nakazuje intenzivno izkoriščanje te surovine, kar podpira ponujeno razlago o jesenski prisotnosti na najdišču.

1 INTRODUCTION

The area of the Stone Age site of Zalog near Verd, in the Ljubija bed, yielded fourteen tools made of antler of red deer, nine bone objects and a large amount of waste made during tool production. Among these, the particularly outstanding group is that of solid antler tools with a perforation that fit numerous functional and technological analogies in the Mesolithic of Europe, while their direct typological analogies can be found within the Early Holocene material of the sites in the Iron Gates area. They can be determined as multipurpose tools, presumably used for working wood as well as less hard materials. In literature, they are commonly referred to as axes, adzes or mattocks; the terms that are connected with the orientation of the blade and suppose the tools to be placed onto archeologically frequently documented helvices.

Another interesting find is three precisely made bone points which, based on their size and context, may positively be identified as spear heads. The appearance of other bone tools such as chisels, burnishing tools and awls fits well into the proposed interpretation of the site as a place of dismemberment of the caught animals and of subsequent working of antler, fur and hide. The frequent appearance of antler tools and the remains of the production process indicate an intensive exploitation of the raw material.

2 ORODJA IZ ROGOVINE

2.1 Material

Rogovina je eden najbolj vsestransko uporabnih materialov, ki so ga imeli na voljo kamenodobni ljudje, saj je obenem robustna in vzdržljiva ter dokaj elastična, hkrati pa jo je lahko obdelovati. Med njenimi poimenovanji se zdi še najbolj posrečen francoski izraz *bois de cerf*, ki opozarja na lesu podobne lastnosti. Poleg tega je relativno lahko dosegljiv vir, katerega zalogo je bilo mogoče vzdrževati z zbiranjem naravno odpadlega rogovja, dodatne vire pa si je človek zagotovil z uplenjenimi živalmi.

Vsa orodja iz Zaloga pri Verdu so izdelana iz rogovja navadnega (rdečega) jelena (*Cervus elaphus*), kar je skladno s situacijo na drugih zgodnjeholocenskih najdiščih (Erdbrink 1982, 104; Clason 1983, 116-118; Pratsch 1994, 11-16), pri čemer se v severni Evropi v omejenem številu pojavljajo še predmeti iz rogovij severnega jelena (*Rangifer tarandus*), losa (*Alces alces*) in srnjaka (*Capreolus capreolus*).

Rogovje se kot del frontalne kosti lobanje pojavlja pri večini vrst cervidov in se - razen pri severnem

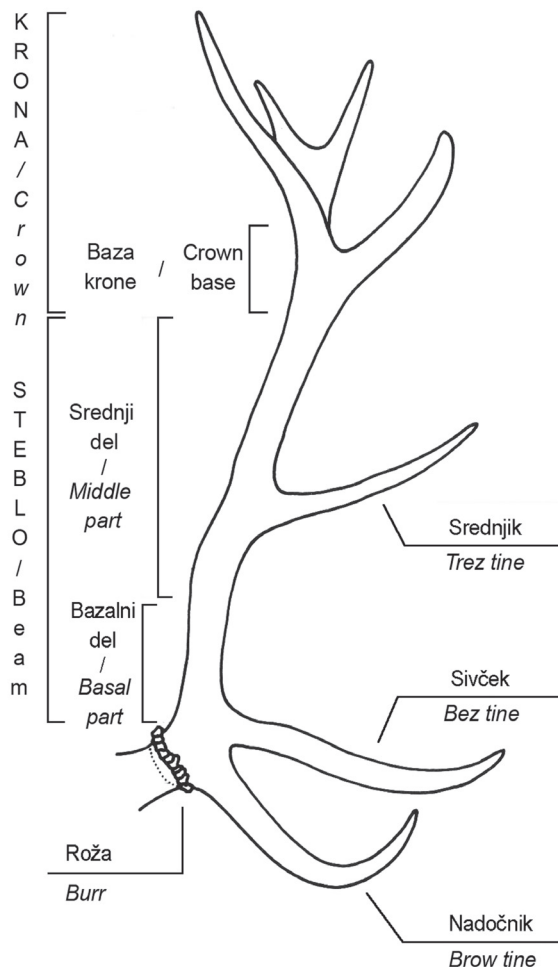
2 ANTLER TOOLS

2.1 Material

Antler was one of the most versatile materials available to the Stone Age people, since it is robust, durable and fairly elastic, while at the same time easy to work. It is also readily available, the stock of which could be maintained by collecting the naturally shed antlers and additionally supplied by the antlers of caught animals. Among the different terms used for it, the French *bois de cerf* seems most appropriate, since it implies its similar characteristics to those of wood.

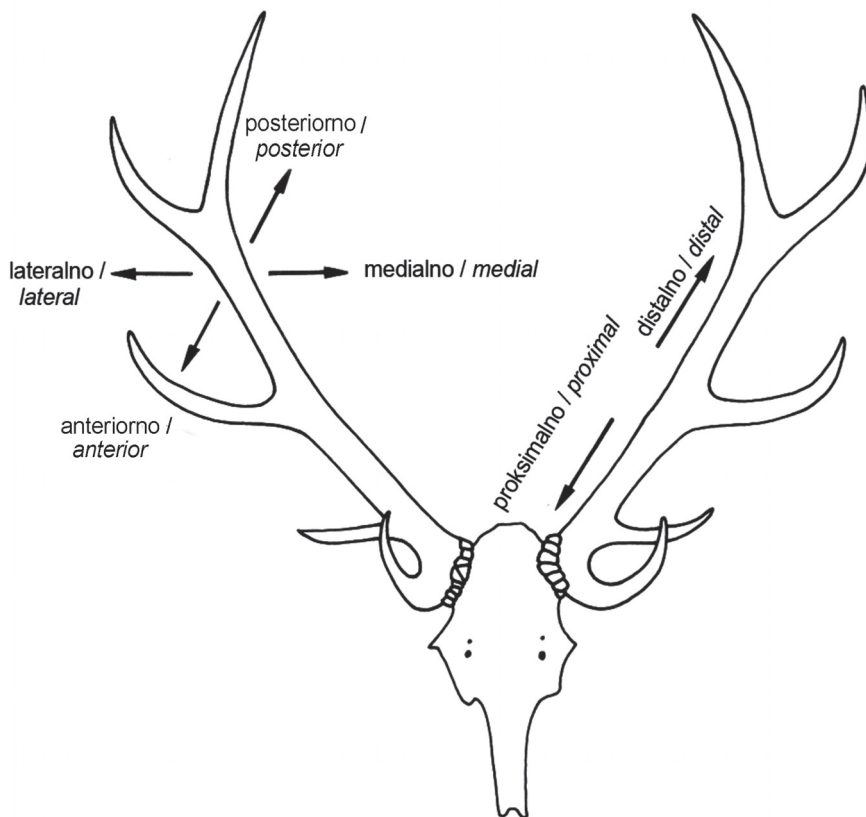
All tools from Zalog near Verd are made of antler of red deer (*Cervus elaphus*), which corresponds with the situation on other Early Holocene sites (Erdbrink 1982, 104; Clason 1983, 116-118; Pratsch 1994, 11-16). In the Northern European sites, tools made of reindeer (*Rangifer tarandus*), elk (*Alces alces*) and roe deer (*Capreolus capreolus*) antlers also appear.

Antlers are a part of the frontal bone of the skull in most *Cervidae* species and develop, with the exception of reindeer and some other species, only with the male. At the age of two, the red deer (*Cervus elaphus*, L., 1758) develops a pair of thin and slightly curved antlers, as yet without a burr. The latter is the proximal termination of the beam in older animals that have larger antlers and a higher number of prongs. An adult animal has twelve to fourteen prongs, exceptionally even twenty. The antler base is characterized by a high morphologic variability tied mostly to the animal's age, nutrition and state of health, while the antler size and prong number is also influenced by genetic factors. The antlers are largest at the age of ten (Kryštufek 1991, 241-244).



Sl. 6.1: Rogovje navadnega jelena. Zoološko poimenovanje posameznih delov (po Pratsch 1994).

Fig. 6.1: Red deer antler. Zoological names for individual parts (from Pratsch 1994).



Sl. 6.2: Oznake položajev na rogovju navadnega jelena (po Pratsch 1994).

Fig. 6.2: Axes in a red deer antler (from Pratsch 1994).

jelenu in še nekaterih izjemah, razvije le pri samcih. Pri navadnem jelenu (*Cervus elaphus*, L., 1758) se v drugem letu starosti oblikujeta ozki in rahlo zakrivljeni rogovji, ki še nimata rože. Slednja predstavlja proksimalni zaključek stebila pri starejših jelenih, ki se jim z leti povečuje velikost rogovja in število parožkov. Pri odraslih živalih doseže njihovo število 12-14, izjemoma celo do 20. Baze rogovja označuje velika morfološka variabilnost, ki je povezana predvsem s starostjo, prehrano in zdravstvenim stanjem živali, medtem ko na velikost rogovja in število parožkov vplivajo tudi dedni dejavniki. Največje rogovje ima jelen pri približno desetih letih (Kryštufek 1991, 241-244).

Razvoj rogovja navadnega jelena je podvržen letnemu ciklusu, ki obsega obdobje rasti med marcem in julijem, ko je še občutljivo rogovje pokrito z žametasto kožo s kratkimi dlakami, v kateri potekajo številne žile in živčni splet. Začetek in trajanje ciklusa sta odvisna od starosti jelena, prehrane in vremena. Rogovje zraste v okoli 100 dneh (pri mlajših osebkih v 69-90 dneh), včasih tudi po 6 cm na dan. Avgusta rogovje odmre in otrdi, pri čemer koža odpade oziroma jo jelen očisti z drgnjenjem ob vejevje in debla. V obdobju do odpada jelen uporablja rogovje za lomljenje drevesnih vej in ritje, med parjenjem (med sredino septembra in januarjem) pa za medsebojne boje. Rogovje jelenom odpade med sredino februarja

The development of antlers in red deer is subjected to an annual cycle that includes the period of growth between March and July, when the still sensitive antler is covered by a velvety skin with short hair that has numerous veins and nerves running through it. The beginning and the duration of the cycle depends on the age and nutrition of the animal as well as on weather conditions. The antlers grow in approximately a hundred days (in younger individuals in sixty-nine to ninety days), sometimes as much as 6 cm per day. In August, the antlers stop growing and harden, whereby the skin falls off or is removed by the deer itself by rubbing against branches and trunks. During the period before it is shed, the animal uses its antlers to break branches and to grub, while during the mating season (from mid September to mid January) it is used in rivalry. The deer sheds its antlers between mid February and April, when a new cycle begins (Kryštufek 1991).

A fully formed antler is a dead bone mass that gradually dries out after the skin is shed in the open air and thereby achieves its greatest firmness. A branch is composed of a compact bony coat with a dense vascular network that surrounds a soft spongy tissue, soaked with blood and bone marrow. An antler can roughly be divided into burr, beam with prongs and crown (Fig. 6.1). The burr is a flat, completely

in vključno aprilom, ko se začne nov cikel (Kryštufek 1991).

Dokončno izoblikovano rogovje je odmrta koščena masa, ki se po guljenju kože na zraku postopno izsuši in doseže največjo trdnost. Vejo sestavlja kompakten koščen plašč z gostim prepletom krvnih žil, ki obdaja mehkejšo gobasto tkivo, prepojeno s krvjo in kostnim mozgom. V grobem lahko rogovje razdelimo na rožo, steblo s parožki in krono (*sl. 6.1*). Roža je ploščat, popolnoma okostenel kolovratni ovalnega preseka, ki ima na obodu značilne bisere in predstavlja skupaj z medaljonom proksimalni konec odvrženega rogovja. Steblo, ki ga označujejo večkratni odkloni, sestavljajo bazalni del med rožo ter sivčkom in srednjikom, osrednji del pod in nad srednjikom ter zgornji del do baze krone. Steblo ima povečini ovalen presek, le nad sivčkom in srednjikom je izoblikovano v izrazit greben. Najdaljši in najbolj ukrivljen parožek na stebelu odraslega jelena je navadno nadočnik (*sl. 6.2*).

Na odpadlem rogovju so pogosti ugrizi zveri in sledovi glodanja malih sesalcev, ki rogovje zaradi visoke vsebnosti kalcija uporabljajo za dopolnitev prehrane (Clason 1983, 85).

Znano je, da je mogoče z namakanjem rogovja v vodi precej skrajšati čas razkosavanja in obdelave, pa tudi zmanjšati možnost nezaželenega loma med procesom izdelave. Tovrstno mehčanje rogovij v prazgodovini dokazujejo predvsem značilni in jasni sledovi rezanja ali fasete na obdelanih površinah (Pratsch 1994, 18,19).

2.2 Masivna orodja iz rogovine

Večja orodja iz jelenovih rogovij so v Zalogu zastopana s trinajstimi orodji z odprtino in dletasto (enosstransko) ali klinasto (dvostransko) preoblikovanim stebлом (*t. 25-27; 28: 8; 29*) in podobnim orodjem, pri katerem prisotnost odprtine ni zanesljiva (*t. 28: 7*).

Bolj ali manj ohranjena orodja z odprtino lahko v grobem uvrstimo v dva tipa, ki se razlikujeta po uporabljenem delu rogovja (*sl. 6.3*). Večina je izdelana iz srednjega dela stebela (*sl. 6.4*), dva pa iz parožkov, pri čemer bi enega glede na masivnost in ukrivljenost lahko pripisali nadočniku (*t. 28: 7; sl. 6.9*). Glede na korodiranost korteksa lahko sklepamo, da so za dve orodji uporabili odpadlo rogovje (*t. 26: 3; 29: 11*), ostali primerki pa so pripadali uplenjenim živalim. Spongioza je pri večini primerov propadla skoraj v celoti, najverjetneje kot posledica poodložitvenih procesov, stanje ohranjenosti kompakte pa je razmeroma dobro.

Pri desetih orodjih (*t. 25: 1,2; 26: 3,4; 27: 5,6; 29: 9-12*) je odprtina izdelana na strukturno najmočnejšem delu izbranega segmenta rogovja, kjer se od stebela odcepi srednjik. Pri vseh orodjih poteka odprtina lateralno-medialno glede na steblo in je navadno nekoliko pomaknjena iz osi stebela proti ostanku srednjika (*sl.*

ossified disk of oval cross-section with characteristic tubercles at its perimeter and represents, together with the medallion, the proximal end of the shed antler. The beam, characterized by several deviations in its angle, is composed of the basal part between the burr and the bez and the trez tines, the middle part under and above the trez tine and the upper part to the crown base. In most cases, it is oval in cross-section; only above the bez and the trez tines does it form a distinct ridge. The longest and most curved prong on the beam of an adult deer is usually the brow tine (*Fig. 6.2*).

The shed antler commonly shows bite marks of carnivores and gnawing marks of small mammals that use antler, due to the high content of calcium, as food supplement (Clason 1983, 85).

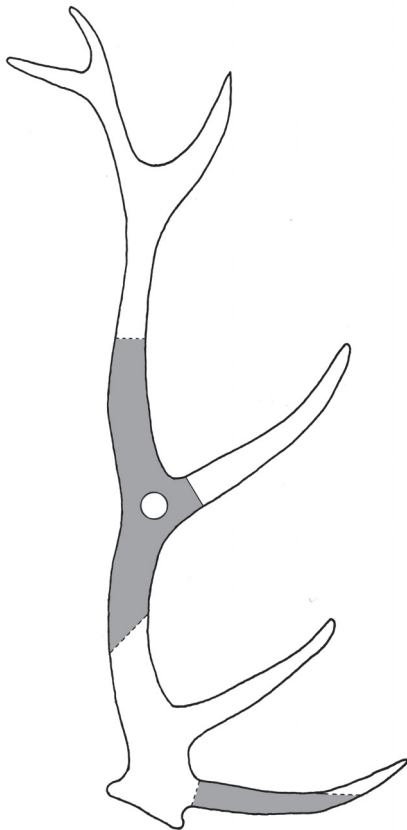
It is a known fact that, by soaking it in water, it is possible to considerably shorten the time of cutting and working the antler as well as to lessen the chance of unwanted breaking during the working process. This sort of antler softening is proved for the prehistoric times mostly by the characteristic and clear traces of cutting or by the facets on the worked surfaces (Pratsch 1994, 18,19).

2.2 Solid antler tools

Large tools made of red deer antlers are represented at Zalog by thirteen tools with a perforation and the beam shaped into a chisel- (cut on one side) or wedge-like termination (cut on both sides) (*Pl. 25-27; 28: 8; 29*). There are also similar tools where the presence of a perforation is not certain (*Pl. 28: 7*).

The tools with a perforation, more or less well preserved, can be divided into two types based on the part of the antler used (*Fig. 6.3*). Most are made on the middle beam part (*Fig. 6.4*) and two on the prongs, whereby one could be made, based on its solidity and curve, on the brow tine (*Pl. 28: 7; Fig. 6.9*). The corrosion of the cortex possibly indicates that in the production of two tools a shed antler was used (*Pl. 26: 3; 29: 11*), while other examples belong to caught animals. In most cases, the spongiosis has almost completely disintegrated, most likely as a consequence of post-depositional processes. The compact substance, on the other hand, is in a relatively good state.

The perforation on ten of the tools (*Pl. 25: 1,2; 26: 3,4; 27: 5,6; 29: 9-12*) is made on the structurally soundest part of the selected antler segment, where the trez tine separates from the beam. The perforations on all these tools run in a lateral-medial axis in respect to the beam, usually slightly off the beam axis and towards the remains of the trez tine (*Figs. 6.4-6.7*). The perforation divides the tool in two almost equal parts. The surface of the determinable examples that came into contact with the worked material was made



Sl. 6.3: Zalog pri Verdu. Uporabljeni deli rogovja navadnega jelena.

Fig. 6.3: Zalog near Verd. The parts of red deer antler used.

6.4-6.7). Odprtina deli orodje na dva približno enaka dela. Pri določljivih primerkih je bila površina, ki je prihajala v stik z obdelovanim materialom, izdelana na proksimalnem, teme pa na distalnem delu stebela. Dve v celotni dolžini ohranjeni orodji merita v dolžino 32,6 cm (*t.* 25: 1; *sl.* 6.4) in 28,8 cm (*t.* 26: 4), tem vrednostim pa so se prvotno približevala vsaj še 4 orodja (*t.* 25: 2; 26: 3; 27: 5,6).

Začetek procesa izdelave je verjetno predstavljala odstranitev proksimalnega (bazalnega) dela rogovja z rožo ter zgornjega dela stebela s krono. Distalni del stebela s temenom je ohranjen le pri dveh primerkih. Pri prvem je bilo steblo pravokotno odstranjeno (odžagano) tik nad sivčkom (*t.* 25: 1; *sl.* 6.4), pri drugem pa odstranjeno z rezanjem oz. fasetiranjem, ki je na kompakti pustilo značilne poševne sledove v obliki črke V ali trapeza (*t.* 26: 4). V procesu izdelave je verjetno sledila odstranitev odvečnega dela srednjika. Ta je bil prav tako ali navpično odrezan oziroma odžagan (*t.* 25: 1; 27: 6; *sl.* 6.5) ali pa so korteks odstranili z ozkimi poševnimi vrezi (*t.* 27: 5; 29: 9,12; *sl.* 6.6).



Sl. 6.4: Zalog pri Verdu. Kat. št. 1. M. = 1 : 2.

Fig. 6.4: Zalog near Verd. Cat. no. 1. Scale = 1 : 2.

on the proximal part and the apex on the distal beam part. Two tools are preserved in their total length and measure 32.6 cm (*Pl.* 25: 1; *Fig.* 6.4) and 28.8 cm (*Pl.* 26: 4) respectively. At least four other tools must have come close to these sizes (*Pl.* 25: 2; 26: 3; 27: 5,6).

The first step in the working process must have been the removal of the proximal (basal) part of the antler with the burr as well as the upper part of the beam with the crown. The distal part of the beam with the apex is preserved only in two examples. The beam of the first was perpendicularly removed (sawed off) just above the bez tine (*Pl.* 25: 1; *Fig.* 6.4), while the



Sl. 6.5: Zalog pri Verdu. Kat. št. 1. Detajl odprtine in ostanka srednjika. M. = 1 : 1.

Fig. 6.5: Zalog near Verd. Cat. no. 1. Detail of the perforation and the trez tine remains. Scale = 1 : 1.



Sl. 6.6: Zalog pri Verdu. Kat. št. 5. Detajl odprtine in ostanka srednjika. M. = 1 : 1.

Fig. 6.6: Zalog near Verd. Cat. no. 5. Detail of the perforation and the trez tine remains. Scale = 1 : 1.

Proksimalni del stebila je v enem primeru dletasto preoblikovan v rezilo z ovalno ploskvijo (*t.* 25: 2; *sl.* 6.10), ostali pa so priostreni z dveh strani (*t.* 25: 1; 26: 4; 27: 6; 28: 8), s čimer je bil sprva oblikovan bolj ali manj raven delovni rob. Ker spongioza ne premore zadostne trdote, se je ta del orodja tudi ob zmerni uporabi kmalu spremenil v nekakšne vilice z dvema rogljema. Vsa ohranjena rezila in vilice potekajo vzporedno z osjo odprtine.

Pri odprtinah prevladujejo popolnoma ali skoraj okrogle (*sl.* 6.4; 6.7), dve pa sta okrogli do ovalni (*t.*



a



b

Sl. 6.7: Zalog pri Verdu. Kat. št. 3. Detajl odprtine; a: medialno; b: lateralno. M.= 1 : 1.

Fig. 6.7: Zalog near Verd. Cat. no. 3. Detail of the perforation; a: medial; b: lateral. Scale = 1 : 1.

beam of the other was removed by cutting or faceting, which left characteristic oblique marks on the compact substance in the shape of a V or a trapeze (*Pl.* 26: 4). Next in the working process was probably the removal of the excess trez tine. This was also either vertically cut or sawed off (*Pl.* 26: 1; 27: 6; *Fig.* 6.5) or the cortex removed by thin oblique cuts (*Pl.* 27: 5; 29: 9,12; *Fig.* 6.6).

The proximal beam part was, in one case, shaped into a chisel blade with an oval surface (*Pl.* 25: 2; *Fig.* 6.10), while others were bifacially sharpened (*Pl.* 25: 1; 26: 4; 27: 6; 28: 8). The latter initially created a more or less straight working edge. However, since the spongiosis is less hard, this part of the tool was transformed by even a moderate use into a sort of a fork with two prongs. All preserved blades and forks run parallel to the perforation axis.

26: 4; 28: 8; *sl.* 6.8). Premeri znašajo večinoma med 2,2 in 2,4 cm, celoten razpon pa je od 1,8 do 2,6 cm. Na odprtinah z lijakasto oblikovanim profilom oboda, ki se običajno nahajajo na medialni strani stebra, so na vrhnjem delu vidni nekaj milimetrov široki in globoki vrezi z ostrim orodjem (*sl.* 6.4-6.6; 6.7: b), s katerim so odstranili zunanji del kompakte, medtem ko je notranji bolj ali manj gladek in kaže le posamične tanke zareze. Odprtina na nasprotni strani ima običajno navpično ali le rahlo poševno steno (*sl.* 6.8). Poševne stene vhodne in izhodne odprtine dokazujejo, da so kompakto predrli z ene in druge strani stebra (*sl.* 6.7: a). Celotna odprtina je bolj ali manj cilindrične oblike in poteka pravokotno na glavno os orodja. Na obodu luknje na lateralni strani so pri enem primerku vidni poševni vrezi, najverjetneje sledovi širjenja luknje z ostrim orodjem (*t.* 26: 4). Med potencialnimi kamnitimi orodji za dodelavo odprtin z območja najdišča bi



Sl. 6.8: Zalog pri Verdu. Kat. št. 8. Detajl odprtine. M. = 1 : 1.

Fig. 6.8: Zalog near Verd. Cat. no. 8. Detail of the perforation. Scale = 1 : 1.



Sl. 6.9: Zalog pri Verdu. Kat. št. 7. M. = 1 : 2.

Fig. 6.9: Zalog near Verd. Cat. no. 7. Scale = 1 : 2.

The perforations are, in most cases, perfectly or nearly perfectly round (*Figs.* 6.4;6.7) and two are round to oval (*Pl.* 26: 4; 28: 8; *Fig.* 6.8). Their diameters measure from 1.8 to 2.6 cm, with most between 2.2 and 2.4 cm. The perforations with a funnel-shaped perimeter profile, usually situated on the medial beam part, show a few millimetres wide and deep cuts with a sharp object on the upper part (*Figs.* 6.4-6.6; 6.7: b), which indicate that the outer part of the compact substance was removed. The inner part is more or less smooth and shows only individual thin cuts. The wall of the perforation on the opposite side is usually vertical or only slightly oblique (*Fig.* 6.8). Oblique walls of the entry and exit perforations prove that the compact substance mass was perforated from both sides of the beam (*Fig.* 6.7: a). The entire perforation is more or less cylindrical in shape and runs perpendicularly to the main axis of the tool. The lateral side of the perforation perimeter of one example shows oblique cuts, most likely marks of widening of the perforation with a sharp object (*Pl.* 26: 4). The potential stone tools from the site for additional working of the perforation might be the convergent scrapers with points that are broken off as well as the pointed tools with lateral retouches on the distal end (Kavur, in this publication, *Pl.* 5: 75,84; 6: 85; 10: 148; 12: 183; 13: 185,186,197; 14: 203; 15: 225; 16: 238,242,247,252; 18: 277; 19: 295,296).

The proximal part of a tool made from a prong, with the preserved length of 27.6 cm, is damaged but it, nevertheless, seems not to have been perforated (*Pl.* 28: 7; *Fig.* 6.9). Based on the blade made perpendicularly to the tool axis, it would be possible for the hollowed antler to have been used as a perforation for a

prišle v poštev konvergentna strgala z odlomljenimi konicami ter koničasta orodja z lateralnimi retušami na distalnem delu (Kavur, v tem zborniku, *t.* 5: 75,84; 6: 85; 10: 148; 12: 183; 13: 185,186,197; 14: 203; 15: 225; 16: 238,242,247,252; 18: 277; 19: 295,296).

Pri orodju na parožku z ohranjeno dolžino 27,6 cm je proksimalni del sicer poškodovan, vendar se zdi, da ni bil prevrtan (*t.* 28: 7; *sl.* 6.9). Glede na rezilo, ki je usmerjeno pravokotno na os orodja, bi bilo mogoče, da je izvotljeno rogovje delovalo kot tulasto nasadišče za kolenasto oblikovano toporišče. Od ostalih orodij se razlikuje tudi po daljšem rezilu z obrabljeno ploskvijo.

2.2.1 Sledovi uporabe in poškodbe

Večina orodij je poškodovanih, pri čemer je težko ločiti med poškodbami, ki si nastale ob uporabi in tistimi, ki so posledica preperevanja. Poškodbe segajo od odlomljenih temen orodij na distalnem delu stebra (*t.* 25: 2; 26: 3; 27: 6) ali proksimalnem delu parožka (*t.* 28: 8), nadalje delno (*t.* 25: 1) ali v celoti (*t.* 27: 5) odlomljenih površin, ki so prihajale v stik z obdelovanim materialom, do orodij, ki so počila po vzdolžni osi (*t.* 26: 4) ali na odprtini (*t.* 25: 9,11,12).

Pri vseh treh orodjih s klinastim rezilom je to počeno po vzdolžni osi (*sl.* 6.10). Odlomljeno lusko kompakte med delovno površino in odprtino bi lahko pripisali tako poškodbi med izdelavo kot ob uporabi (*t.* 25: 2), medtem ko lahko izbočen profil obdelane površine pri enem primerku nedvomno povežemo z intenzivno uporabo (*t.* 28: 7). Pri orodju z dletastim rezilom (*t.* 25: 2; *sl.* 6.10) so na robovih kompakte vidne ozke in plitve zareze.

Sledovi obrabe na primerkih z dvostransko obdelano površino nastopajo v obliki bleščeče zglajenih robov kompakte. Na konicah vilic enega orodja (*t.* 27: 6) so vidne plitve vdrtine.

knee-shaped helve. It stands out from the other tools also by its longer blade with a worn surface.

2.2.1 Damage and traces of use

Most tools are damaged, whereby it is difficult to distinguish between the damage that occurred through use and that which is a consequence of weathering. Damage to the tools is visible where the apices were broken off on the distal ends of the beam (*Pl.* 25: 2; 26: 3; 27: 6) or on the proximal ends of the prong (*Pl.* 28: 8), where the surfaces in contact with the working material were partially (*Pl.* 25: 1) or completely (*Pl.* 27: 5) broken off as well as where the tools split along the longitudinal axis (*Pl.* 26: 4) or at the perforation (*Pl.* 29: 9,11,12).

All three tools with a wedge blade have their edges split along the longitudinal axis (*Fig.* 6.10). The chip of the compact substance that broke off between the working surface and the perforation could be ascribed either to damage either during production or during use (*Pl.* 25: 2), while the convex profile of the worked surface in one example can undoubtedly be linked to heavy use (*Pl.* 28: 7). The tools with a chisel blade (*Pl.* 25: 2; *Fig.* 6.10) reveal thin and shallow cuts on the edges of the compact substance.

Traces of wear appear on the examples worked on two sides as shiny smoothed edges of the compact substance. The tips of a fork on one tool (*Pl.* 27: 6) revealed also shallow indentations.



Sl. 6.10: Zalog pri Verdu. Kat. št. 2. Detajl rezila.

M. = 1 : 1.

Fig. 6.10: Zalog near Verd. Cat. no. 2. Detail of the blade.

Scale = 1 : 1.

Popravila polomljenih orodij niso bila ugotovljena. Čeprav bi lahko glede na simetričnost orodja v primeru poškodbe izdelali nov delovni rob na nasprotni strani, so pri vseh orodjih rezila oziroma vilice izdelana na proksimalnem delu. Zgolj kot bolj ali manj verjetno omenimo možnost, da so poškodovana rezila lahko enostavno predelali v vilice.

3 KOMENTAR

3.1 Kratek oris masivnih orodij iz rogovine v mezolitiku Evrope

Precejšnja tipološka homogenost masivnih orodij iz rogovine z evropskih mezolitskih najdišč je logičen rezultat omejitvev, ki jih prinaša morfologija surovine. Za izdelavo orodij so uporabljali predvsem proksimalni del rogovja in srednji del stebela, manj pogosto pa krono in paroške. To velja posebej za orodja z odprtino oziroma ušesom za pritrditev na toporišče, pri katerih je lahko odprtina izdelana lateralno-medialno glede na potek glavne osi stebela (pravokotno na ravnino paroškov) ali anteriorno-posteriorno (v ravnini s paroški). Večina odprtine je cilindrične oblike, pojavljajo pa se tudi rahlo konične, s čimer je bil zagotovljen trdnejši stik med orodjem in držajem. Pri delu orodij na proksimalnem delu rogovja je odprtina izdelana tako, da tvori skupaj z glavno osjo stebela kot okoli 80°. Ohranjena toporišča z severnoevropskih najdišč imajo navadno stožčasto odebeljen vrhnji del, ki je preprečeval zdrs orodja z držaja. Za njihovo izdelavo so uporabljali predvsem les jelše, jesena in leske, ki je razmeroma fleksibilen in se zlomi šele pri večji obremenitvah (Andersen 1973-1974, 66; Pratsch 1994, 24).

V literaturi se za ta robustna orodja pojavljajo različni izrazi, ki nakazujejo raznolikost funkcionalnih interpretacij in se najpogosteje nanašajo na obliko in usmeritev rezila ali obdelane površine glede na toporišče. Nadaljnja delitev glede na del rogovja, na katerem je izdelano orodje, je bolj ali manj delovne narave, saj zaenkrat ni dokazov, da bi bila namenjena različnim opravilom. Predlagani načini uporabe segajo od orodja za razkosavanje plena, kopanje, obdelavo lesa in odstranjevanje zgojenele notranjosti debel v procesu izdelave čolnov do cepinov za klesanje lukenj v zaledenela jezera in reke (Erdbrink 1982, 121). Primerjava sledov uporabe na primerkih z danskih najdišč, ki se kažejo kot bleščeče zglajeni robovi delovnih površin, s sledovi replik je pokazala, da gre za sekire, s katerimi je bilo mogoče podirati drevesa in/ali obdelovati les (Jensen 2001). Nekateri raziskovalci to možnost zavračajo, pri čemer izhajajo iz predpostavke, da obdelovani material ne more biti trši od orodja. Po Smithu, ki za vsa orodja z odprtino uporablja izraz kopača, bi vzporedne zareze na

Repair of the damaged tools has not been established. Based on the symmetry of the tools, a second working edge, for example, could be envisaged on the opposite side. However, the tools reveal blades or forks that were made on the proximal ends exclusively. As a suggestion with more or less possibility to it, the damaged blades may also have simply been re-worked into forks.

3 COMMENTARY

3.1 Brief outline of the solid antler tools in the Mesolithic of Europe

The considerable typological homogeneity of the solid antler tools from the European Mesolithic sites is a logical consequence of the limitations brought about by the morphology of the material itself. In tool production, mostly proximal ends of antler and the middle parts of the beam were used; the crown and the prongs were used less frequently. This is particularly true for tools with a perforation or a socket by way of which it was fastened to the helve. The perforation of these tools could be made either in a lateral-medial axis in relation to the main beam axis (perpendicular to the prong plane) or in an anterior-posterior axis (parallel to the prongs). Most perforations are cylindrical in shape, sometimes also slightly conical, whereby a closer fit between the helve and the tool was ensured. The perforation of the tools, with the working edge made on the proximal end, is made so as to form an angle of approximately 80° with the main axis of the beam. The preserved helves from the Northern European sites usually have conically thickened upper parts that prevented the tool from slipping off the helve. In helve production, mostly alder, ash or hazel woods were used, which are rather flexible and only break under considerable pressure (Andersen 1973-1974, 66; Pratsch 1994, 24).

In literature, various terms are used for these robust tools, which indicate the various interpretations as to its function. These terms are most commonly related to the form or the direction of the blade or the worked surface in relation to the helve. Further division based on the part of the antler used to make the tool is of a more or less working nature, since there is, for the time being, no evidence to suggest its use in various tasks. The suggested manners of use span from tools for cutting meat, digging, woodworking and removing the charred interior of trunks in boat-making, to ice-picks for making holes into frozen lakes and rivers (Erdbrink 1982, 121). The comparison of the traces of use on the examples from the Danish sites, that appear as shiny smoothed edges of working surfaces, with those on the replicas has shown that the axes were used to either fell trees or work wood (Jensen 2001). Some researchers deny this possibility, whereby their opinion is based

robovih površin, ki so prihajale v stik z obdelovanim materialom, lahko povzročilo kopanje po tleh z veliko kamenja, medtem ko zbrušene površine povezuje s prstmi z večjo vsebnostjo organskih sestavin. Pogoste poškodbe terminalnih delov orodij naj bi nastale kot posledice udarca ob večji kamen, podobni šoki pa bi lahko povzročili tudi pogosto izpričane zlome orodja pri odprtini (Smith 1989, 282).

Zastopanost masivnih orodij iz jelenovih rogovij na evropskih najdiščih iz časa po koncu glaciala je v regionalnem smislu precej neenakomerna. To dejstvo je bilo v literaturi največkrat pojasnjeno z različnimi pogoji za ohranitev organskih materialov, zaradi česar naj bi bila izjemna pogostost najdb v severni Evropi bolj ali manj rezultat organskim materialom prijaznih pogojev v tamkajšnjih barjih in močvirjih (Andersen 1973-1974; Gramsch 1973; Pratsch 1994), na podoben sklep pa navaja tudi situacija na Britanskem otočju (Smith 1989) in na območjih ob obalah Severnega morja, kjer je bila večina orodij iz rogovine najdena v vlažnem oziroma vodnem okolju (Erdbrink 1982; Clason 1983).

Zdi se, da tafonomski dejavniki prvenstveno pogujejo tudi skromno zastopanost tega gradiva na mezolitskih najdiščih v Franciji, kjer na planih najdiščih na silikatni podlagi predmetov iz organskih materialov skorajda ne poznamo, v opaznejšem številu pa so prisotni v pokopih ob atlantski obali (Téviec, Hoëdic) in na nekaterih najdiščih v jamah in spodmolih (Rozoy 1978, 985-996). Mezolitska orodja s predrtino sodijo na celotnem območju med Francijo, Švico in jugozahodno Nemčijo med redkosti (Rozoy 1978, 988-996, t. 223), njihov vzpon pa je opazen šele v zgodnjem neolitiku (Billamboz 1977; Jochim 1993, sl. 66).

Na mezolitskih najdiščih jugozahodne Nemčije je kljub primerljivim pogojem za ohranitev zastopanost rogovine zelo različna, pri čemer variira tako razmerje med posameznimi najdišči kot med različnimi kronološkimi fazami. Praviloma je opazen vzpon tovrstne industrije v pozno mezolitskih kontekstih. Ta fenomen dobro ilustrirata večfazni plani najdišči Henauhof Nordwest na nekdanji obali Federseeja (Jochim 1993) ter Rottenburg-Siebenlinden ob Neckarju (Kind 2003). V primeru Henauhof Nordwesta je bilo 96 % vseh najdb iz jelenovega in srnjakovega rogovja (281 kosov) odkritih v poznomezolitiki plasti 3, v kateri so prepoznani ostanki zgodnje jesenske naselbine. Povsem drugačno sliko kaže starejša plast 4, ki se je odlagala v poletnih mesecih v borealu, v kateri sta bogato zastopana koščena industrija in favnistični material, število rogovij pa je zelo majhno (Jochim 1993, 130,138,139). Na okoli 70 km oddaljenem najdišču Rottenburg-Siebenlinden so bili proti pričakovanjem, ki so jih vzbujali dobri pogoji za ohranitev organskih materialov, artefakti iz kosti in rogovine zelo redki. Še največ (sedem) jih je bilo najdenih v okviru sklopa

on the assumption that the material worked cannot be harder than the tool used to work them. According to Smith, who uses the term mattock for all tools with a perforation, the parallel cuts on the surface edges that came into contact with the worked material could be caused by digging the earth with a great amount of stones, while he ties the smoothed surfaces with soils with a higher amount of organic components. The frequent damage to the terminal parts of tools would, in his opinion, appear as a consequence of encountering large stones during digging, with similar impacts possibly causing also the commonly attested splitting of tools at the perforation (Smith 1989, 282).

The distribution of solid tools made of red deer antler is regionally quite uneven on European sites from the time after the end of the Glacial. This fact was, in literature, mostly explained with the different conditions for the preservation of organic material, which would then also go to explain the high frequency of these finds in Northern Europe, where the more or less favourable conditions enabled the preservation of organic materials in the local moors and marshes (Andersen 1973-1974; Gramsch 1973; Pratsch 1994). A similar conclusion could be drawn for the situation in the British Isles (Smith 1989) as well as on the coasts of the North Sea, where most antler tools were found in humid or wet environments (Erdbrink 1982; Clason 1983). It seems that the taphonomic factors importantly condition also the poor representation of this material at the Mesolithic sites in France, where the plane sites on a silicate ground are almost devoid of objects made of organic material, while they are present in a considerable number in the inhumation graves on the Atlantic coast (Téviec, Hoëdic) as well as in some cave and rock shelter sites (Rozoy 1978, 985-996). In the area between France, Switzerland and south-western Germany, Mesolithic tools with a perforation appear rarely (Rozoy 1978, 988-996, Pl. 223), their numbers appearing to increase only in the early Neolithic (Billamboz 1977; Jochim 1993, Fig. 66).

The Mesolithic sites of south-western Germany reveal a varying representation of antler, despite the comparable conditions for preservation, whereby both the relationship among individual sites as well as among various chronological phases vary. This phenomenon is well illustrated by the multi-phase plane sites of Henauhof Nordwest, on the former coast of Federsee (Jochim 1993), and Rottenburg-Siebenlinden along the Neckar (Kind 2003). In the case of Henauhof Nordwest, 96% of all finds made of red and roe deer antler (281 pieces) were uncovered in the Late Mesolithic layer 3, which was recognized as the remains of an early autumnal settlement. A completely different picture is revealed by the earlier layer 4 that was deposited in the summer months in the Boreal with a high representation of bone industry and faunistic material but a very

Siebenlinden 1 - horizont II, datiranega v boreal (Kind 1993, 247-255).

Artefakti iz rogovja so pravilo tudi v pozno paleolitskih in mezolitskih inventarjih južnega in vzhodnega obrobja Alp, Istre in Krasa, pri čemer se orodja iz tega materiala iz razumljivih razlogov pojavljajo le na trajnejših naselbinah v nižinah ter v jamah in spodmolih, kot sta Riparo Gaban v okolici Trenta (Kozłowski, Dalmeri 2000) in Mala Triglavca pri Divači (Leben 1988; Turk 2004). Tudi večje število predmetov iz rogovja z obeh najdišč na Ljubljanskem barju je v prvi meri posledica stanja raziskanosti in dobrih pogojev za ohranitev organskih materialov. Pozno mezolitske plasti iz Brega pri Škofljici označuje visoka zastopnost koščenih konic, medtem ko kljub prevladi navadnega jelena med skeletnimi ostanki živali (68,2 %) artefakti iz rogovij niso bili odkriti (Frelj 1986). Iz starejšega horizonta poselitve, ki je radiokarbonsko datiran v preboreal, ni sporočenih nobenih tovrstnih najdb (Mlekuž 2001). Posebnost Zaloga pri Verdu so masivna orodja iz jelenovih rogovij z odprtino, ki so v mezolitiku bolj ali manj omejena na najdišča v severni in zahodni Evropi, podonavsko-balkanskem prostoru in na vzhodno ležečih območjih ob spodnjem toku Buga in Dnjestra.

Sodeč po pregledani literaturi so masivna orodja iz rogovja na območjih ob alpskem loku zastopana le s primerki na stebelu brez odprtine. Ta tip orodja, ki se posamično pojavlja že v mlajšem paleolitiku in je posebej pogost na najdiščih iz boreala (Provenzano 1998, 17-23; Pratsch 1999; Kind 2003, 247-251, sl. 170: 1,6), je na južnem in vzhodnem obrobju Alp znan npr. iz spodmolov Mala Triglavca pri Divači (Leben 1988, t. 1: 1-3), Vatte di Zambana (Broglia 1971, sl. 8) in Gaban ob Adiži (Kozłowski, Dalmeri 2000, sl. 21). Gre za do 20 cm dolga orodja na stebelu ali nadočniku, ki so bila glede na sledove na proksimalnem delu bodisi nasajena na kratke držaje iz rogovja oziroma lesa ali pa opremljene z usnjenimi omoti (Pratsch 1999). V večini primerov je dletasto rezilo usmerjeno pravokotno na os držaja. Glede na zaobljenost ploskve, ki dokazuje obdelavo mehkega in hkrati abrazivnega materiala, ter etnografske analogije, so običajno interpretirana kot orodja za izkopavanje korenin ali lukenj za pasti ali za druge namene, kot sta npr. odstranjevanje lubja in obdelava kož.

small number of antlers (Jochim 1993, 130,138,139). The site of Rottenburg-Siebenlinden, lying approximately 70 km away, yielded very rare bone and antler artefacts despite the high expectations aroused by the good conditions for the preservation of organic material. Most (seven) were found within the Siebenlinden 1 complex - horizon II, dated to the Boreal (Kind 1993, 247-255).

Antler artefacts appear as a rule also in the Late Palaeolithic and Mesolithic assemblages of the southern and eastern outskirts of the Alps, in Istria and the Kras, whereby tools of this material only appear, for cogent reasons, in long-lasting settlements on the plains and in rock shelters such as Riparo Gaban in the vicinity of Trento (Kozłowski, Dalmeri 2000) and Mala Triglavca near Divača (Leben 1988; Turk 2004). The high number of antler objects from both sites at the Ljubljansko barje is, first and foremost, the consequence of the state of research and favourable conditions for the preservation of organic material. The Late Mesolithic layers from Breg near Škofljica are characterized by a strong presence of bone points, while there were no antler artefacts found there despite the prevalence of red deer (68.2%) among the animal skeletal remains (Frelj 1986). The earlier settlement horizon, dated with the radiocarbon method to the Pre-Boreal, revealed no such finds (Mlekuž 2001). A particular feature of the Zalog near Verd site is the solid tools from red deer antler with a perforation that are, in the Mesolithic, mostly limited to the sites in Northern and Western Europe, the Danubian and Balkan region as well as in the area of the lower reaches of the Bug and the Dniester Rivers to the east.

The review of the literature revealed that solid antler tools are only represented, in the areas along the Alpine arch, with the examples made on the beam without a perforation. This tool type, that appears individually already during the Late Palaeolithic and is particularly frequent on the Boreal sites (Provenzano 1998, 17-23; Pratsch 1999; Kind 2003, 247-251, Fig. 170: 1,6), is known in the southern and eastern outskirts of the Alps at the rock shelters of Mala Triglavca near Divača (Leben 1988, Pl. 1: 1-3), Vatte di Zambana (Broglia 1971, Fig. 8) and Gaban along the Adige River (Kozłowski, Dalmeri 2000, Fig. 21), for example. These are tools of up to 20 cm in length made on the beam or the brow tine, either helved onto short antler or wooden helves or furnished with leather wrappings (Pratsch 1999). In most cases, their chisel blades run perpendicular to the helve axis. The rounded surface that indicates the working of a soft and also abrasive material as well as and ethnographic analogies usually suggest the interpretation of the objects as tools used for digging up roots, holes for traps or other purposes such as removing bark or processing hide.

3.2 Orodja z odprtino

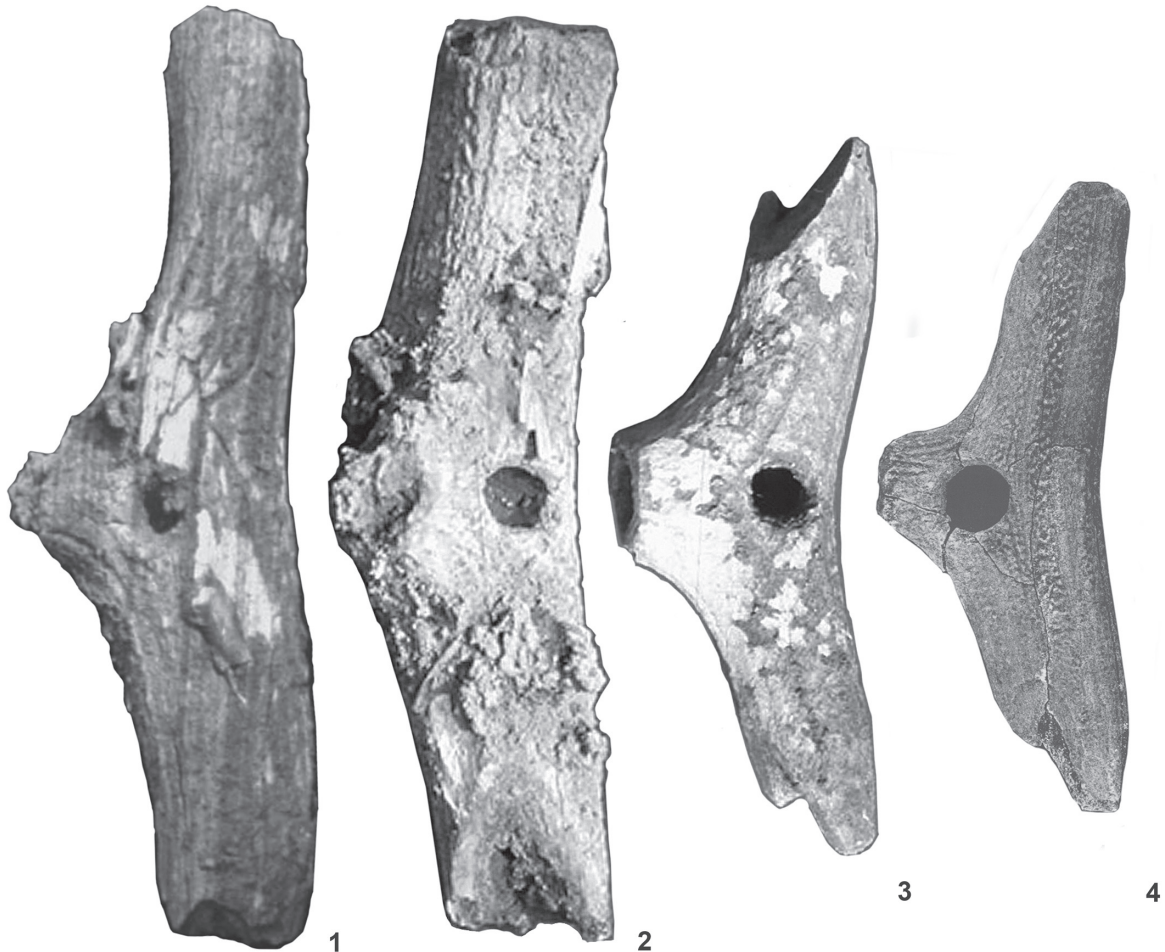
Enkratna zbirka orodij iz Zaloga pri Verdu zasluži nekoliko bolj poglobljeno obravnavo v okviru pregleda masivnih rogovinastih orodij v mezolitiku Evrope, pri čemer se opiramo na kronološko in tehnološko analizo najdb iz večfazne naselbine Friesack 4 v bližini Berlina (Pratsch 1994), v katero je avtor pritegnil tudi druge najdbe iz severne Evrope. Na drugi strani je naša pozornost usmerjena na epipaleolitska in mezolitska najdišča v Železnih vratih (Boroneanț 1973; id. 1999; Bačkalov 1979; Srejšović 1979).

Za srednji in pozni preboreal (Friesack I-II: ca. 9700-9400/9200 PS) severne in zahodne Evrope so značilna orodja iz rogovja losa, med tehnikami razkosavanja rogovij in kosti pa je večkrat izpričano klanje po vnaprej izdelanih vrezih (*groove and splinter technique*). Na prehodu v zgodnji boreal se pojavijo orodja na segmentu stebela in na bazalnem delu z odprtino in

3.2 Tools with a perforation

The unique tool collection from Zalog near Verd deserves a more in-depth treatment within an overview of solid antler tools in the Mesolithic of Europe, whereby the author leans onto the chronological and technological analysis of the finds from the multi-phase settlement of Friesack 4 in the vicinity of Berlin (Pratsch 1994) as well as on other finds from Northern Europe. The author's attention is also directed towards the Epi-Palaeolithic and Mesolithic sites in the Iron Gates (Boroneanț 1973; id. 1999; Bačkalov 1979; Srejšović 1979).

The Middle and Late Pre-Boreal periods (Friesack I-II: ca. 9700-9400/9200 BP) of Northern and Western Europe are characterized by tools made of elk antler, while the techniques of cutting the antler and bone include the frequently attested groove and splinter technique. The transition into the Early Boreal witnesses



Sl. 6.11: 1 Ostrovul Mare; 2,3 Schela Cladovei; 4 Vlasac (1-3 po Boroneanț 1999; 4 po Srejšović, Letica 1979). M. = ca. 1 : 3.

Fig. 6.11: 1 Ostrovul Mare; 2,3 Schela Cladovei; 4 Vlasac (1-3 from Boroneanț 1999; 4 from Srejšović, Letica 1979). Scale = ca 1 : 3.

brez nje, v tehnologiji izdelave pa popolnoma prevlada fasetiranje (Pratsch 1994, 33). V zgodnjem borealu (Friesack III: ca. 9100-8800 PS) se navedenim oblikam pridružijo še orodja na kroni in parožkih, ki so jih sodeč po sledovih obrabe prvenstveno uporabljali v obdelavi kože in krzna ter produkciji kamnitih orodij (Erdbrink 1982, 115; Pratsch 1994, 31). Največja raznolikost oblik označuje konec boreala in zgodnji atlantik (Friesack IV: ca. 8200-7000 PS), ko se prvič pojavijo orodja na bazalnem delu rogovja z lateralno-medialno odprtino. Sočasno se intenzivira uporaba tehnike žaganja, ki je sicer izpričana že v mlajšem paleolitiku (Pratsch 1994, 34).

Večje število orodij z odprtino izvira tudi z najdišč na obeh bregovih Donave v Železnih vratih. Žal je v nekaterih publikacijah gradivo reproducirano precej pomanjkljivo, podrobnejšo tipološko-kronološko obravnavo pa onemogočajo tudi nejasnosti v zvezi z datacijami posameznih faz. Pri kronologiji se opiramo na korigirane ¹⁴C datume človeških pokopov z najdišč Schela Cladovei, Vlasac in Lepenski vir, ki jih prinašajo Bonsall *et al.* (2000).

Intenziviranje uporabe predmetov iz rogovine je na temu območju opazno že v poznem glacialu (Dryas III) in zgodnjem postglacialu (Cuina Turcului II; Ostrovul Banului I-II), obdelava jelenovih rogovij pa doživi največji vzpon med vključno preborealom in zgodnjim atlantikom (Vlasac I-III, Schela Cladovei I-III, Lepenski vir I-II; Icoana I-III; ca. 9800-6800 PS). Intenzivnost izkoriščanja te surovine nakazujejo prava skladišča jelenovih rogovij v naselbinah Icoana in Alibeg na levi obali Donave (Boroneanț 1973, 14), ki spominjajo na podobne najdbe z najdišč v južni Skandinaviji. Rogovina ima vlogo dominantne surovine tudi v pozno mezolitskih fazah kulture Bug-Dniester v Moldaviji in zahodni Ukrajini (Soroki II), od koder Bačkalov in Srejić navajata tudi analogije za orodja z odprtino (Bačkalov 1979, 20; Srejić 1979, 59).

Pregled objav materiala z najdišč v Železnih vratih pokaže, da so se v borealu in zgodnjem atlantiku na tem območju uporabljale podobne generalne oblike orodij ter enake tehnike izdelave kot v severni Evropi (fasetiranje in žaganje; Boroneanț 1973, 14), ključne razlike pa so povezane z izbiro delov rogovja ter usmeritvijo odprtine glede na glavno os stebela.

V primerjavi z mezolitikom severne in zahode Evrope rožena industrija Železnih vrat praktično ne pozna orodij, ki bi bila izdelana na proksimalnem delu roga. Nasprotno jo zaznamuje prevlada orodij iz srednjega in distalnega dela stebela, ki jim sledijo še orodja na kroni in parožkih. Iz dostopne literature nam je znan le en primerek, izdelan na skrajnem proksimalnem delu z rožo (Srejić, Letica 1978, t. 91: 3).

Druga značilnost, ki ločuje inventar podonavsko-balkanskega prostora od najdb iz severne in zahodne Evrope, je prisotnost orodij na srednjem delu stebela,

the appearance of tools made on a segment of the beam and on the basal part with or without a perforation, while the production technology witnesses a complete predominance of faceting (Pratsch 1994, 33). During the Early Boreal (Friesack III: ca. 9100-8800 BP), the above-mentioned forms were joined by tools made on the crown and the prongs that were, based on the traces of wear, used primarily in the processing of hide and fur as well as stone-tool production (Erdbrink 1982, 115; Pratsch 1994, 31). The greatest variety of forms is characteristic for the end of the Boreal and Early Atlantic (Friesack IV: ca. 8200-7000 BP), when the tools on the basal antler parts with a lateral-medial perforation make their appearance. At the same time, there is an intensification in the use of the sawing technique, otherwise attested to already in the Late Palaeolithic (Pratsch 1994, 34).

The high number of tools with a perforation originates also from the sites on both banks of the Danube at the Iron Gates. Unfortunately, some publications offer poor reproductions of the material, while a more detailed typological and chronological analysis is prevented also by the ambiguity concerning the dating of individual phases. The chronology in this text is based on the corrected ¹⁴C dates for inhumation graves from the sites of Schela Cladovei, Vlasac and Lepenski vir, published by Bonsall *et al.* (2000).

The intensification of the use of antler objects can be observed in this area already during the Late Glacial (Dryas III) and Early Post-Glacial periods (Cuina Turcului II; Ostrovul Banului I-II), while the peak in the working of red deer antler can be observed between and including Pre-Boreal and Early Atlantic (Vlasac I-III, Schela Cladovei I-III, Lepenski vir I-II; Icoana I-III; ca. 9800-6800 BP). The intensity of exploitation of the material is indicated by real repositories of red deer antler at the settlements of Icoana and Alibeg on the left bank of the Danube (Boroneanț 1973, 14) that are reminiscent of similar finds from the sites in southern Scandinavia. Antler represents the dominant material used also in the Late Mesolithic phases of the Bug-Dniester Culture in Moldavia and western Ukraine (Soroki II), where Bačkalov and Srejić seek analogies for tools with a perforation (Bačkalov 1979, 20; Srejić 1979, 59).

An overview of the material from the Iron Gates sites reveals that, during the Boreal and Early Atlantic periods, similar general tool forms as well as a shared production technique link this area with Northern Europe (faceting and sawing; Boroneanț 1973, 14). The differences concern the choice of antler part and the perforation axis in relation to the main beam axis.

In comparison to the Mesolithic of Northern and Western Europe, tools made on proximal antler parts are practically unknown in the Iron Gates antler industry. The latter is marked rather with a predominance

pri katerih je odprtina izdelana lateralno-medialno glede na ravnino parožkov. Najdbe iz Zaloga imajo najboljše primerjave prav v tej skupini orodij, ki je na območju Železnih vrat zastopana z več tipi. Kljub precejšnji količini pregledanih objav roženih orodij, nobenem od teh tipov ne poznamo analogij iz ostalih mezolitskih najdišč v Evropi, razen že omenjenega območja ob spodnjem Bugu in Dnjestru.

Prvi tip, ki ga glede na število najdenih primerkov lahko upravičeno poimenujemo po Zalogu, predstavljajo orodja, pri katerih leži odprtina bolj ali manj v osi srednjika (sl. 6.11: 1,2). Več bolj ali manj ohranjenih orodij tipa Zalog, ki so po velikosti in obliki praktično identične tistim z Ljubljanskega barja, je bilo najdenih na eponimnem najdišču Schela Cladovei (Boroneanț 1999, sl. 17: 6; ca. 8100-7800 PS), še eno pa izvira z domnevno nekoliko mlajšega najdišča Ostrovul Mare (Boroneanț 1999, sl. 14: 4). Sodeč po objavljenih fotografijah gre v vseh primerih za orodja z lateralno odprtino, pri katerih je delovni rob usmerjen vzporedno z osjo odprtine (Boroneanț 1999). Poleg primerkov z ravno odstranjenim proksimalnim delom stebela so iz Schele Cladovei in Vlasca znana tudi orodja, pri katerih sta bila dvostransko preoblikovana oba konca stebela (sl. 6.11: 3,4; Boroneanț 1999; Srejšević, Letica 1978, t. 90: 1,3). Sorodna so tudi manjša orodja s kratkim in ravno odrezanim proksimalnim delom ter enostransko oblikovanim rezilom, izdelanim neposredno nad srednjikom (Boroneanț 1973, t. 6: 3; id. 1999; Srejšević, Letica 1978, t. 53; 90: 1; Bačkalov 1979, t. 19: 1).

Naslednji tip orodja iz srednjega dela stebela predstavljajo večja orodja, pri katerih je odprtina izdelana na distalnem delu stebela nad srednjikom, krajši proksimalni del pa je oblikovan v rezilo. Orodja, ki so zastopana le na najdiščih na levem bregu Donave (Ostrovul Banului, Icoana), je Boroneanț interpretiral kot preprosta rala (Boroneanț 1973, t. 6: 4,5; id. 1999), vendar je njegovo tezo zavrnil že Bačkalov (1979, 20). Orodja iz baze krone z odprtino, pri katerih je rezilo izdelano na stebelu, parožki pa odrezani (Srejšević, Letica 1978, t. 91: 1; Boroneanț 1999, sl. 7: 1), so zastopana tudi v srednji in severni Evropi, kjer se pojavijo v poznem atlantiku (Pratsch 1994, 30).

Značilne sekire na stebelu v obliki črke T, pri katerih je bila odprtina izdelana čez os srednjika, so na območju Železnih vrat izpričane na naselbinah Vlasac (II), Lepenski vir (II) in Alibeg (Boroneanț 1973, t. 6: 2; Srejšević, Letica 1978, t. 89: 1,4; 90: 2; Srejšević 1979, t. 9: 1), en primerek pa izvira tudi iz plasti IV v Crveni Steni (Basler 1975, 15,16; sl. 2: 1). Sekire tega tipa so v srednji in zahodni Evropi značilne za zgodnje neolitske kontekste poznega atlantika in subborreala (Billamboz 1977, 127-131; Erdbrink 1982, 121-133; Clason 1983, 120,121; Smith 1989, 278; Bonsall, Smith 1990), njim sočasne pa so tudi najdbe pozno

of tools made on the middle or distal beam parts, followed by tools made on the crown and prongs. The available literature revealed only one example made on the proximal-most part with the burr (Srejšević, Letica 1978, Pl. 91: 3).

The second characteristic separating the assemblages of the Danubian and Balkan region from the finds of Northern and Western Europe is the presence of tools made on the middle beam part with the perforation made in a lateral-medial axis to the prong plane. It is this group, represented by several types in the Iron Gates area, that furnishes the best comparisons for the Zalog finds. Other Mesolithic sites in Europe, except those from the already mentioned areas of the lower Bug and Dniester, have not provided analogies to any of these tool types in spite of the extensive research in the publications of antler tools.

The first type, which can justifiably bear the name of the Zalog site considering the number of its examples found, is represented by tools with the perforation lying more or less within the trez tine axis (Fig. 6.11: 1,2). Several more or less preserved tools of the Zalog type, in size and form practically identical to those from the Ljubljansko barje, were found on the eponymic site of Schela Cladovei (Boroneanț 1999, Fig. 17: 6; ca 8100-7800 BP), while another one originates from the presumably somewhat later site of Ostrovul Mare (Boroneanț 1999, Fig. 14: 4). The published photos allow the conclusion that all the tools have a lateral perforation with the working edge parallel to the perforation axis (Boroneanț 1999). In addition to the examples with the proximal part of the beam removed with a straight cut, Schele Cladovei and Vlasac also yielded tools with both beam ends bifacially worked (Fig. 6.11: 3,4; Boroneanț 1999; Srejšević, Letica 1978, Pl. 90: 1,3). Related to these are small tools with a short proximal part removed with a straight cut and a blade made on one side only, directly above the trez tine (Boroneanț 1973, Pl. 6: 3; id. 1999; Srejšević, Letica 1978, Pl. 53; 90: 1; Bačkalov 1979, Pl. 19: 1).

The next tool type made on the middle beam part is represented by large tools with the perforation made on the distal beam part above the trez tine, while the shorter proximal part is worked into a blade. The tools of this type, uncovered only on the left bank of the Danube (Ostrovul Banului, Icoana), were interpreted by Boroneanț as simple ploughs (Boroneanț 1973, Pl. 6: 4,5; id. 1999), but this interpretation was correctly refuted already by Bačkalov (1979, 20). Tools made on the crown base with a perforation, where the blade is made on the beam and the prongs cut off (Srejšević, Letica 1978, Pl. 91: 1; Boroneanț 1999, Fig. 7: 1), can also be found in Central and Northern Europe, where they appear in the Late Atlantic (Pratsch 1994, 30).

The characteristic T-shaped axes made on the beam with the perforation that exceeds the trez tine

mezolitskih kultur v severni Evropi (Friesack V: ca. 5700-4300 PS; Pratsch 1994, 30). Za razliko od orodij tipa Zalog je pri teh sekirah odprtina izdelana čez širši del stebila in poteka skozi ostanek srednjika.

3.2.1 Interpretacija orodij tipa Zalog

Kot izhodišče poskusa funkcionalne interpretacije orodij tipa Zalog vzemimo predpostavko, da je bilo orodje opremljeno s toporiščem. Moteča se zdi predvsem ekscentričnost odprtine, ki ni ugodna za nasajena orodja v funkciji sekire. Zanimivo je tudi, da so glede na ovalen presek stebila odprtino izdelali čez njegov ožji del, kar je imelo za posledico nižje uho oziroma slabše oprijemališče med orodjem in držajem v primerjavi z anteriorno-posteriorno usmerjenimi odprtinami čez steblo in ostanek srednjika pri T-sekirah. Morda so bila orodja na sredini stebila z lateralno-medialno odprtino v osi srednjika bolj izpostavljena poškodbam in so se sčasoma opustila, za kar govori tudi ozko omejen pojav ter skorajšnja odsotnost v mlajših obdobjih prazgodovine. Tako se med številnimi orodji z Dežmanovih kolišč v okolici Iga pojavljajo skoraj izključno orodja na proksimalnem (bazalnem) delu rogovja in primerki na ravnih segmentih stebila, lateralno-medialna odprtina v bližini srednjika pa je izpričana le pri posamičnih orodjih z dletastim rezilom (Korošec, J., P. Korošec 1969, t. 95: 9; 99: 1; 100: 1,9; prim. tudi orodje iz Kevdrc - Šubic 1998, 20).

Zastavlja se tudi vprašanje o možnostih za drugačno funkcijo odprtine. V paleolitiku so v odprtinah na istem mestu rogovja (npr. magdalénijski primerki z najdišč na Moravskem; Valoch 2001, 141, sl. 21: 4; t. 10: 1,2,5) ravnali iveri za izdelavo rogovinastih konic kopij.¹ V primeru, da so bila najdena orodja zagozde za klanje lesa, bi lahko odprtine služile izvlačenju zagozde s pomočjo palice oziroma vzvoda. Slabost te domneve je razmeroma majhen premer odprtine, ki ne sprejme vzvodu primerne palice. Nagibamo se k interpretaciji, da gre za kombinirano orodje s toporiščem, ki se je uporabljalo kot sekira in kot zagozda. V prid te domneve govorijo lega odprtine v težišču orodja ter poškodbe na rezilu in temenu, ki dokazujejo, da so po njem tolkli.

axis, are attested to in the Iron Gates area at the settlements of Vlasac (II), Lepenski vir (II) and Alibeg (Boroneaș 1973, Pl. 6: 2; Srejović, Letica 1978, Pl. 89: 1,4; 90: 2; Srejović 1979, Pl. 9: 1). One example was also found in layer IV at Crvena Stijena (Basler 1975, 15-16, Fig. 2: 1). In Central and Western Europe, axes of this type are characteristic of Early Neolithic contexts of the Late Atlantic and Sub-Boreal periods (Bilambos 1977, 127-131; Erdbrink 1982, 121-133; Clason 1983, 120,121; Smith 1989, 278; Bonsall, Smith 1990). Contemporary to these are the finds of the Late Mesolithic Cultures in Northern Europe (Friesack V: ca. 5700-4300 BP; Pratsch 1994, 30), where the perforation is made across the wider beam part and through the remains of the trez tine, contrarily to the Zalog type tools.

3.2.1 Interpretation of the Zalog type tools

The starting point for the attempt at a functional interpretation of the Zalog type tools is the supposition that the tools were equipped with a helve, whereby the most disturbing fact is the eccentricity of the perforation that is not suitable for helved tools functioning as axes. As for the perforation, it is interesting to note that it was made, given the oval cross-section of the beam, through its narrow part. This caused the perforation to be lower or, in other words, the contact between the helve and the tools poorer when compared to the perforations in T-shaped axes that run in an anterior-posterior axis across the beam and the remains of the trez tine. The tools made on the middle beam part with a lateral-medial perforation in the trez tine axis were possibly more prone to damage and were abandoned in time, which is suggested by the highly limited appearance and their near absence in the later periods of prehistory. The numerous tools from the Dežman's pile-dwellings in the vicinity of Ig include almost exclusively tools made on the proximal (basal) antler parts and examples on straight beam segments, while the lateral-medial perforation near the trez tine is attested to only in individual tools with a chisel blade (Korošec, J., P. Korošec 1969, Pl. 95: 9; 99: 1; 100: 1,9 CFR. Also the tool from Kevdrc - Šubic 1998, 20).

A question to be addressed is that of possible other functions of the perforations. In the Palaeolithic, the perforations on the same antler parts (for example the Magdalénian examples from the sites in Moravia; Valoch 2001, 141, Fig. 21: 4; Pl. 10: 1,2,5) were used to straighten the splinters to make antler spear points.¹ Were the tools found actually used as wedges for wood splitting, the perforation might then serve to extract the wedges with the aid of a stick or a lever.

¹ Za podatek se zahvaljujem dr. Ivanu Turku.

¹ I would like to thank dr. Ivan Turk for providing this information.

4 OSTALI PREDMETI IZ ROGOVINE IN KOSTI

4.1 Predmeti iz rogovine

Med orodji iz jelenovega rogovja sta tudi rahlo poškodovana konica oziroma šilo na parožku (*sl. 6.12*) in gladilo s polkrožno zaobljenim delovnim robom, izdelano iz segmenta stebela na stiku s parožkom (*t. 30: 13*). Gre za funkcionalni orodji s številnimi paralelami, ki pa niso kronološko ali kulturno izpovedne. Gladilo ima dobro primerjavo v plasti D v Klanjčevi peči v Čičariji, ki je bila pripisana koncu paleolitika ali mezolitiku (Malez 1986, sl. 17: 10). Podobna gladila iz Vlasca pripadajo tako starejšim kot tudi mlajšim fazam nasebine (Srejšović, Letica 1978, t. 84).

4.2 Predmeti iz kosti

Koščeni predmeti so zastopani še z dvema gladiloma ali dletoma (*t. 30: 15,16*), dvema šiloma (*t. 30: 17*) in s tremi dvojnimi konicami (*t. 31: 19-21; sl. 6.13*).

Večja orodja iz metakarpalnih in metatarsalnih kosti, pri katerih je glavica sklepa funkcionirala kot držaj, vzdolžno odstranjena kost z ravnim delovnim robom pa kot delovna površina, so pogost del inventarjev mezolitskih najdišč (npr. Srejšović, Letica 1978, t. 94; 5: 2,3,4,6). Enako velja za koščena šila iz epifiz (Camps-Fabrer, Ramseyer, Stordeur 1990; Srejšović, Letica 1978, t. 98: 2; Kind 2003, 252, sl. 170: 5).

Poškodovani konici pripadata podolgovatemu in ozkemu tipu z vzporednima lateralnima robovoma (*t. 31: 19,20*). Pri obeh primerkih je en konec v preseku konveksno-konkaven do sploščeno ovalen, drug pa okroglo-ovalen. V celoti ohranjena dvostranska konica ima konveksna lateralna robova ter v večjem delu pravokoten presek z zaobljenimi robovi, ki v terminalni tretjini preide v ovalnega (*t. 31: 20*). Robova 12,8 cm dolge konice nista popolnoma simetrična. Na podobno dolžino lahko sklepamo tudi pri obeh poškodovanih primerkih.

Vse tri konice so izdelane iz diafiz z dokaj tankimi stenami, kar je razvidno iz konveksno-konkavnega preseka dela konice, na katerem se še sluti naravna površina kosti. Ostali deli konic so bleščeče gladki, sledovi ostrih orodij razen izrazitejših faset na bikonveksnem primerku niso vidni.

Klekasta preloma na poškodovanih konicah dveh primerkov nakazujejo močnejši udarec, ki je zelo verjetno nastal ob uporabi. Glede na simetrično izdelavo domnevamo, da je bila konica v obeh primerkih izdelana tudi na poškodovanem koncu.

Vitke konice z zglajeno površino so v literaturi navadno obravnavane kot osti projektilov, kar dokazujejo najdbe z ostanki kopjišč s severa Evrope, pa tudi

The weak point of this supposition is the relatively small diameter of the perforation that would not fit a lever-like stick. We are therefore inclined to interpret the objects as helved combined tools used as axes as well as wedges. Speaking in favour of this supposition is the position of the perforation in the centre of gravity of the tool as well as the damage to the blade and the apex that prove that the tools were beaten upon.

4 OTHER ANTLER AND BONE OBJECTS

4.1 Antler objects

The tools made of red deer antler include a slightly damaged point or awl on a prong (*Fig. 6.12*) and a burnishing tool with rounded semi-circular working edge, made on a beam segment at the contact with a prong (*Pl. 30: 13*). These are functional tools with numerous parallels that are, however, not chronologically or culturally telling. A good comparison for the burnishing tool can be found in layer D of Klanjčeva peč, a cave in the Čičarija region, ascribed to the end of the Palaeolithic or to the Mesolithic (Malez 1986, Fig. 17: 10). Similar burnishing tools from Vlasac belong to early as well as late phases of the settlement (Srejšović, Letica 1978, Pl. 84).



Sl. 6.12: Zalog pri Verdu. Kat. št. 14. M. = 1 : 2.

Fig. 6.12: Zalog near Verd. Cat. no. 14. Scale = 1 : 2.

Bone objects are represented with two additional burnishing tools or chisels (*Pl. 30: 15,16*), two awls (*Pl. 30: 17*) and three double points (*Pl. 31: 19-21; Fig. 6.13*).

Large tools made of metacarpal and metatarsal bones, where the epiphysis functioned as a handle and the longitudinally removed bone with a straight working edge as the working surface, form a frequent part of the assemblages of Mesolithic sites (for example, Srejšović, Letica 1978, Pl. 94; 5: 2-4,6) as do bone awls



Sl. 6.13: Zalog pri Verdu. Kat. št. 20. M. = 1 : 1.

Fig. 6.13: Zalog near Verd. Cat. no. 20. Scale = 1 : 1.

primerki, ki so jih našli v skeletih uplenjenih živali (Gramsch 1990, 20) in ljudi (Borneat, Plopsor 1990). Dolge in ozke konice, ki jih odlikuje optimalno razmerje med prebojnostjo in trpežnostjo, so v poznem mlajšem paleolitiku nadomestile starejše primerke s široko bazo in ploščatim presekom (Turk 2002). Dvojne konice so najpogostejše v mezolitskih kontekstih, čeprav so podobno kot enojne konice s poudarjeno bazo v uporabi od mlajšega paleolitika do bakrene dobe (skupina 3 po Delporte *et al.* 1988; Camps-Fabrer, Ramseyer, Stordeur 1990; Bellier, Cattelain 1990, 21-29).

Visok delež konic na mezolitskih najdiščih zavzemajo fragmentirani primerki, med katerimi so najbolj pogoste konice z odlomljenim vrhom ali zgornjo polovico. Analize najdb iz severne Evrope so pokazale, da so za njihovo izdelavo uporabljali predvsem metapodije srnjakov, jelenov in losov (Gramsch 1990, 16).

made on epiphyses (Camps-Fabrer, Ramseyer, Stordeur 1990; Srejović, Letica 1978, Pl. 98: 2; Kind 2003, 252, Fig. 170: 5).

The damaged points belong to an oblong narrow type with parallel lateral edges (Pl. 31: 18,19). Both examples reveal one end that is convex-concave to flattened oval and the other round-oval in cross-section. The completely preserved bifacial point has convex lateral edges. On its larger part, it has a rectangular cross-section with rounded edges that becomes oval in the terminal third (Pl. 31: 20) and its two edges are not completely symmetrical. The point measures 12.8 cm in length. A similar length could be suggested for the two damaged examples.

All three points are made of diaphyses with fairly thin walls, as discernible from the convex-concave cross-section of a point where the natural bone surface can still be detected. Other parts of points are shiny smooth and without visible traces of sharp tools except for the more pronounced facets on the biconvex example.

The carinated breaks on the damaged points of two examples indicate a heavy blow that was most probably delivered through use. The symmetrical shape allows for the supposition that the point was made in both cases on the damaged ends as well.

The slender points with a smoothed surface are, in literature, usually treated as projectile heads, as indicated by the finds of points from Northern Europe as well as examples found in the skeletons of caught animals (Gramsch 1990, 20) and of humans (Borneat, Plopsor 1990). Long and thin points, distinguished by the optimal relationship between the penetrative force and durability, have replaced earlier examples with a wide base and a flattened cross-section at the end of the Late Palaeolithic (Turk 2002). Double points are most frequent in Mesolithic contexts though they are, similarly to the single points with an accentuated base, in use from the Late Palaeolithic to the Copper Age (group 3 of Delporte *et al.* 1988; Camps-Fabrer, Ramseyer, Stordeur 1990; Bellier, Cattelain 1990, 21-29).

Fragmented examples represent a high percentage of points on Mesolithic sites, most with missing tips or upper halves. The analyses of finds from Northern Europe have shown that mostly the metapodia of roe deer, red deer and elk were used in their production (Gramsch 1990, 16).

It is difficult to determine which of the points were best suited for hunting. A number of them would very probably be more suitable serving as pins, for tying hair or clothes, or as awls (Karsten, Knarrström 2003, 65,91, Fig. 61). Then there are the several centimetres long double points, usually interpreted as arrow heads, that might indicate the possibility of being used as hooks, inasmuch as this is not refuted by the re-

Določitev, katere od konic so bile najprimernejše za lov, je zelo težka. Številne najdbe bi bilo verjetno primerneje obravnavati kot igle za spenjanje las ali obleke in šila (Karsten, Knarrström 2003, 65,91, sl. 61). Predvsem pri nekaj centimetrov dolgih dvojnih konicah, navadno interpretiranih kot osti puščic, se zarisuje tudi možnost, da gre za trnek, seveda v kolikor tega ne zanikajo ostanki smole ali omotov za pritrjevanje (Gramsch 1987, 86, sl. 12: 11,12). Pri več tesno skupaj najdenih konicah obstajajo tudi domneve, da predstavljajo ostanke vilic z več roglji oziroma sestavljenih harpun (Heidelk-Schacht 1984, 23).

Konice iz Zaloga po simetričnosti izdelave prekašajo večino podobno velikih primerkov z bližnjega najdišča Breg pri Škofljici, kjer je bilo odkritih skupno 31 koščeni konic. Med večinoma enojnimi konicami s poudarjeno bazo se ozkima konicama iz Zaloga najbolj približujeta nekoliko bolj masivna primerka ovalnega do trikotnega preseka z ohranjeno dolžino 12,9 in 14,2 cm (Freljh 1986, t. 8: 4,5). Konice z Brega imajo sicer primerjave tako na najdiščih poznega mlajšega paleolitika, npr. v najdbah iz Zigeunerhöhle na avstrijskem Štajerskem (Pittioni 1955, sl. 4: 2), Županovega spodmola v Pivški kotlini (Osole 1976, t. 6: 9,10) in Šandalje II v Istri (Malez 1986, sl. 22: 3), kot v mezolitskih kontekstih, npr. v Mali Triglavci (Leben 1988, t. 2: 9,11). Več fragmentiranih primerkov z vzporednima stranskima robovoma okroglega in pravokotnega preseka izvira tudi iz sauveterjskih in kastelovjskih plasti v spodmolu Gaban ob Adiži (Kozłowski, Dalmeri 2000, 21, sl. 20: 2,4).

Dobre primerjave za oba dolga in ozka primerka iz Zaloga pri Verdu izvirajo iz že omenjene naselbine Friesack in drugih mezolitskih najdišč v severni Nemčiji, kjer se med 10 in 20 cm dolge konice ovalno ali zaobljeno pravokotnega preseka pojavljajo predvsem v plasteh iz preboreala in boreala (Gramsch 1987, 85,86, sl. 12: 5-7; Heidelk-Schacht 1984, 24, sl. 1: d-f; 6: e). Zelo podobne dvojne konice okroglega do ovalnega preseka so z nekaj primerki zastopane tudi med številnimi koščeni projektili z najdišč na desnem bregu Donave v Železnih vratih (Srejšović, Letica 1979, t. 102: 1-3; Bačkalov 1979, t. 8: 5; 9: 3-5; prim. Gramsch 2004, 188-193, sl. 5, 7: 1,2,5), med katerimi sicer prevladujejo osti kopij in puščic s stanjšano oziroma enostransko prirezano bazo (Srejšović, Letica 1979, t. 101: 1-5,7-16).

V plasteh zgodnje borealne faze najdišča Friesack 4 (Gramsch 1987, 86, sl. 13; t. 24: 1) je bila najdena dobra primerjava za konico s konveksnima stranicama in pravokotnim presekom z zaobljenimi robovi (t. 31: 20; sl. 6.13; skupina 2 po Delporte *et al.* 1988). Dvojna konica rombičnega preseka je v dveh tretjinah svoje dolžine prislonsjena ob vrh lesenega nosilca in pritrjena z omotom iz ličja in brezove smole, pri čemer je iz ohranjenega dela kopjišča premera 1 cm štrlel le

mains of resin or wrappings for attachment (Gramsch 1987, 86, Fig. 12: 11,12). The finds of several points uncovered close together give rise to suppositions of them representing the remains of forks with several prongs or of composite harpoons (Heidelk-Schacht 1984, 23).

The Zalog points surpass, in their symmetry, most examples of similar sizes from the near-by site of Breg near Škofljica, where altogether thirty-one bone points were uncovered. There, the mostly single points with an accentuated base include two solid examples, oval to triangular in cross-section, with the preserved lengths of 12.9 and 14.2 cm that come closest to the two thin points from Zalog (Freljh 1986, Pl. 8: 4,5). Apart from that, analogies for the points from Breg can be found on the sites dating from the end of the Late Palaeolithic, for example in the finds from the cave of Zigeunerhöhle in Styria, Austria (Pittioni 1955, Fig. 4: 2), the rock shelter of Županov spodmol in the Pivka Valley (Osole 1976, Pl. 6: 9,10) and in Šandalja II Cave in Istria (Malez 1986, Fig. 22: 3), but also in the Mesolithic contexts, for example at the rock shelter of Mala Triglavca (Leben 1988, Pl. 2: 9,11). Several fragmented examples with parallel lateral edges of a round or rectangular cross-section originate also from the Sauveterrian and Castelno-vian layers at the Gaban rock shelter along the Adige (Kozłowski, Dalmeri 2000, 21, Fig. 20: 2,4).

Good analogies for the two long and thin examples from Zalog near Verdu originate from the already-mentioned settlement of Friesack as well as other Mesolithic sites in northern Germany, where 10 to 20 cm long points of oval or rounded cross-sections appear mostly in the layers dating to the Pre-Boreal and Boreal periods (Gramsch 1987, 85,86, Fig. 12: 5-7; Heidelk-Schacht 1984, 24, Fig. 1: d-f; 6: e). Very similar double points of round to oval cross-sections are represented with a few examples also among the numerous bone projectiles from the sites on the right bank of the Danube at the Iron Gates (Srejšović, Letica 1979, Pl. 102: 1-3; Bačkalov 1979, Pl. 8: 5; 9: 3-5; cf. Gramsch 2004, 188-193, Fig. 5, 7: 1,2,5), which are, in fact, mostly composed of spear- and arrow heads with a base that is thinned or cut on one side (Srejšović, Letica 1979, Pl. 101: 1-5,7-16).

The layers of the early Boreal phase of the Friesack 4 site (Gramsch 1987, 86, Fig. 13; Pl. 24: 1) yielded a good analogy for the point with convex sides and a rectangular cross-section with rounded edges (Pl. 31: 20; Fig. 6.13; group 2 of Delporte *et al.* 1988). This double, 10.1 cm long point of a rhombic cross-section leans, in two thirds of its length, against the top of a wooden bearer and is attached to it with a wrapping made of bast and birch resin, whereby only the broader, terminal part of the point sticks out of the preserved shaft, measuring 1 cm in diameter. The

širši, terminalni del 10,1 cm dolge konice. Sodeč po preseku lahko tak način pritrditve domnevamo tudi za primerek iz Zaloga, kjer ima distalni del, ki obsega 2/3 celotne dolžine konice, bolj ali manj pravokoten presek, terminalni del, torej od najširšega dela navzgor pa ovalno-okroglega.

5 SKLEP

Analiza artefaktov iz kosti in rogovja nam omogoča vsaj delni vpogled v ekonomiko lovsko-nabiralne skupnosti z zahodnega roba Ljubljanskega barja, ki je lahko iz bolj ali manj stalnega tabora izkoriščala širok spekter živalskih in rastlinskih virov. Glede na zastopanost skeletnih ostankov živali, ki pa glede na opisane omejitve tafonomske narave najverjetneje ne odraža realnega stanja, je bil ena pomembnih aktivnosti lov na velike gozdne sesalce. V arheološkem zapisu sledijo skromnejše dokumentirane ribe in ptice, precejšen del dnevnih potreb po kalorijah pa so nedvomno zagotovili z nabranimi rastlinami, žabami, polži in ličinkami.

Med ostanki jelena, ki mu najbolj ustrezajo stičišča gozdov in odprtih površin, prevladujejo kosti odraslih osebkov, kar bi lahko nakazovalo, da so se lovci izogibali uplenitev najmlajših živali, ki doživijo spolno zrelost v drugem letu starosti in so najbolj produktivni med 4 in 12 letom. To trditev moramo obravnavati le kot bolj ali manj verjetno hipotezo, saj je vzorec zob, na podlagi katerih je bila ocenjena starost jelenov ob zakolu, skromen (N=5; Toškan, Dirjec, v tem zborniku).

Lov na jelene se je verjetno odvijal jeseni ali pozimi, ko se zbirajo v večjih čredah in je njihovo rogovje v najboljši kondiciji. Dodaten razlog, ki govori v prid tej sezoni lova, je pomanjkanje zavetja, ki jih živalim čez ostali del leta ponujajo listni pokrov in talno rastlinje (Kartsten, Knarrström 2003, 68).

Tudi med ostanki divjih svinj so zastopani predvsem mladi odrasli in odrasli osebki (Toškan, Dirjec, v tem zborniku). Lov na prašiča, gozdno žival, ki ji prija bližina vode ali močvirij, je izredno nevaren, zato je bilo potrebno smrtno rano zadati kar se da hitro. Še najverjetnejša strategija vključuje uporabo pasti, npr. jam s priostrenimi koli, ki so plenu onemogočile gibanje.

V opremo lovcev iz Zaloga so poleg loka in puščic s kamnitimi ostmi sodili tudi večji projektili s koščeni ostmi. Najverjetneje gre za razmeroma tanka in dolga kopja ali sulice, s katerimi so živali bodisi ranili na daljavo ali usmrtili iz neposredne bližine. Dejstvo, da so bile konice najdene skupaj z ostanki živali, bi lahko nakazovalo, da gre bodisi za uporabljene osti, ki so obtičale v plenu in so jih izvlekli šele na mestu končne obdelave, ali pa so pri razkosavanju izluščili uporabne kosti in jih na kraju obdelali v orodja.

cross-section allows us to suppose a similar manner of attachment also for the Zalog example. There the distal part, that covers two thirds of the entire length of the point, is of a more or less rectangular cross-section and the terminal part, from the broadest part upwards, of an oval to round cross-section.

5 CONCLUSION

The analysis of bone and antler artefacts enables an at least partial insight into the economy of the hunter-gatherer community from the western outskirts of the Ljubljansko barje that could exploit a wide spectre of animal and plant resources from its more or less permanent camp. In view of the above-described taphonomic limitations, the representation of the skeletal remains of animals most probably does not reflect the actual state. It does, however, show that hunting big forest game represented an important activity. The archaeological record then proceeds with the less well documented fish and birds, while a substantial amount of daily calorie requirement was undoubtedly supplied by the gathered plants, frogs, snails and grub.

The remains of red deer, animals that seek areas where forests border to open spaces, predominantly include those of adult individuals. This would indicate that the hunters avoided catching young individuals that reach their maturity in the second year and are most fertile between the ages of four and twelve. This statement, however, has to be taken as a more or less likely hypothesis due to the small teeth sample used to determine the age of the red deer at kill (N=5; Toškan, Dirjec, in this publication).

The hunt for red deer probably took place in autumn or winter, when the animals gather in large herds and their antlers are in peak condition. An additional reason for the above-mentioned seasons of hunt is the lack of shelter that the leafage and ground vegetation offer in other seasons (Kartsten, Knarrström 2003, 68).

The remains of wild boar also include mostly young adult and adult individuals (Toškan, Dirjec, in this publication). The hunt for boar, a forest animal that likes the vicinity of waters or marshes, is very dangerous. This produced the need to strike the fatal blow as quickly as possible, whereby the safest strategy would include the use of a trap, for example a pit with spiked piles that prevented the prey from moving.

The equipment of the Zalog hunters included, beside bow and arrows with stone heads, also large projectiles with bone heads. These are relatively thin and long lances used to wound the animal from a distance or kill it from immediate vicinity. The fact that the points were found together with animal remains

Glede na kontekst lahko uporabo orodij z ravnim rezilom (gladila, dleta?), šil in konice iz parožka kro- ne prepoznamo v odiranju in razkosavanju plena ter poznejši obdelavi kožuhov in kož, ki se je verjetno od- vijala ob vodi, nekoliko vstran od bivališč.

Posebej pomenljiv je pojav masivnih rogovinastih orodij z odprtino, ki imajo kljub ogromnemu številu sorodnih mezolitskih najdb v severni in zahodni Evro- pi neposredne analogije le v gradivu z okvirno soča- snih najdišč v Železnih vratih, še več primerjav pa bi verjetno našli v mezolitiku severnega zaledja Črnega morja. Vse kaže, da so pri distribuciji sorodnih orodij v mezolitiku Evrope igrali pomembno vlogo tudi lega in ekonomika najdišča, predvsem sezona in intenzivnost izkoriščanja lokalnih virov. Povezava med sezono bi- vanja in pojavom orodij iz rogovine se zdi utemeljena predvsem zaradi dejstva, da rogovja jelenov premo- rejo največjo trdnost prav v zgodnji jeseni, zato jih je bilo smiselno loviti takrat. Glede na najdbe zavrženih delov rogovij ter poškodovanih in rabljenih orodij v Zalogu lahko domnevamo, da so jih na tem mestu ne le izdelovali in popravljali, temveč tudi uporabljali. Poleg obdelave lesa in razkosavanja plena jih lahko verjetno povežemo z izkopavanjem korenin, vodnega rastlinja in živali, lukenj za pasti in podobno.

would indicate that the latter are either fired heads that were stuck in the prey and drawn out only on the spot of the final processing or that useful bones of the prey were cut out and made into tools on the spot.

Considering the context, the use of tools with a straight blade (burnishing tools, chisels ?), awls and points made on a prong of the crown may be sought in skinning and meat cutting as well as the subsequent processing of furs and hides, which most probably took place near water and slightly removed from the settlement.

Of a particular importance is the appearance of solid antler tools with a perforation, the direct analogies of which could, in spite of the large number of related Mesolithic finds in Northern and Western Europe, only be found in the material of the roughly contemporary sites of the Iron Gates. Having said that, more analogies could surely be found in the Me- solithic of the northern hinterland of the Black Sea. It all points to the fact that the distribution of similar tools in the Mesolithic of Europe was importantly in- fluenced mostly by the season and the intensity of the exploitation of local resources, as well as the location and the economy of a site. The connection between the season of occupation and the appearance of an- tler tools seems justified mostly by the fact that the red deer antler is hardest precisely in early autumn. It would therefore seem the season most reasonable for hunting this animal. The finds of discarded antler parts and damaged or used tools at Zalog support the supposition that antler tools were not only produced and repaired but also used at the site. Their use can be connected to woodworking and dismembering of prey and probably also to digging of roots, water plants and animals, of holes for trap and the like.

6 KATALOG

1. Orodje na stebelu rogovja navadnega jelena; srednjik je bil navpično odrezan, vidni so sledovi vrezov; v lateralno-medialni osi je med ostankom srednjika in sredino stebela okrogla odprtina; spongioza v celoti manjka; korodiran obod odprtine na medialni strani je skoraj navpičen, vidni so sledovi dolbenja; gladek obod odprtine na lateralni strani se rahlo konično oži; distalni del stebela je ravno odrezan, vidni so sledovi vrezov; poškodovan proksimalni del stebela je klinasto preoblikovan; površina robov preoblikovanega dela je bleščeče gladka; d. 32,6 cm; š. 8,7 cm; pr. luknje 2,2-2,4 cm; LZ II-04/N 073; *t.* 25: 1; *sl.* 6.4,6.5.
2. Orodje na stebelu rogovja navadnega jelena; v lateralno-medialni osi je med ostankom srednjika in sredino stebela okrogla odprtina; ostanek srednjika je poško- dovan in korodiran; spongioza v celoti manjka; zgor- nji del oboda odprtine na medialni strani se konično oži, vidni so sledovi dolbenja; spodnji del oboda je

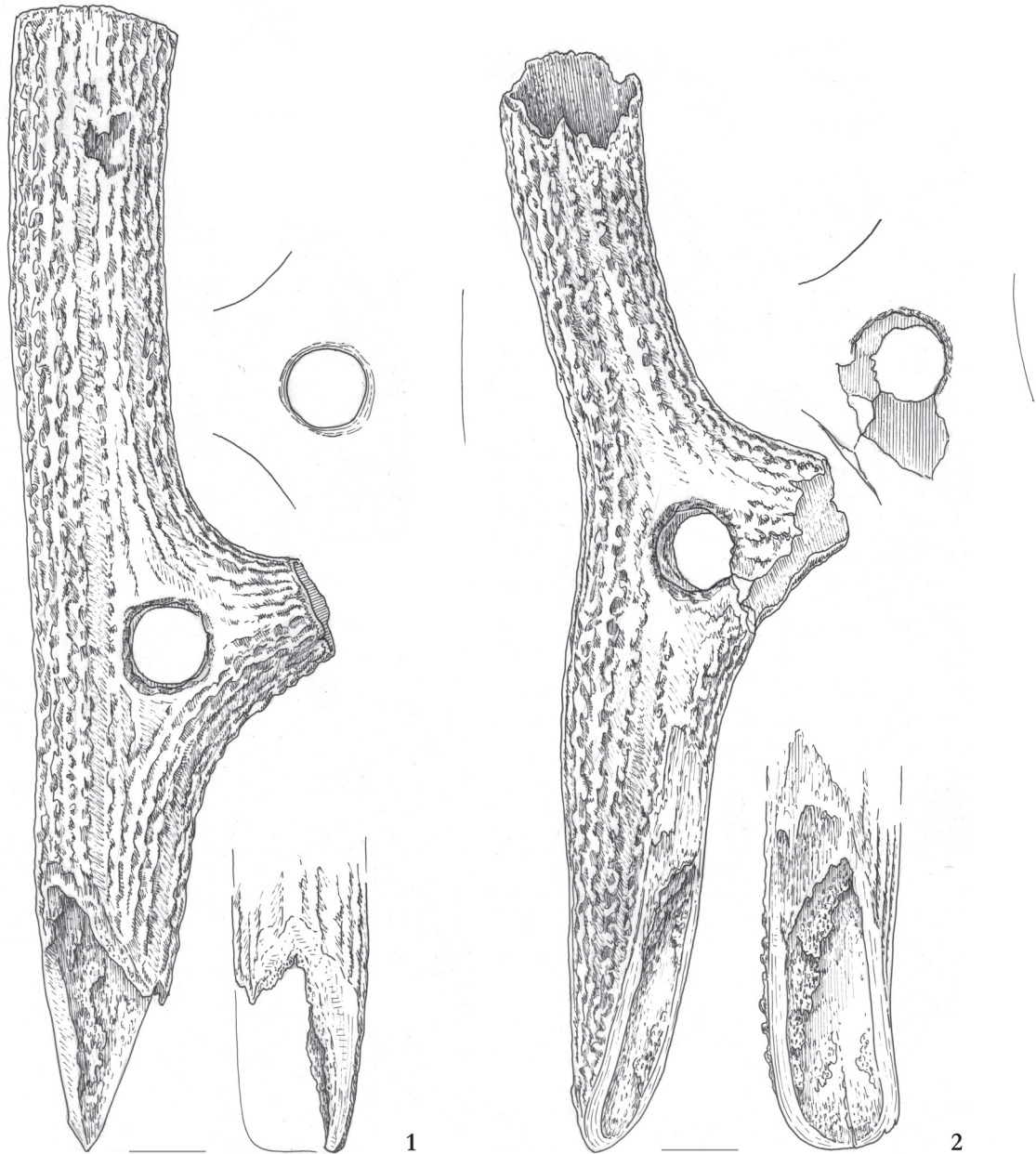
6 CATALOGUE

1. Tool on the beam of a red deer antler; trez tine is verti- cally cut off, visible cut marks; a round perforation is made in the lateral-medial axis between the remains of the trez tine and the middle of the beam; spongi- osis is missing completely; corroded perimeter of the perforation on the medial side is almost vertical, vis- ible chisel marks; smooth perforation perimeter on the lateral side slightly and conically narrows; distal beam part is cut straight, visible cut marks; damaged proxi- mal part is shaped into a wedge; surface of the edges of the wedge is shiny smooth; length 32.6 cm; width 8.7 cm; perforation diameter 2.2-2.4 cm; LZ II-04/N 073; *Pl.* 25: 1; *Fig.* 6.4,6.5.
2. Tool on the beam of a red deer antler; a round perfo- ration is made in the lateral-medial axis between the remains of the trez tine and the middle of the beam; the remains of the trez tine are damaged and corroded; spongiosis is missing completely; upper part of the

- navpičen; odprtina na lateralni strani se rahlo konično oži; distalni del stebela s temenom je odlomljen; proksimalni del stebela je dletasto preoblikovan; površina robov preoblikovane površine je bleščeče gladka, v stranskem pogledu je rahlo izbočena; sledove obrabe kaže tudi ohranjen del spongioze; vrh rezila je počen; del kompakte nad rezilom manjka; ohr. d. 31,4 cm; š. 7,7 cm; rek. pr. luknje 2,2-2,4 cm; LZ II-04/N 030; *t.* 25: 2; *sl.* 6.10.
3. Orodje na stebelu rogovja navadnega jelena; korteks je obrabljen, spongioza v celoti manjka; v lateralno-medialni osi je med odrezanim srednjikom in sredino stebela okrogla odprtina; ostanek srednjika je poškodovan in korodiran; obod odprtine na lateralni strani je navpičen in gladek; obod odprtine na medialni strani se konično oži, vidni so sledovi dolbenja; distalni del stebela s temenom je odlomljen; proksimalni del stebela je delno odlomljen; ohranjen je le del zglajenega dletastega roba; ohr. d. 28,6 cm; š. 7,7 cm; pr. luknje 2,3-2,6 cm; LZ II-04/N 060; *t.* 26: 3; *sl.* 5.7.
 4. Orodje na stebelu rogovja navadnega jelena; ohranjena je medialna polovica rogovja; v lateralno-medialni osi je med ostankom srednjika in sredino stebela okrogla odprtina; ostanek srednjika je poškodovan in korodiran; obod odprtine na medialni strani je navpičen; vidni so sledovi vrezovanja; na distalnem delu stebela so vidni sledovi dolbenja; na proksimalnem delu stebela je ohranjen nekoliko obrabljen dletast rob; ohr. d. 28,8 cm; š. 7,6 cm; pr. luknje 2,2-2,5 cm; LZ II-04/N 107; *t.* 26: 4.
 5. Orodje na stebelu rogovja navadnega jelena; v lateralno-medialni osi je med odrezanim srednjikom in sredino stebela okrogla odprtina; na ostanku srednjika so vidne poševne fasete, ki se ožijo proti sredini parožka; del spongioze manjka; zgornji del oboda odprtine na lateralni strani se konično oži, vidni so sledovi dolbenja; navpičen spodnji del oboda je gladek; odprtina na medialni strani se rahlo konično oži in je bolj ali manj gladka; na poškodovanem distalnem delu stebela je več vrezov; proksimalni del stebela je počen, preoblikovani del je odlomljen; d. 28,3 cm; š. 7,1 cm; pr. luknje 2,2-2,4 cm; LZ II-04/N 086; *t.* 27: 5; *sl.* 6.6.
 6. Orodje na stebelu rogovja navadnega jelena; korteks je precej obrabljen, spongioza skoraj v celoti manjka; srednjik je bil navpično odrezan, vidni so sledovi vrezov; v lateralno-medialni osi je med ostankom srednjika in sredino stebela okrogla odprtina; zgornji del oboda odprtine na medialni strani se konično oži, vidni so sledovi dolbenja; obod odprtine na lateralni strani manjka; distalni del stebela s temenom je odlomljen; proksimalni del stebela je klinasto preoblikovan; robovi so bleščeče gladki; zglajen je tudi rob grebena stebela nad preoblikovanim delom; ohr. d. 26,4 cm; š. 9,4 cm; ohr. pr. luknje 2,7 cm; LZ II-04/N 004; *t.* 27: 6.
 7. Orodje iz parožka navadnega jelena; proksimalni del je odlomljen; distalni del je dletasto preoblikovan; površina robov je zglajena in obrabljena; preoblikovana ploskev je v stranskem pogledu rahlo izbočena; spongioza v celoti manjka; vrh izbočenega rezila je počen; ohr. d. 27,6 cm; š. 5,5 cm; LZ II-04/N 100; *t.* 28: 7; *sl.* 6.9.
- perforation perimeter on the medial side narrows conically, visible chisel marks; lower part of the perimeter is vertical; perforation slightly and conically narrows on the lateral side; distal beam part with the apex is broken off; proximal beam part is shaped into a chisel; surface of the edges of the chisel part is shiny smooth, in side view slightly convex; traces of wear can also be observed on the preserved part of the spongiosis; tip of the blade is cracked; part of the compact substance above the blade is missing; preserv. l. 31.4 cm; w. 7.7 cm; rec. perforation diam. 2.2-2.4 cm; LZ II-04/N 030; *Pl.* 25: 2; *Fig.* 6.10.
3. Tool on the beam of a red deer antler; cortex is worn, spongiosis is missing completely; a round perforation is made in the lateral-medial axis between the removed trez tine and the middle of the beam; remains of the trez tine are damaged and corroded; perforation perimeter on the lateral side is vertical and smooth; perforation perimeter on the medial side narrows conically, visible chisel marks; distal beam part with the apex is broken off; proximal beam part is partially broken off; only a part of the smoothed chisel edge is preserved. Preserv. l. 28.6 cm; w. 7.7 cm; perforation diam. 2.3-2.6 cm; LZ II-04/N 060; *Pl.* 26: 3; *Fig.* 6.7.
 4. Tool on the beam of a red deer antler; medial half of the antler is preserved; a round perforation is made in the lateral-medial axis between the remains of the trez tine and the middle of the beam; remains of the trez tine are damaged and corroded; perforation perimeter on the medial side is vertical; visible cut marks; distal beam part reveals chisel marks; a somewhat worn chisel edge is preserved on the proximal beam part; preserv. l. 28.8 cm; w. 7.6 cm; perforation diam. 2.2-2.5 cm; LZ II-04/N 107; *Pl.* 26: 4.
 5. Tool on the beam of a red deer antler; a round perforation is made in the lateral-medial axis between the removed trez tine and the middle of the beam; visible oblique facets on the remains of the trez tine that narrow towards the middle of the prong; part of spongiosis is missing; upper part of the perforation perimeter on the lateral side narrows conically, visible chisel marks; vertical lower part of the perimeter is smooth; perforation on the medial side slightly narrows conically and is more or less smooth; damaged distal beam part shows several cuts; proximal beam part is cracked, reshaped part is broken off; l. 28.3 cm; w. 7.1 cm; perforation diam. 2.2-2.4 cm; LZ II-04/N 086; *Pl.* 27: 5; *Fig.* 6.6.
 6. Tool on the beam of a red deer antler; cortex fairly worn, spongiosis is missing almost completely; trez tine vertically cut, visible cut marks; a round perforation is made in the lateral-medial axis between the remains of the trez tine and the middle of the beam; upper part of perforation perimeter on the medial side narrows conically, visible chisel marks; perforation perimeter on the lateral side is missing; distal beam part is broken off; proximal beam part is shaped into a wedge; edges are shiny smooth; edge of the beam ridge above the wedge part is also smoothed; preserv. l. 26.4 cm; w. 9.4 cm; preserv. perforation diam. 2.7 cm; LZ II-04/N 004; *Pl.* 27: 6.
 7. Tool on a prong of a red deer antler; proximal part is

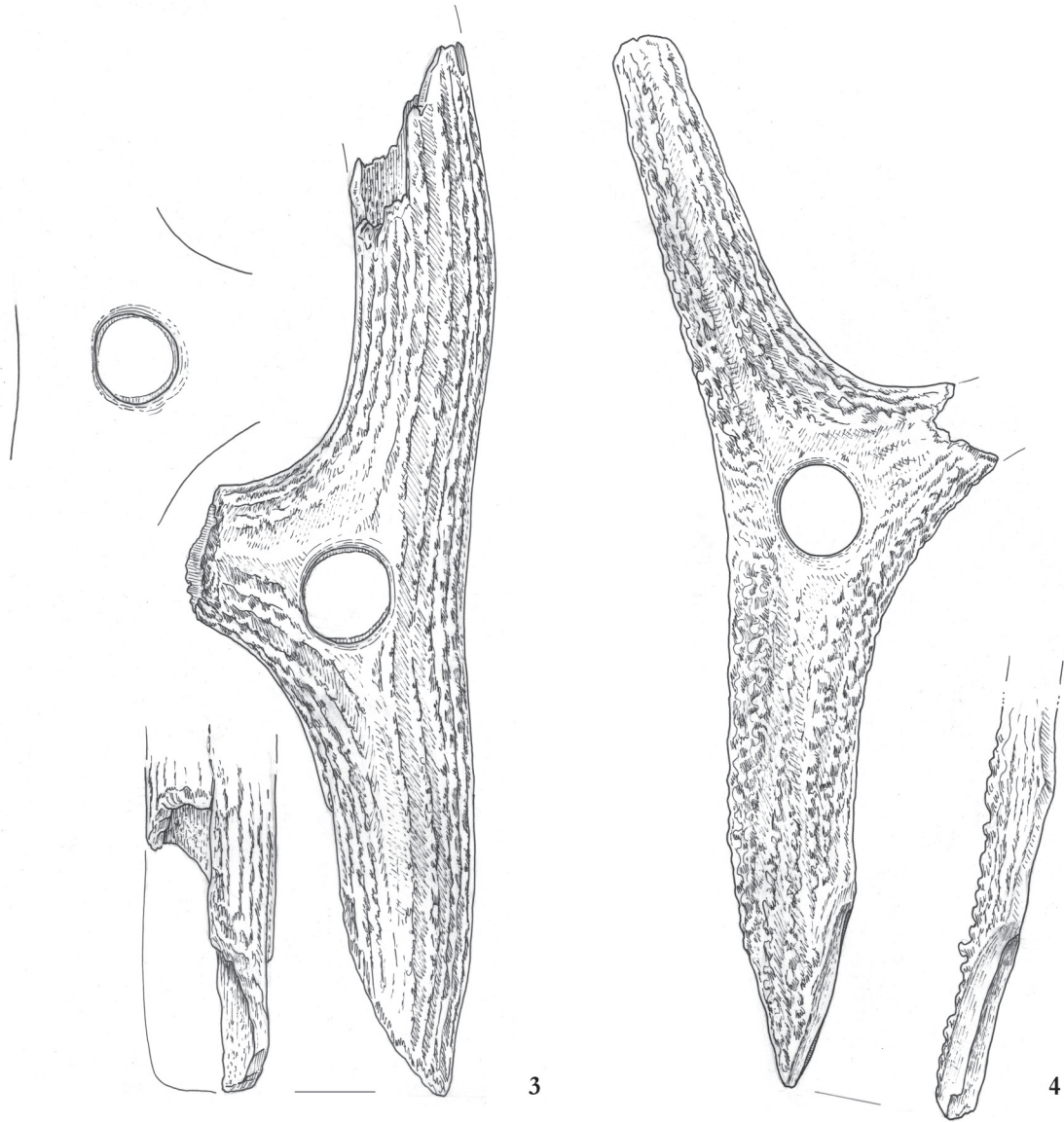
8. Orodje iz paroška navadnega jelena; korteks je obrabljen, spongioza v celoti manjka; obod odprtine na eni strani je gladek in se konično oži, poškodovani obod odprtine na nasprotni strani je bolj ali manj navpičen, vidni so sledovi dolbenja; navpični spodnji del oboda je gladek; odprtina na medialni strani se rahlo konično oži in je bolj ali manj gladka; proksimalni del paroška je klinasto preoblikovan; robovi so obrabljeni; distalni del paroška s temenom je odlomljen; ohr. d. 23,1 cm; š. 4,1 cm; pr. luknje 1,8-2,1 cm; LZ II-04/N 060; t. 28: 8; *sl. 6.8.*
9. Orodje na stebelu rogovja navadnega jelena; korteks je delno obrabljen, spongioza skoraj v celoti manjka; na ostanku srednjika so vidni sledovi dolbenja; v lateralno-medialni osi je med ostankom srednjika in sredino stebela izdelana okrogla odprtina; obod odprtine na medialni strani se konično oži, vidni so sledovi dolbenja; zgornji del oboda odprtine na lateralni strani se konično oži, vidni so sledovi dolbenja; spodnji del oboda je navpičen; proksimalni del stebela je odlomljen; distalni del v celoti manjka; ohr. d. 12,9 cm; š. 9,1 cm; rek. pr. luknje 2,4 cm; LZ II-04/N 014; t. 29: 9.
10. Orodje na stebelu rogovja navadnega jelena; v lateralno-medialni osi je med odrezanim srednjikom in sredino stebela okrogla odprtina; korodiran obod odprtine se konično oži; vidni so sledovi dolbenja; ohranjena je le medialna polovica rogovja; preoblikovani del orodja, teme in ostanek srednjika so odlomljeni; ohr. d. 16,0 cm; š. 7,3 cm; pr. luknje 2,2-2,5 cm; LZ II-04/N 009; t. 29: 10.
11. Orodje na stebelu rogovja navadnega jelena; hrapava površina korteksa je korozijsko izravnana, spongioza skoraj v celoti manjka; v lateralno-medialni osi je med odlomljenim srednjikom in sredino stebela izdelana okrogla odprtina; obod odprtine na medialni strani se konično oži, vidni so sledovi dolbenja; proksimalni del stebela s temenom je odlomljen; distalni del v celoti manjka; ohr. d. 19,8 cm; š. 7,3 cm; ohr. pr. luknje 1,8 cm; LZ II-04/N 060; t. 29: 11.
12. Orodje na stebelu rogovja navadnega jelena; hrapava površina korteksa je korozijsko izravnana; na ostanku srednjika so vidni sledovi dolbenja; v lateralno-medialni osi je med ostankom srednjika in sredino stebela izdelana okrogla luknja za nasaditev; ohranjen obod odprtine se konično oži, vidni so sledovi dolbenja; distalni in proksimalni del stebela sta odlomljena; ohr. d. 21,1 cm; ohr. š. 4,9 cm; rek. pr. luknje 2,6 cm; LZ II-04/N 105; t. 29: 12.
13. Gladilo na segmentu stebela jelenovega rogovja z ostankom paroška; hrapava površina korteksa je korozijsko izravnana; robovi delovne površine s polkrožnim zaključkom so zaobljeni; spongioza je obrabljena; d. 10,0 cm; š. 3,7 cm; LZ II-04/N 105; t. 30: 13.
14. Konica na parošku krone jelenovega rogovja; hrapava površina korteksa je korozijsko izravnana; bazalni del krone je odlomljen; vrh zglajene konice je poškodovan; ohr. d. 14,9 cm; š. 5,9 cm; LZ II-04/N 081; *sl. 6.12.*
15. Gladilo iz epifize nedoločene živali; ohr. d. 13,0 cm; š. 6,2 cm; LZ II-04/N 085; t. 30: 15.
16. Gladilo iz epifize nedoločene živali; rezilo je poško-
- broken off; distal part is shaped into a wedge; edge surface is smoothed and worn; surface of the wedge is slightly convex in side view; spongiosis is missing completely; tip of the convex blade is cracked; preserv. l. 27.6 cm; w. 5.5 cm; LZ II-04/N 100; *Pl. 28: 7; Fig. 6.9.*
8. Tool on a prong of a red deer antler; cortex is worn, spongiosis is missing completely; perimeter of the round perforation is smooth on one side and narrows conically, damaged perforation perimeter on the opposite side is more or less vertical, visible chisel marks; vertical lower part of the perimeter is smooth; perforation slightly and conically narrows on the medial side and is more or less smooth; proximal prong part is shaped into a wedge; edges are worn; distal prong part with the apex is broken off; preserv. l. 23.1 cm; w. 4.1 cm; perforation diam. 1.8-2.1 cm; LZ II-04/N 060; *Pl. 28: 8; Fig. 6.8.*
9. Tool on the beam of a red deer antler; cortex partially worn, spongiosis is almost completely missing; chisel marks visible on the remains of the trez tine; a round perforation is made in the lateral-medial axis between the remains of the trez tine and the middle of the beam; perforation perimeter on the medial side narrows conically, visible chisel marks; upper part of the perforation perimeter on the lateral side narrows conically, visible chisel marks; lower perimeter part is vertical; proximal beam part is broken off; distal part is missing completely; preserv. l. 12.9 cm; w. 9.1 cm; rec. perforation diam. 2.4 cm; LZ II-04/N 014; *Pl. 29: 9.*
10. Tool on the beam of a red deer antler; a round perforation is made in the lateral-medial axis between the removed trez-tine and the middle of the beam; corroded perforation perimeter narrows conically; visible chisel marks; only the medial half of the antler is preserved; reshaped part of the tool, apex and remains of the trez tine are broken off; preserv. l. 16.0 cm; w. 7.3 cm; perforation diam. 2.2-2.5 cm; LZ II-04/N 009; *Pl. 29: 10.*
11. Tool on the beam of a red deer antler; rough surface of the cortex is levelled by corrosion, spongiosis is almost completely missing; a round perforation is made in the lateral-medial axis between the removed trez tine and the middle of the beam; perforation perimeter narrows conically on the medial side, visible chisel marks; proximal beam part with the apex is broken off; distal part is missing completely; preserv. l. 19.8 cm; w. 7.3 cm; preserv. perforation diam. 1.8 cm; LZ II-04/N 060; *Pl. 29: 11.*
12. Tool on the beam of a red deer antler; rough surface of the cortex is levelled by corrosion; visible chisel marks on the remains of the trez tine; a round perforation for helving is made in the lateral-medial axis between the remains of the trez tine and the middle of the beam; preserved perforation perimeter narrows conically, visible chisel marks; distal and proximal beam parts are broken off; preserv. l. 21.1 cm; preserv. w. 4.9 cm; rec. perforation diam. 2.6 cm; LZ II-04/N 105; *Pl. 29: 12.*
13. Burnishing tool on a segment of the beam of a red deer antler with the remains of a prong; rough cortex

- dovano; ohr. d. 16,0 cm; š. 3,9 cm; LZ II-04/N 115; *t. 30: 16.*
17. Šilo iz epifize nedoločene živali; konica je odlomljena; ohr. d. 13,7 cm; š. 2,0 cm; LZ II-04/N 110; *t. 30: 17.*
18. Šilo iz diafize nedoločene živali; ohr. d. 17,1 cm; š. 2,5 cm; LZ II-04/N 059.
19. Konica iz diafize nedoločene živali; terminalni del konice je odlomljen; ohr. d. 11,2 cm; š. 0,9 cm. LZ II-04/N 075; *t. 31: 19.*
20. Konica iz diafize nedoločene živali; terminalni del konice je odlomljen; ohr. d. 9,9 cm; š. 0,9 cm; LZ II-04/N 070; *t. 31: 20.*
21. Dvojna konica iz diafize nedoločene živali; d. 12,8 cm; š. 1,3 cm; LZ II-04/N 089; *t. 31: 21; sl. 6.13.*
- surface is levelled by corrosion; edges of the working surface with a semi-circular termination are rounded; spongiosis is worn; l. 10.0 cm; w. 3.7 cm; LZ II-04/N 105; *Pl. 30: 13.*
14. Point on the crown prong of red deer antler; rough cortex surface is levelled by corrosion; basal crown part is broken off; tip of the smoothed point is damaged; preserv. l. 14.9 cm; w. 5.9 cm; LZ II-04/N 081; *Fig. 6.12.*
15. Burnishing tool made on the epiphysis of an undetermined animal; preserv. l. 13.0 cm; w. 6.2 cm; LZ II-04/N 085; *Pl. 30: 15.*
16. Burnishing tool made on the epiphysis of an undetermined animal; blade is damaged; preserv. l. 16.0 cm; w. 3.9 cm; LZ II-04/N 115; *Pl. 30: 16.*
17. Awl made on the epiphysis of an undetermined animal; point is broken off; preserv. l. 13.7 cm; š. 2.0 cm; LZ II-04/N 110; *Pl. 30: 17.*
18. Awl made on the diaphysis of an undetermined animal; preserv. l. 17.1 cm; w. 2.5 cm; LZ II-04/N 059.
19. Point made on the diaphysis of an undetermined animal; terminal point part is broken off; preserv. l. 11.2 cm; w. 0.9 cm. LZ II-04/N 075; *Pl. 31: 19.*
20. Point made on the diaphysis of an undetermined animal; terminal point part is broken off; preserv. l. 9.9 cm; w. 0.9 cm; LZ II-04/N 070; *Pl. 31: 20.*
21. Double point made on the diaphysis of an undetermined animal; l. 12.8 cm; w. 1.3 cm; LZ II-04/N 089; *Pl. 31: 21; Fig. 6.13.*



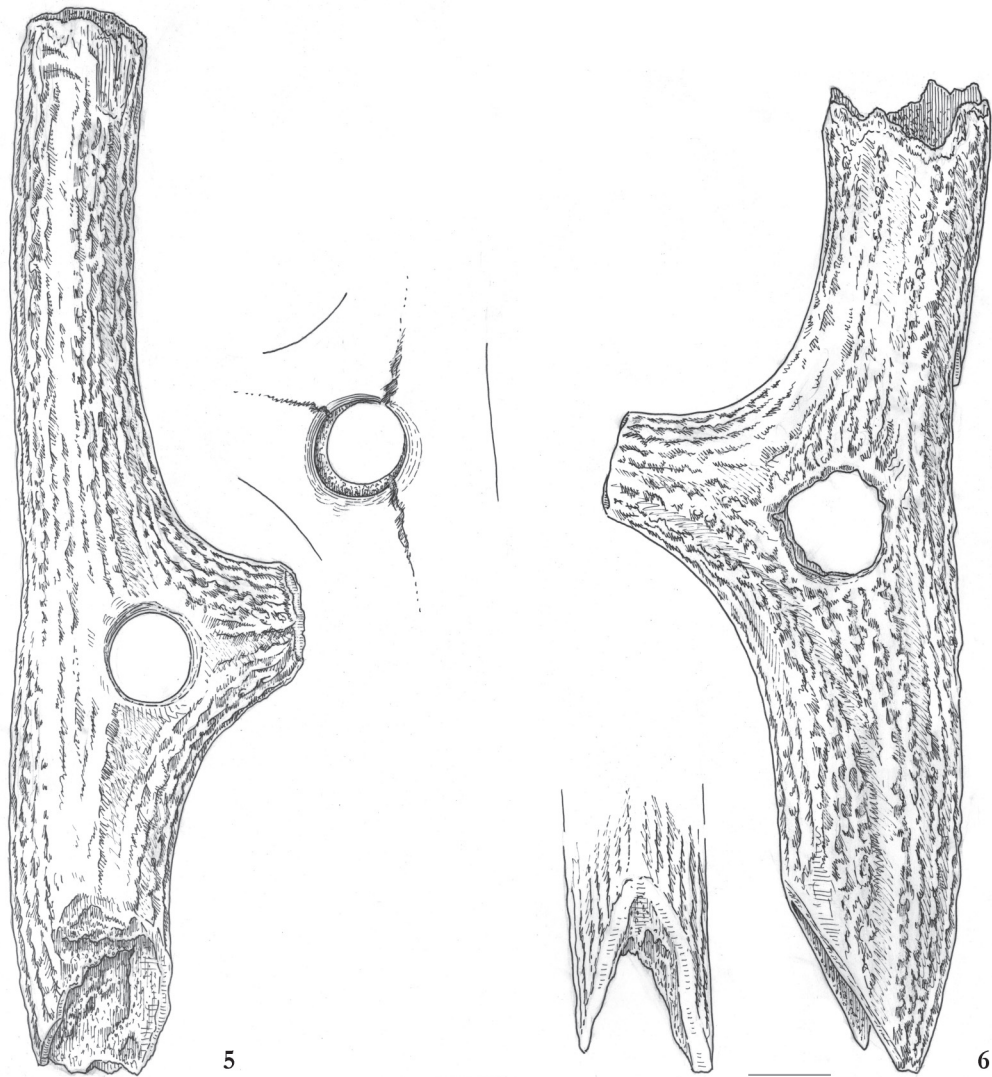
T. 25: Zalog pri Verdu. Rogovina. M. = 1 : 2 (risba: Dragica Knific Lunder).

Pl. 25: Zalog near Verd. Antler. Scale = 1 : 2 (drawing: Dragica Knific Lunder).



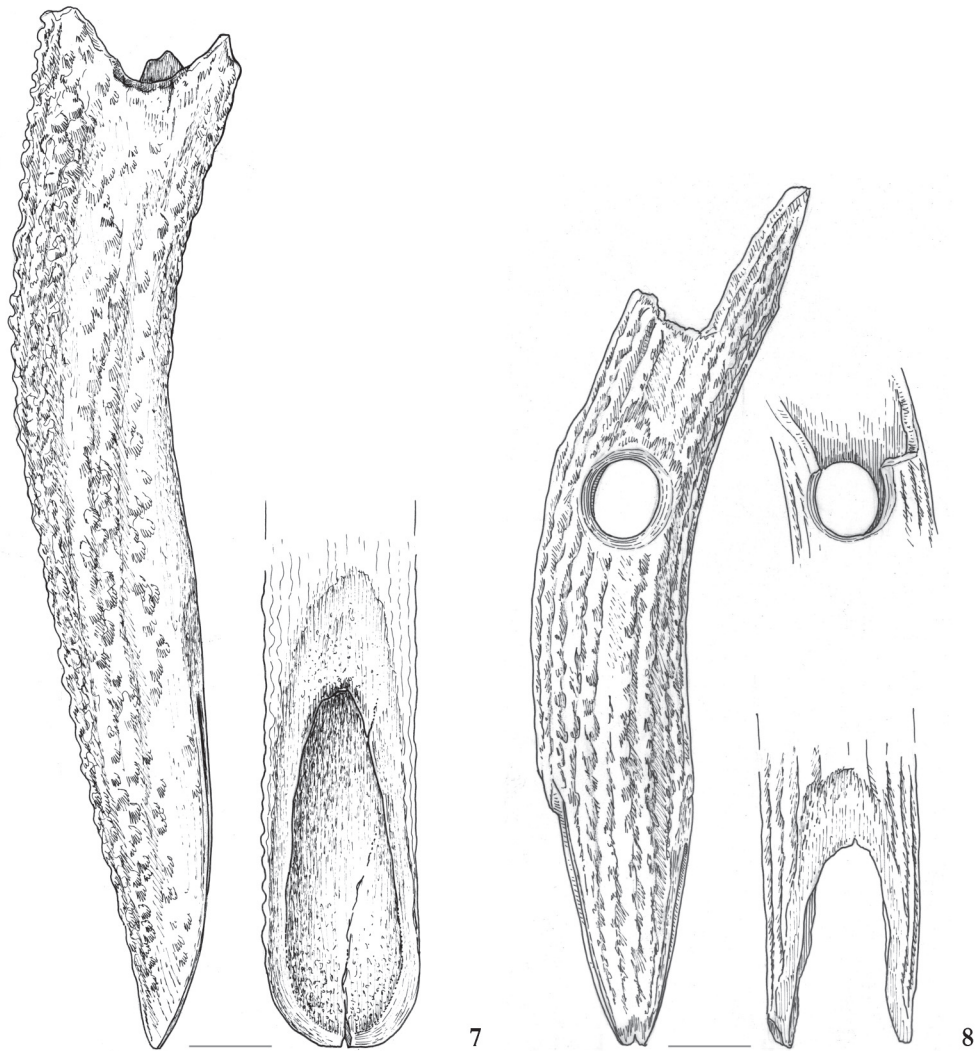
T. 26: Zalog pri Verdu. Rogovina. M. = 1 : 2 (risba: Dragica Knific Lunder).

Pl. 26: Zalog near Verd. Antler. Scale = 1 : 2 (drawing: Dragica Knific Lunder).



T. 27: Zalog pri Verdu. Rogovina. M. = 1 : 2 (risba: Dragica Knific Lunder).

Pl. 27: Zalog near Verd. Antler. Scale = 1 : 2 (drawing: Dragica Knific Lunder).



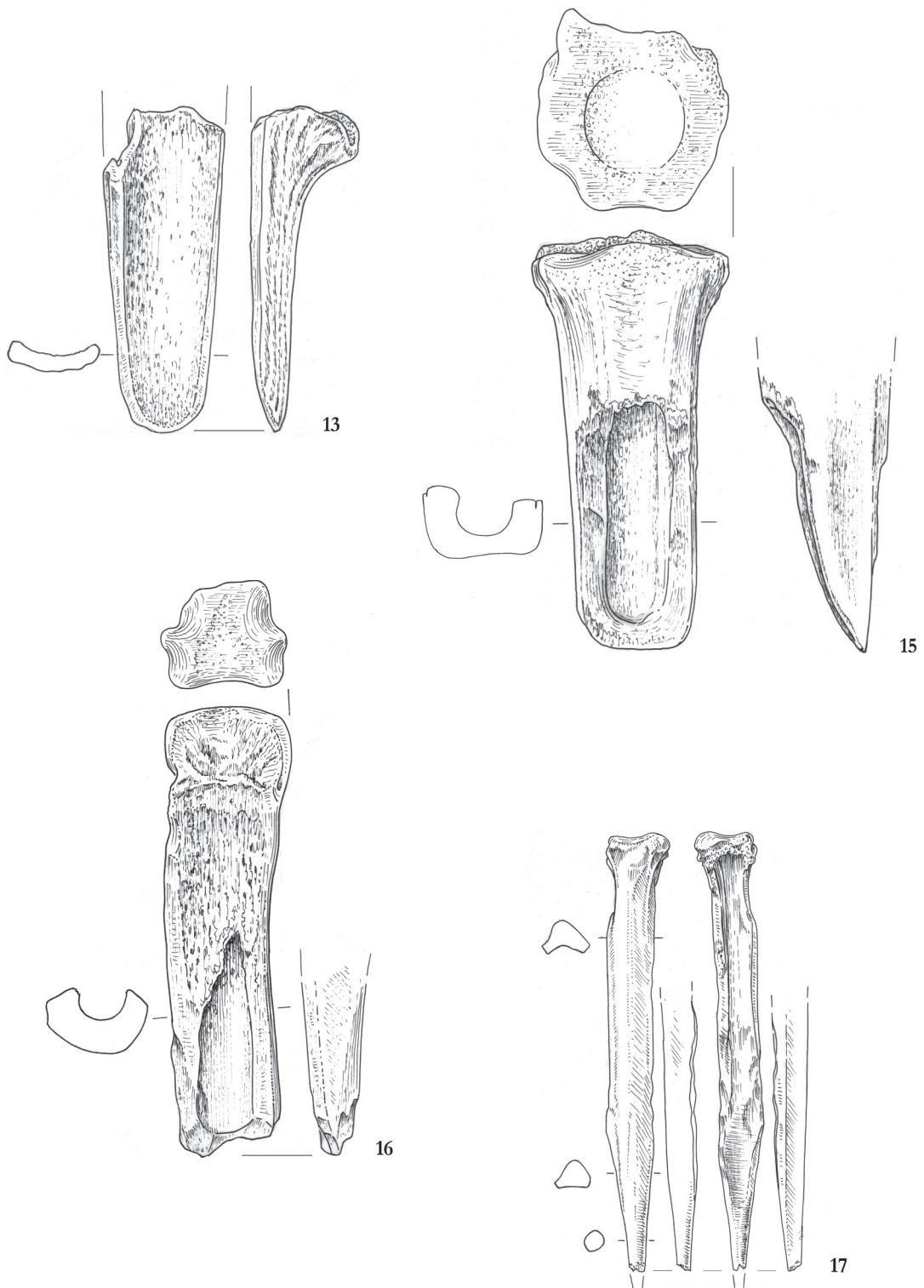
T. 28: Zalog pri Verdu. Rogovina. M. = 1 : 2 (risba: Dragica Knific Lunder).

Pl. 28: Zalog near Verd. Antler. Scale = 1 : 2 (drawing: Dragica Knific Lunder).



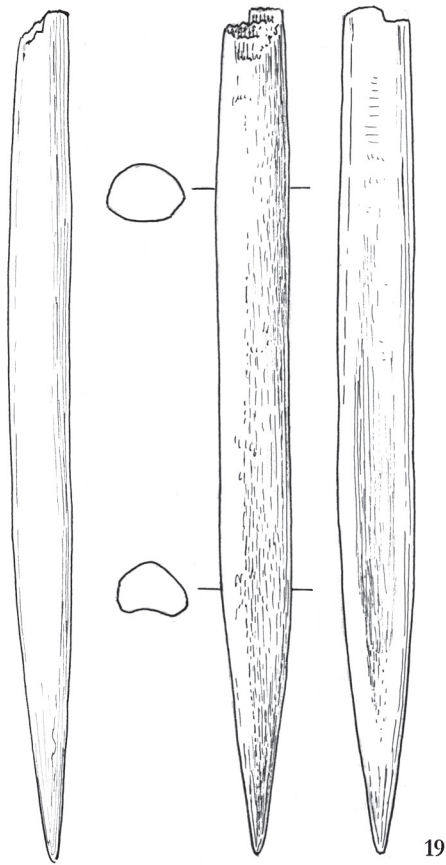
T. 29: Zalog pri Verdu. Rogovina. M. = 1 : 2 (risba: Dragica Knific Lunder).

Pl. 29: Zalog near Verd. Antler. Scale = 1 : 2 (drawing: Dragica Knific Lunder).

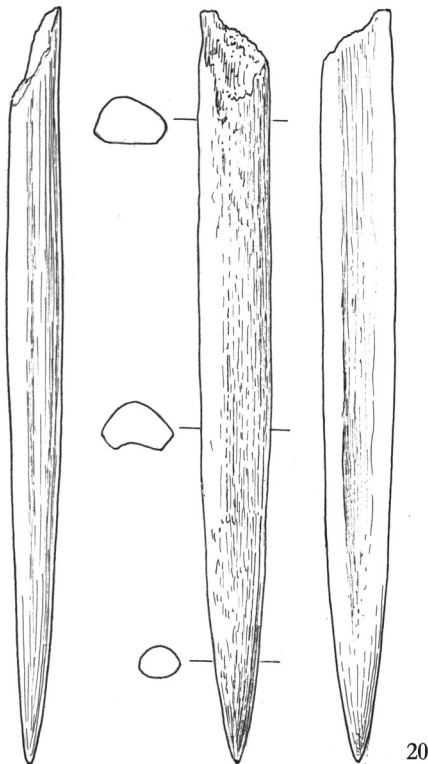


T. 30: Zalog pri Verdu. 13 rogovina; 15-17 kost. M. = 1 : 2 (risba: Dragica Knific Lunder).

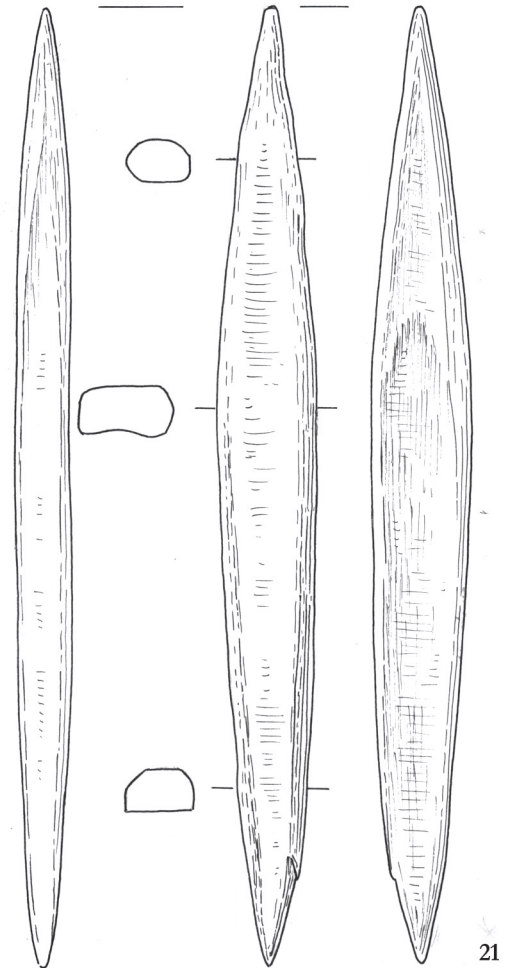
Pl. 30: Zalog near Verd. 13 antler; 15-17 bone. Scale = 1 : 2 (drawing: Dragica Knific Lunder).



19



20



21

T. 31: Zalog pri Verdu. Kost. M. = 1 : 1 (risba: Dragica Knific Lunder).

Pl. 31: Zalog near Verd. Bone. Scale = 1 : 1 (drawing: Dragica Knific Lunder).

ANTROPOLOŠKA ANALIZA LOBANJE

ANTHROPOLOGICAL ANALYSIS OF THE CRANIUM

Zdravka HINCAK in Marija ŠTEFANČIČ

Izvleček

Pri podvodnem raziskovanju struge potoka Ljubija je bila na najdišču Zalog pri Verdu poleg orodja iz kamna, kosti in rogovine ter fragmentov živalskih kosti odkrita tudi človeška lobanja. Na osnovi karakterističnih spolnih znakov je lobanja določen ženski spol. S primerjavami osnovnih kranimetričnih podatkov podamo lahko le zelo splošno oceno. Lobanja iz struge Ljubije pri Zalogu se po antropometričnih podatkih dobro vklaplja v mezolitski okvir.

Ključne besede: Slovenija, Ljubljansko barje, mezolitik, človeška lobanja

Abstract

The underwater research at the archaeological site of Zalog near Verd has revealed, apart from tools made of stone, bone and antler as well as animal bone fragments, also the remains of a human cranium. Characteristic gender marks have determined it to be of the female sex. Though the comparison of the basic craniometrical data sets for *neurocranium* enables only a very general assessment, the skull from Zalog near Verd can nevertheless be observed to fit perfectly within the Mesolithic frame.

Key words: Slovenia, the Ljubljansko barje, Mesolithic, human cranium

1 UVOD

Pri podvodnem raziskovanju struge potoka Ljubija so na najdišču Zalog pri Verdu poleg orodja iz kamna, kosti in rogovine ter fragmentov živalskih kosti odkrili tudi človeško lobanjo (*sl.* 7.1). V laboratoriju za radiometrično datiranje in raziskave izotopov na Christian Albrecht University v Kielu so za določitev absolutne starosti z AMS metodo, uporabili fragmenta čelnice (*os temporale*). Kalibrirani rezultati so z upoštevanjem napake dveh standardnih deviacij pokazali pri 95 % verjetnosti ocenjeno starost 7957 do 7610 let cal BC. Razpon postavlja lobanjo v začetno obdobje evropskega holocena, to je Boreal. Po Blytt Sernanderjevi razdelitvi evropskega holocena, ki temelji na stratigrafski šotnih plasti, je bilo to obdobje toplega in suhega podnebja (Roberts 1994).

2 METODE

Lobanjo je bilo potrebno po izkopu stabilizirati v destilirani vodi in po protokolu konzervirati v 20 % raztopini polietilenglikola ter jo v predelu nezraščeneh šivov učvrstiti z akrilnim lepilom. Obe senčnici (*os temporale*) nista lepljeni. Del desne senčnice (*pars*

1 INTRODUCTION

The underwater research at the archaeological site of Zalog near Verd has revealed, apart from tools made of stone and antler as well as animal bone fragments, also the remains of a human cranium (*Fig.* 7.1). Of the latter, two temporal bone fragments (*os temporale*) have been used for absolute dating using the AMS method, which was conducted at the Leibniz-Laboratory for Radiometric Dating and Stable Isotope Research, Christian-Albrechts-Universität zu Kiel. Calibrated results indicated, considering the error of two standard deviations and with 95% probability, the range of 7957-7610 BC. The established range places the specimen into the initial period of the European Holocene - in the Boreal period. According to the Blytt Sernander classification of the European Holocene, which is based on peat stratigraphy, it was a period of warm and dry climate (Roberts 1994).

2 METHODS

After discovery, the cranium needed to be stabilized in distilled water. It was preserved in 20% polyethylene glycol solution in accordance with the protocol. Open cranial sutures were secured with acrylic glue. The temporal bones (*ossa temporalia*) were not glued.

squamosa ossis temporalis dextra) je zaradi postmortalne deformacije rahlo zvita.

DNK ekstrakcija iz kostnega vzorca je bila izvedena po sledečem postopku. Zunanja plast kosti je bila odstranjena s smirkovim papirjem. Da bi vzorec ostal čist, je bil pridobljen z ročnim vrtnjem, nato pa

Part of the right temporal bone (*pars squamosa ossis temporalis dextra*) is slightly bent due to post-mortal deformation.

The bone sample was subjected to DNA extraction. In that procedure, the outer layer of the bone was removed using sand paper. A hand drill was used for



Sl. 7.1: a - frontalni pogled; b - lateralni pogled; c - koronalni pogled; d - posteriorni pogled. M. = ca. 1 : 2.
Fig. 7.1: a - Frontal View; b - Lateral View; c - Coronal View; d - Posterior View. Scale = ca. 1 : 2.

zdrobljen v prah. Kostni prah je bil preko noči shranjen v inkubatorju v ekstrakcijskem puferju proteinaze K. Sledila je ekstrakcija z organskimi topili (fenol/kloroform/isoamil alkohol). Tako pridobljeni vzorci so bili zgoščeni v mikro koncentracijskih epruvetkah. Na žalost jedrne DNK ni bilo mogoče ugotoviti niti v sledovih, pač je bila pridobljena majhna količina mt DNK. Po nekajkratnih ponovitvah so dodatne analize mt DNK še v teku.

3 OPIS

Lobanja ima dobro ohranjen nevrokranij s precej poškodovano bazo, z izjemo ozkega odseka vzdolž levega dela zatilne rupe (*foramen magnum*), pri čemer je mogoče določiti pomembni antropometrični točki *basion* in *opisthion*. Čelnica (*os frontale*) je nekoliko poškodovana v predelu nadočesnega oboka (*arcus superciliaris*). Na površini temenskih kosti (*os parietale*) je na nekaterih mestih plitva poškodba površinskega dela kompaktnega sloja kosti. Verjetno gre za vpliv vodnih sedimentov. Zatilna kost (*os occipitale*) je ohranjena do točke *opisthion* na robu zatilne rupe. Površina lobanje ne kaže sledov, ki bi nastali bodisi antemortem ali vsled kakšnih neobičajnih poškodb postmortem.

Čelo je pokončno z bilateralno dobro izraženimi izboklinami (*tuber frontale*). Nadočesni oboki (*tuber frontale*) in glabela (*glabella*) so izraženi. Linea temporalis je dobro izražena, nekoliko bolj na desni strani, kar kaže na dobro razvito žvekalno muskulaturo. Lobanjski svod je visok in simetrično razvit. Na zatilju se opaža rahla sploščenost v predelu obeliona. Oba mastoida (*processus mastoideus dexter et sinister*) sta izredno gracilna. Na lambdoidnem šivu (*sutura lambdoidea*) so izražene ne več kot 9 mm velike suturalne koščice (*ossa suturalia*). V zatilju je rahlo nakazan greben v višini nihalne linije (*linea nuchalis*), vendar brez izrazito izbočenega iniona.

Na osnovi karakterističnih spolnih znakov (Recommendation 1980) je lobanji določen ženski spol. Stopnja seksualizacije znaša -0,5. Značilnosti ženskega spola niso izrazito poudarjene (*tab. 7.1*).

| Spolni znak / <i>The sexual sign</i> | W | X | WX |
|--|----|----|----|
| <i>Glabella</i> | 3 | 0 | 0 |
| <i>Tuber parietale et frontale</i> | 2 | -1 | -2 |
| <i>Arcus superciliaris</i> | 2 | 1 | 2 |
| <i>Protuberantia occipitalis externa</i> | 2 | -1 | -2 |
| <i>Squama occipitalis</i> | 3 | -1 | -3 |
| <i>Inclinatio frontale</i> | 1 | -1 | -1 |
| <i>Margo supraorbitalis</i> | 1 | 0 | 0 |
| <i>Processus mastoideus</i> | 3 | -1 | -3 |
| Σ | 17 | | -9 |

sampling so as to keep the sample clean, after which the sample was pulverized. The bone powder was incubated overnight in the extraction buffer containing proteinase K. Extraction with organic solvents (phenol/chloroform/isoamyl alcohol) followed. The samples thus obtained were concentrated in micro-concentrator tubes. Unfortunately, the nuclear DNA could not be established, not even in traces. On the other hand, a small amount of mtDNA could be obtained. Additional analyses of mtDNA are in progress.

3 DESCRIPTION

The cranium has a well preserved *neurocranium* with a heavily damaged basal part except for the narrow segment along the left part of the occipital hole (*foramen magnum*), whereby the important anthropometric points of *basion* and *opisthion* could be determined. The frontal bone (*os frontale*) is slightly damaged in the right supraciliary arch area (*arcus superciliaris*). The surface of both parietal bones (*ossa parietalia*) shows, in some places, superficial damage to the upper part of the solid bone (*substantia compacta*). This is probably the consequence of the influence of the water sediments. The occipital bone (*os occipitale*) is well preserved up to the posterior point of *foramen magnum* (*opisthion*). There are no traces of pre- or unusual post-mortem damages on the skull surface.

The forehead is vertical with well developed *tuber frontale* on both sides. The supraciliary arches and the *glabella* are well defined. The *linea temporalis* is more robust, somewhat stronger on the right side, indicating developed masticatory muscles. The cranial vault is symmetrical and high. The symmetry is broken on the occiput by mild flatness in the *obelion* region. Both mastoid processes (*processus mastoideus dexter et sinister*) are exceptionally gracile. Several tiny sutural bones (*ossa suturalia*), no longer than 9 mm, are visible on the lambdoid suture (*sutura lambdoidea*). The occiput is slightly creased at *linea nuchalis*, but without a distinctly convex *inion*.

The cranium has been determined as female (Recommendations 1980) based on the characteristic gender marks (*Tab. 7.1*). The sexualization level is only -0,5, since the female features on the cranium are not distinct.

The age at death was determined on the basis of the closure of cranial sutures (Meindel, Lovejoy 1985; Nawrocki 1997). The cranial sutures are open with

Tab. 7.1: Zalog. Stopnja seksualizacije.

Tab. 7.1: Zalog. The sexualization level.

Starost ob času smrti je bila določena na osnovi zraščanja lobanjskih šivov (Meindel, Lovejoy 1985; Nawrocki 1997). Lobanjski šivi so odprti, razen delno zraščenega sagitalnega šiva (*sutura sagittalis*) v predelu S3. Po regresijski formuli lahko določimo starostni razpon med 20 in 34 leti.

Kraniometrična analiza, izvedena po Martinu (Martin, Saller 1957), definira lobanjo kot dolgo (182 mm), srednje široko (139 mm) in visoko (136 mm). Glede na najmanjšo širino čela (ft-ft=95 mm) lahko ocenimo, da je obraz ozek, čeprav obrazne kosti niso ohranjene. Pogled na lobanjo od zgoraj (*norma verticalis*) kaže pentagonoidno obliko, pogled od zadaj (*norma occipitalis*) pa hišasto obliko. Vrednost dolžinsko-širinskega indeksa (8/1) opredeljuje lobanjo kot mezokrano (*mesocrania*), dolžinsko-višinski indeks (17/1) kot hipsikrano (*hypsicrania*) in širinsko-višinski indeks (17/8) kot akrokranano (*acrocrania*). Transverzalni fronto-parietalni indeks (9/8) kaže na metriopetopi tip ali po Schwalbu na megasemi tip. Glede na transversalno-frontalni indeks (9/10) je lobanja lateralno v predelu temenskih kosti (*os parietale*) srednje izbočena. Prostornina lobanje znaša 1348 ccm in se uvršča med prostorne lobanje (*aristencephalia*) (tab. 7.2).

partial closure noticed only in the part S3 of the sagittal suture (*sutura sagittalis*). According to the calculations of the regression formula, the person's age was between 20 and 34 years.

The craniometrical analysis after Martin, Saller (1957) defined the cranium as long (182 mm), medium-narrow (139 mm) and high (136 mm). Based on the minimum forehead breadth value (ft-ft=95mm) it may be assumed that the face was narrow, although the facial bones are not preserved. The coronal view (*norma verticalis*) shows the skulls to be of a pentagonoid form, while the posterior view (*norma occipitalis*) shows the house form. The calculations for the length-breadth index (8/1) describe the cranium type as mesocranial, the length-height index (17/1) as hypsicranial and the breadth-height index (17/8) as acrocranial (Tab. 7.2). The transversal fronto-parietal index (9/8) indicates the medium type, i.e. metriometopic or, according to Schwalbe, megasemic type. The transversal frontal index (9/10) shows the skull to have a medium curvature laterally, in the region of the parietal bones (*ossa parietalia*). The skull volume is 1348 ccm, ranking it among large skulls, i.e. the aristencephalic type.

Tab. 7.2: Zalog. Lobanjske mere (v mm) in indeksi.

Tab. 7.2: Zalog. Cranial measurements (in mm) and indexes.

Stopnja seksualizacije: $\Sigma^{WX} : \Sigma^X = -0,5$

The sexualization level: $\Sigma^{WX} : \Sigma^X = -0,5$

W: pomembnost znaka

X: stopnja seksualizacije za posamezen znak

W: Importance of the sign

X: The sexualization level for each sign

| Mera - indeks / <i>Measurements - indexes</i> | Oznaka po Martinu / <i>Martin no.</i> | Vrednost / <i>Value</i> |
|---|--|-------------------------|
| Največja dolžina: g-op / <i>Maximum length: g-op</i> | 1 | 182 mm |
| Dolžina glabela-inion: g-i / <i>Glabella-inion length: g-i</i> | 2 | 176 mm |
| Največja širina: eu-eu / <i>Maximum breadth: eu-eu</i> | 8 | 139 mm |
| Najmanjša širina čela: ft-ft / <i>Minimum frontal breadth: ft-ft</i> | 9 | 95 mm |
| Največja širina čela: co-co / <i>Maximum frontal breadth: co-co</i> | 10 | 114 mm |
| Največja širina zatilja: ast-ast / <i>Biasterionic breadth: ast-ast</i> | 12 | 109 mm |
| Višina lobanje: ba-b / <i>Basion-bregma height: ba-b</i> | 17 | 136 mm |
| Dolžinsko-širinski indeks / <i>Length-breadth index</i> | 8/1 | 76 |
| Dolžinsko-višinski indeks / <i>Length-height index</i> | 17/1 | 75 |
| Širinsko-višinski indeks / <i>Breadth-height index</i> | 17/8 | 98 |
| fronto-parietalni indeks / <i>Fronto-parietal index</i> | 9/8 | 68 |
| Transverzalno frontalni indeks / <i>Transversal frontal index</i> | 9/10 | 83 |
| Lobanjska prostornina / <i>Cranium capacity</i> | 1348 ccm (<i>aristencephalia type</i>) | |

4 ANALIZA

Izmerjene vrednosti za dolžino, širino in višino lobanje in indekse smo primerjali s podatki devetih mezolitskih najdišč v Evropi. Na splošno so primerjane lobanje dolge ali zelo dolge, ozke do široke in srednje visoke do visoke (*tab. 7.3*).

V primerjavo smo vključili ženske lobanje treh mezolitskih najdišč iz Skandinavije: Koelbjerg (zgodnji mezolitik) in Ravnstrup (pozni mezolitik) iz Danske ter Bäckaskog iz Norveške (Torgersen 1976). Izstopa zelo dolga lobanja iz Koelbjerga, ki pa sodi v čas zgodnjega mezolitika. Kot primerjavo lahko navedemo lobanjo poznega paleolitika iz Dolnih Vestonic na Moravskem, ki je dolga 192 mm, pri čemer pa je širina lobanje običajna (139 mm) (Trinkhaus *et al.* 2000).

Iz Italije imamo podatke za žensko lobanjo z najdišča Ortucchio (Pasarello 1978). Čeprav je lobanja opisana kot dolga, ozka in nizka z najmanjšimi vrednostmi za vse mere v primerjavi z drugimi najdišči, pa je bilo v tej jami najdenih več mezolitskih skeletnih ostankov robustnejše osebe. Primerjamo tudi mere dveh moških oseb z najdišča Téviéc-Hoëdic v Franciji (Vallois 1978) in Mugem na Portugalskem (Da Cunha 1978).

Daleč najštevilčnejši so podatki za Vlasac na desni obali Donave v Železnih Vratih. V zelo zgodnjem mezolitskem sloju so bili odkriti kostni ostanki 57 oseb (povprečne vrednosti za 17 ženskih lobanj so navedene v *tabeli 3*). Razponi za mere teh lobanj niso homogeni, saj vrednosti za indekse obsegajo zelo širok razpon tipov (Nemeskéri, Szatháry 1978). Znotraj širokega razpona se razdvajata dve skupini, ki opredeljujeta kronološko starejšo in kronološko mlajšo fazo. Za starejšo fazo so značilne lobanje z večjo višino zgornjega dela obraza in širšimi ličnicami (Nemeskéri, Szatháry 1978), medtem ko se v mlajši fazi na splošno opaža precejšnja gracilizacija (Mikić 1981).

4 ANALYSIS

The measured values of length, breadth and height for the Zalog skull as well as its indexes have been compared with skulls from nine Mesolithic sites in Europe (*Tab. 7.3*). In general, the compared skulls are long to very long, narrow to broad and medium high to high.

The comparison included female skulls from three Mesolithic sites in Scandinavia: Koelbjerg (Early Mesolithic) and Ravnstrup (Late Mesolithic) in Denmark and Bäckaskog in Norway (Torgersen 1976). Of these the Koelbjerg skull, dated to the Early Mesolithic, stands out for its considerable length. For further comparison the skull of an Upper Palaeolithic age from Dolní Vestonice in Moravia can be cited, measuring 192 mm in length. Its width, however, was of an average value (139 mm) (Trinkhaus *et al.* 2000).

The site of Ortucchio, Italy, provided the data set for a female skull (Pasarello 1978). Although it is described as long, narrow and low with the lowest values of all sites mentioned, there were several Mesolithic skeletal remains of a more robustly built person also found in that cave. In addition to this skull, the measures of two male persons from the sites of Téviéc-Hoëdic, France (Vallois 1978), and Mugem, Portugal (Da Cunha 1978), have also been compared.

By far the most numerous were the data sets obtained at the site of Vlasac on the right bank of the Danube in the Iron Gates. The very early Mesolithic layer there yielded bone remains of fifty-seven persons (the average values for seventeen female skulls are cited in *table 3*). The measure ranges for these skulls are not homogenous, since the index values cover a very wide range of types (Nemeskéri, Szatháry 1978). Within this wide range there are two separate groups that denote two chronological phases, the early and the late phase. The female skulls of the early phase are characterized by great height of the upper part of the

Tab. 7.3: Osnovne mere lobanje (mm) in indeksi za mezolitska najdišča v Evropi.

Tab. 7.3: Basic measures of the skull (mm) and indexes (Martin) for some Mesolithic sites in Europe.

Mera - indeks po Martinu / *measurements - indexes (after Martin)*

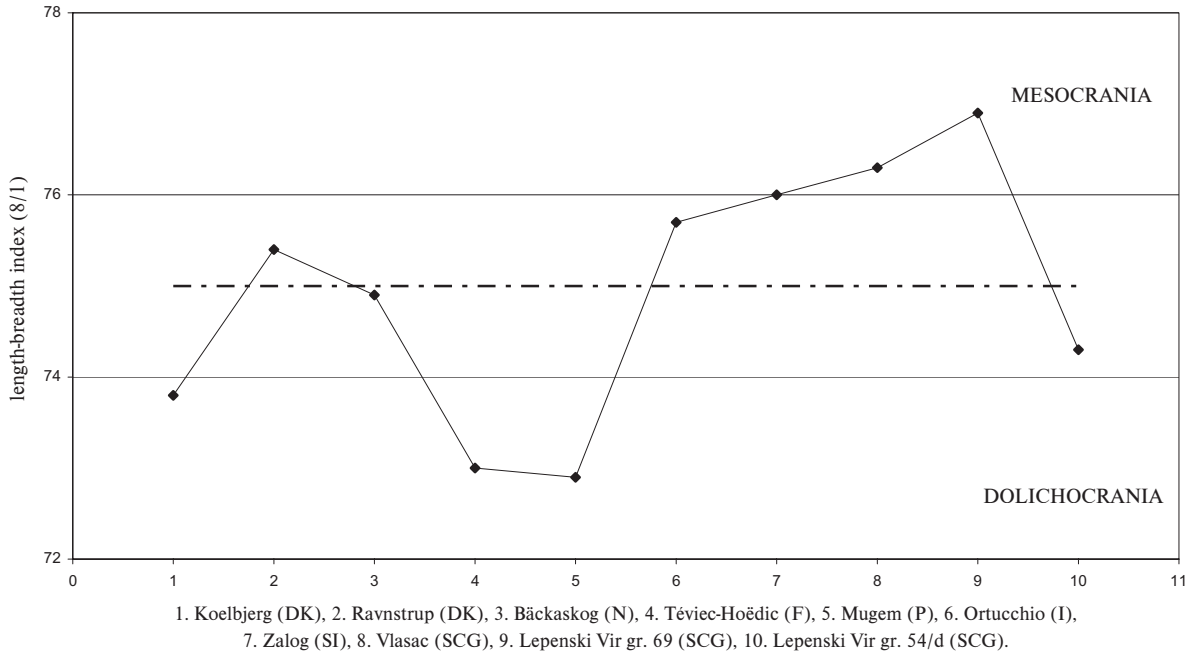
| Najdišče / <i>Site</i> | 1 | 8 | 17 | 8/1 | 17/1 | 17/8 |
|------------------------|-------|-------|-------|------|------|-------|
| Koelbjerg | 191 | 141 | 138 | 73,8 | 72,3 | 97,9 |
| Ravnstrup | 187 | 141 | 156 | 75,4 | 83,4 | 110,6 |
| Bäckaskog | 183 | 137 | 131 | 74,9 | 71,6 | 95,6 |
| Téviéc-Hoëdic | 188,2 | 137,2 | 139,2 | 73,0 | 74,0 | 101,2 |
| Mugem | 183,5 | 133,7 | 134,2 | 72,9 | 73,1 | 100,4 |
| Ortucchio | 177 | 134 | 127 | 75,7 | 71,8 | 94,8 |
| Zalog | 182 | 139 | 136 | 76,0 | 75,0 | 98,0 |
| Lepenski Vir gr. 7/II | 189 | 143 | - | 75,7 | - | - |
| Lepenski Vir gr. 69 | 195 | 150 | 143 | 76,9 | 75,3 | 95,3 |
| Vlasac | 186 | 141,7 | 139,6 | 76,3 | 74,7 | 98,6 |
| Lepenski Vir gr. 54/d | 179 | 133 | 142 | 74,3 | 79,3 | 106,7 |

Vključili smo tudi lobanje iz najbolj zgodnje faze nahajališča Lepenski Vir (Gavrilović, Schwidetzky 1978) in sicer grobova 69 in 7/II in pa lobanjo iz groba 54/d, ki je edina nedvomno ženskega spola (Mikić 1981).

Z merami in indeksi za lobanje navedenih nahajališč

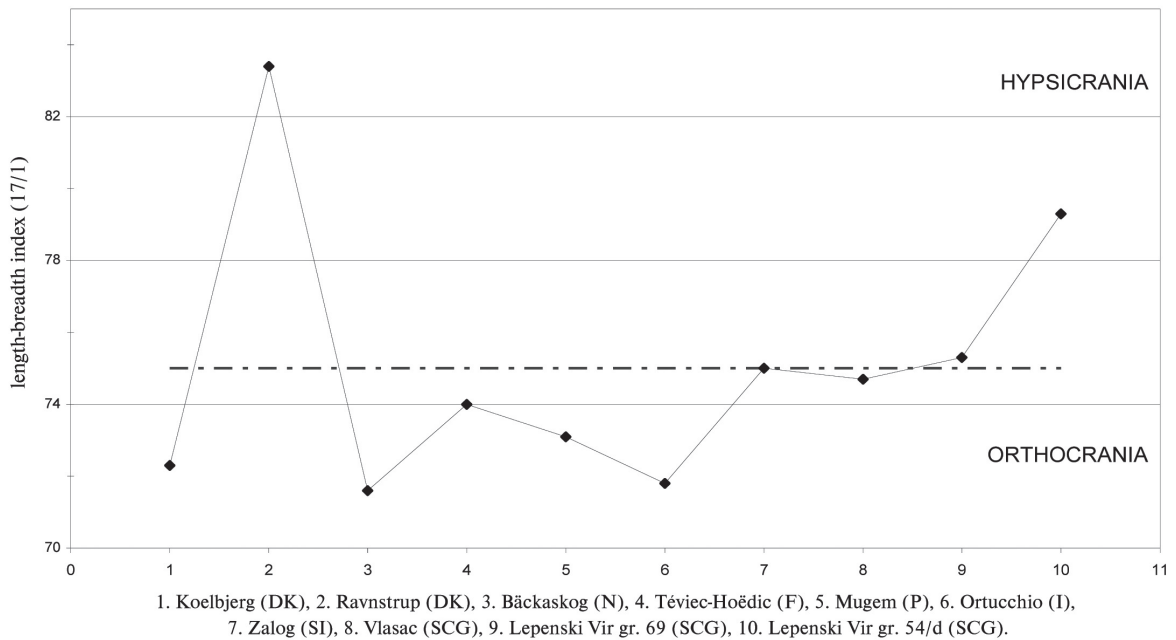
face and a broad zygomatic arch (Nemeskéri, Szatháry 1978), while in the later phase a considerable gracilization can in general be observed (Mikić 1981).

The skulls from the earliest phase of the Lepenski Vir site were also included in the analysis (Gavrilović, Schwidetzky 1978). More precisely, the skulls from



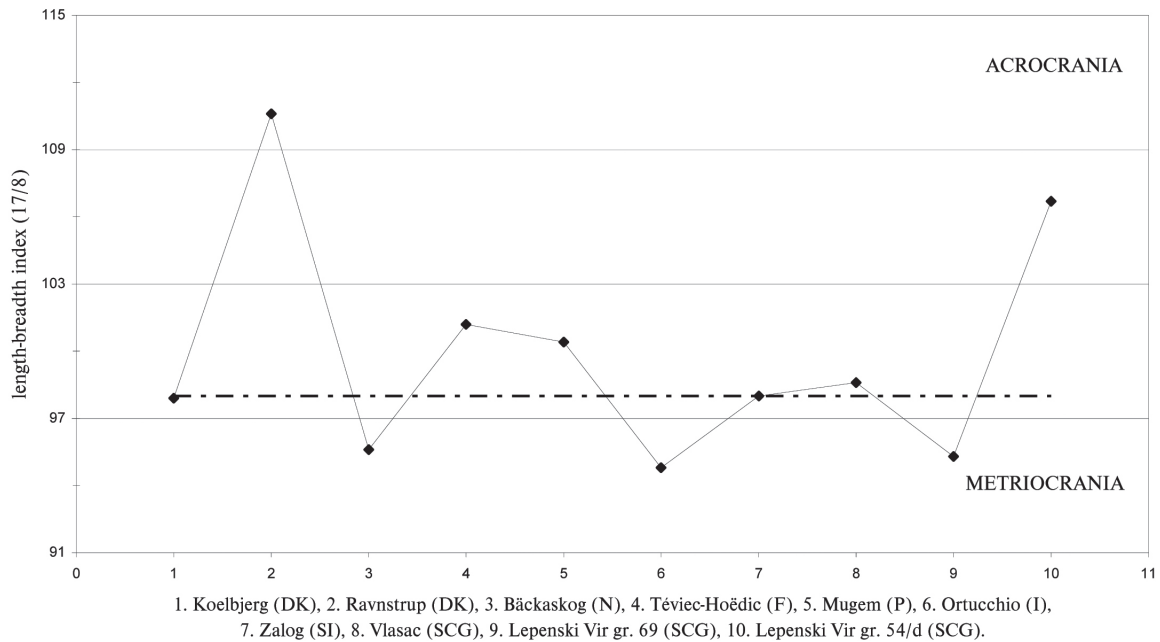
Sl. 7.2: Razporeditev dolžinsko širinskega indeksa (1/8).

Fig. 7.2: The distribution of length-breadth indexes (8/1).



Sl. 7.3: Razporeditev dolžinsko višinskega indeksa (17/1).

Fig. 7.3: The distribution of length-height indexes (17/1).



Sl. 7.4: Razporeditev širinsko višinskega indeksa (17/8).
 Fig. 7.4: The distribution of the breadth-height indexes (17/8).

skušamo prikazati antropološki okvir mezolitika (tab. 7.3; sl. 7.2-7.4).

Na sliki 7.2 so prikazane vrednosti dolžinsko-širinskega indeksa za posamezna mezolitska najdišča. V večini primerov kažejo lobanje glede na dolžinsko-širinski indeks precejšnjo homogenost. Večinoma so mezokranega tipa in le v treh primerih dolihokrane. Tudi vrednosti mezokranih lobanj so blizu meje dolihokranije. Visok indeks za lobanjo iz Lepenskega Vira (grob 69) je izjema, saj kažeta lobanji iz grobov 7/II in 54/d nižje vrednosti (sl. 7.2).

Vrednosti za dolžinsko-višinski indeks, prikazane na sliki 7.3, kažejo večja odstopanja. Najnižja vrednost (71,6) za najdišče Ortucchio in najvišja (83,4) za Ravnstrup obsega razpon od ortokranega do hipsikranega tipa. Večina lobanj je ortokranega tipa. Tudi za obe hipsikrani lobanji so vrednosti dolžinsko-višinskega indeksa na meji ortokranije.

Slika 7.4 kaže distribucijo vrednosti širinsko-višinskega indeksa. Razpon obsega najnižjo vrednost (94,8) za Ortucchio in najvišjo vrednost (110,6) za Ravnstrup. Nižje vrednosti za štiri najdišča so v okviru metriokranega tipa, ostale so akrokranega tipa.

Podobnost med lobanjami smo ocenili tudi s pomočjo multivariantne distančne analize (Knussmann, 1967; Piontek, Kaczmarek 1981). Uporabili smo lahko le tri osnovne mere: dolžino lobanje (1), širino lobanje (8) in višino lobanje (17). Vključili smo šest lobanj, ki so nedvomno ženskega spola iz najdišč Koelbjerg,

graves 69 and 7/II as well as the skull from grave 54/d, the latter being the only one which is certainly of the female sex (Mikić 1981).

The measures and indexes of the skulls from the above-cited sites serve to present the anthropological frame of the Mesolithic period (Tab. 7.3; Figs. 7.2-7.4).

Figure 7.2 shows the values of the length-breadth index for individual Mesolithic sites. In most cases, the skulls appear quite homogenous if the length-breadth index is considered. They are mostly of the medium, i.e. *mesocrania* type, only three belong to the narrow, i.e. *dolichocrania* type. The values of the *mesocrania* type skulls are even close to those of the *dolichocrania* type skulls. The high index of the skull from Lepenski Vir (grave 69) constitutes an exception, since the skulls from graves 7/II and 54/d exhibit lower values (Fig. 7.2).

The values for the length-height index, shown on Figure 7.3, indicate substantial deviations. The lowest index (71.6) for the site of Ortucchio, Italy, and the highest value (83.4) for Ravnstrup, Denmark, span a range from the *orthocrania* to the *hypsocrania* type. Most skulls are of the former type. Both *hypsocrania* skulls also show values that border on the *orthocrania* type.

Figure 7.4 shows the distribution of the values of the breadth-height index. The range includes the lowest value (94.8) for Ortucchio and the highest value

Ravnstrup, Bäckaskog, Ortucchio, Zalog in Lepenski Vir gr. 54/d (tab. 7.4;7.5).

Koeficiente skupne distance (C^2_R) prikazuje tabela 7.4. Če se osredotočimo na lobanjo iz Zaloga pri Verdu vidimo, da se najbolj ujema z lobanjo iz Norveške, saj znaša koeficient distance komaj 0,32. Sorazmerno nizki koeficient distance (0,83) je tudi med našo in dansko lobanjo iz Koelbjerga in med našo in italijansko lobanjo iz Ortucchia (0,98). Kot dokaj podobno lahko upoštevamo tudi še lobanjo iz Lepenskega Vira (1,08).

Koeficiente distance oblike (C^2_p) prikazuje tabela 7.5. Razvidno je, da se lobanja iz Zaloga po obliki najbolj ujema z norveško in delno z dansko lobanjo iz Koelbjerga (0,83), nekoliko manj pa z lobanjo iz Italije (0,98) in Lepenskega Vira (1.06). Izmed vseh šestih lobanj, vključenih v distančno analizo, najbolj izstopa lobanja iz Ravnstrupa, ki je zelo visoka. Razlog za tako veliko odstopanje je lahko to, da sodi ta lobanja v obdobje poznega mezolitika, medtem ko so vse ostale lobanje datirane v zgodnji mezolitik.

Posebno mesto med primerjalnim gradivom predstavlja naključna najdba ženske lobanje iz Dola pri

Tab. 7.4: Distančna analiza po Penrosu: koeficienti skupne distance (C^2_R). Legenda: 1. Koelbjerg, 2. Ravnstrup, 3. Bäckaskog, 4. Ortucchio, 5. Zalog pri Verdu, 6. Lepenski Vir gr. 54/d.

Tab. 7.4: Penrose's distance analysis: Coefficients of general distance (C^2_R). Legend: 1. Koelbjerg, 2. Ravnstrup, 3. Bäckaskog, 4. Ortucchio, 5. Zalog near Verd, 6. Lepenski Vir gr. 54/d.

| | 2 | 3 | 4 | 5 | 6 |
|---|------|-------------|-------------|-------------|------|
| 1 | 4,12 | 0,96 | 2,72 | 0,83 | 2,45 |
| 2 | | 6,46 | 8,73 | 4,18 | 2,42 |
| 3 | | | 0,46 | 0,32 | 2,02 |
| 4 | | | | 0,98 | 2,53 |
| 5 | | | | | 1,06 |

Tab. 7.5: Distančna analiza po Penrosu: koeficienti distance oblike (C^2_p). Legenda: 1. Koelbjerg, 2. Ravnstrup, 3. Bäckaskog, 4. Ortucchio, 5. Zalog pri Verdu, 6. Lepenski Vir gr. 54/d.

Tab. 7.5: Penrose's distance analysis: Coefficients of shape distance (C^2_p). Legend: 1. Koelbjerg, 2. Ravnstrup, 3. Bäckaskog, 4. Ortucchio, 5. Zalog near Verd, 6. Lepenski Vir gr. 54/d.

| | 2 | 3 | 4 | 5 | 6 |
|---|------|------|-------------|-------------|-------------|
| 1 | 4,53 | 1,72 | 4,88 | 1,19 | 2,99 |
| 2 | | 8,76 | 13,20 | 5,72 | 4,32 |
| 3 | | | 0,81 | 0,40 | 2,04 |
| 4 | | | | 1,75 | 3,07 |
| 5 | | | | | 1,08 |

(110.6) for Ravnstrup. Lower values for four sites are within the frame of the *metriocrania* type, while the others are of the *acrocrania* type.

The similarity among the skulls has been assessed also using the multivariate distance analysis (Knussmann, 1967; Piontek, Kaczmarek 1981). Only three basic skull measurements could be used: length (1), breadth (8) and height (17). The assessment included six skulls that undoubtedly belonged to female individuals, from the sites of Koelbjerg, Ravnstrup, Bäckaskog, Ortucchio, Zalog and Lepenski Vir (the latter grave 54/d (tab. 7.4,7.5).

The general distance coefficients (C^2_R) are shown on Table 4. The skull from Zalog near Verd has its best match in the skull from Norway, since the distance coefficient is only 0.32. The relatively low distance coefficient (0.83) can also be noticed between the Zalog and the Koelbjerg skulls, on the one hand, and between the Zalog and the Ortucchio skulls (0.98), on the other. The skull from Lepenski Vir (grave 54/d) can also be considered as fairly similar (1.08).

The shape distance coefficients (C^2_p) are shown on Table 5. It is shown that, in shape, the Zalog skull corresponds best to the Norwegian (0.32) and partially to the Danish skull (Koelbjerg; 0.83) as well as the skull from Lepenski Vir (1.06). Of the six skulls included in the distance analysis, that from Ravnstrup shows the biggest deviation, being very high. The reason for this deviation might be that the Ravnstrup skull belongs to the Late Mesolithic, while all others date to the Early Mesolithic.

Another skull has to be mentioned here, that is the female skull from Dol near Borovnica (the Ljubljansko barje, Slovenia). The skull is of medium length, it is narrow and high, belonging to the *mesocrania*, *hypsicrania* and *acrocrania* types (Štefančič 1985). Although some of the basic measures are lower than those for the Zalog skull, the index values correspond exactly. The dating with the AMS method showed the age of 4882 ± 31 BP or 3710-3637 cal BC at two sigma range (KIA28895).

5 CONCLUSION

In view of the extremely small number of specimens from Europe, with the exception of Vlasac, and the different dates they provide, the potential of the anthropological analysis is limited. The comparison of the basic craniometrical data sets only enables a general assessment to be given, which states that the skull from the Ljubija bed near Zalog fits well, in its anthropometric data, into the Mesolithic framework. The damage to the facial bones unfortunately prevents us to determine the presence of the Neolithic gracilization. Having said that, further research is needed in order to gather

Borovnici. Lobanja je srednje dolga, ozka in visoka, mezokrana, hipsikrana in akrokrona (Štefančič 1985). Osnovne mere lobanje so nekoliko nižje v primerjavi z lobanjo iz Zaloga, vendar se v vrednostih indeksov lobanji popolnoma ujemata. Meritve z AMS metodo so pokazale starost 4882 ± 31 PS oziroma 3710-3637 cal BC pri razponu dveh sigem (KIA28895).

more data for the Mesolithic period and only a higher number of inhumation burials will enable a more extensive analysis, particularly if aided also by genetic analyses.

5 SKLEP

Zaradi izrazito majhnega števila najdb iz širokega evropskega prostora, z izjemo najdišča Vlasac, in različnih datacij, so možnosti antropološke analize omejene. S primerjavami osnovnih kranimetričnih podatkov podamo lahko le zelo splošno oceno. Lobanja iz struge Ljubije pri Zalogu se po antropometričnih podatkih dobro vklaplja v mezolitski okvir. Zaradi poškodovanih obraznih delov je nemogoče ugotoviti prisotnost neolitske gracilizacije. Potrebna so nadaljnja raziskovanja z namenom pridobitve čim več možnih podatkov za mezolitsko obdobje. Le večje število skeletnih pokopov bi omogočalo obširnejšo obdelavo, predvsem če bi bila le ta podprta tudi z genetskimi analizami.

VELIKI SESALCI

LARGE MAMMALS

Borut TOŠKAN in Janez DIRJEC

Izvleček

Analiza favne z mezolitskega najdišča Zalog pri Verdu je izpostavila prevladujoč delež ostankov jelena in divjega prašiča. Upoštevajoč zastopanost posameznih (delov) skeletnih elementov obeh navedenih vrst je najdišče mogoče opredeliti kot lovsko postojanko. Verodostojnost interpretacije zmanjšujejo vprašljiva reprezentativnost vzorca in veliko število rogovinastih ostankov z očitnimi sledmi obdelave.

Ključne besede: Slovenija, Ljubljansko barje, mezolitik, živalski ostanki, lovsko postojanko, rogovinasta orodja

Abstract

The faunal analysis of the Mesolithic site of Zalog near Verd revealed the predominance of skeletal elements of red deer and wild boar. Considering the representation of individual (parts of) skeletal elements of the two cited species, the site may be defined as a hunters' camp. The credibility of this interpretation, however, is undermined by the questionable representation of the sample as well as a high number of antler remains with obvious traces of working.

Key words: Slovenia, the Ljubljansko barje, Mesolithic, animal remains, hunters' camp, antler tools

1 UVOD

V Sloveniji je iz obdobja med 8.000 in 5.000 leti pr. n. št. poznanih kar nekaj mezolitskih najdišč, ki pa zaradi neustrezne metodike in/ali omejenega obsega njihovega raziskovanja niso bistveno prispevali k poznavanju staroholocenskega živalstva (za izjeme glej Pohar 1984; 1986; 1990; Toškan, Dirjec 2004a; Toškan, Kryštufek 2004; Turk, Toškan, Dirjec 2004). Izmed več predneolitskih planih najdišč z območja Ljubljanskega barja (npr. Vuga 1977; 1986; Turk, Vuga 1982; Josipovič 1983; Culiberg, Turk, Vuga 1984; Frelih 1986) je bila tako živalskim ostankom nekoliko večja pozornost namenjena le v primeru Brega pri Škofljici (Pohar 1984). Zaradi navedenega se zdi analiza favne s kamenodobnega¹ najdišča Zalog pri Verdu (286,31 m nm. v.) vsekakor smiselna, pa čeprav so bile najdbe pobrane iz struge potoka Ljubije, kar zagotovo zmanjšuje njihovo izpovedno vrednost.

1 INTRODUCTION

There are quite a few Mesolithic sites, dated to the period from 8000 to 5000 BC, known in Slovenia. However, due to inadequate methods and/or limited extent of research they did not substantially add to the knowledge of the Early Holocene animal life (for exceptions see Pohar 1984; 1986; 1990; Toškan, Dirjec 2004a; Toškan, Kryštufek 2004; Turk, Toškan, Dirjec 2004). Of the several plain pre-Neolithic sites from the area of the Ljubljansko barje (for example: Vuga 1977, 1986; Turk, Vuga 1982; Josipovič 1983; Culiberg, Turk, Vuga 1984; Frelih 1986), at least some attention to animal remains was only paid at Breg near Škofljica (Pohar 1984). Having said the above, the faunal analysis of the Stone Age¹ site of Zalog near Verd (286,31 metres above sea-level) is undoubtedly reasonable, even despite the fact that the finds were taken from the bed of the Ljubija Stream which surely reduces the interpretative value of the sample.

¹ Na osnovi radiokarbonskih datacij je bilo najdišče umeščeno v 8. tisočletje pr. n. št. (Gaspari, Erič, v tem zborniku).

¹ The site has been dated to the 8th millennium BC on the basis of radiocarbon dating (Gaspari, Erič, in this publication).

2 MATERIAL IN METODE

Podrobne podatke o najdišču in metodologiji terenskega raziskovanja podajata Gaspari in Erič (v tem zborniku), zato se na tem mestu posvečava le predstavitvi arheozoološke analize. Živalski ostanki so bili pobrani ročno iz poglobitev v rečnem dnu, kjer so bile zapažene koncentracije najdb. Posamezna koncentracija predstavlja osnovno zbiralno enoto, katere mikrolokacija je definirana z njenim centroidom. V celoti je bilo na približno 80 m dolgem odseku struge odkritih več kot 120 takšnih koncentracij, od katerih jih je 86 vsebovalo tudi kosti velikih sesalcev.

Določevala sva vse skeletne elemente z izjemo reber in pretežnega dela vretenc (od slednjih sva določila le nosač in okretlač). Pri biometrični analizi sva sledila smernicam von den Driescheve (1976), starost živali ob poginu pa sva ocenjevala na osnovi obrabe žvekalne površine kočnikov. Kvantitativne primerjave med taksoni temeljijo na številu določenih primerkov (*Number of Identified Specimens*, NISP; Grayson 1984), medtem ko sva zastopanost posameznih skeletnih elementov izrazila z najmanjšim številom živalskih enot (*Minimal Animal Unit*, MAU; Lyman 1999). Statistična obdelava je bila narejena s programskim paketom StatSoft 2001, STATISTICA za Windows, verzija 6.0.

2 MATERIAL AND METHODS

Detailed data on the site and the methodology of field research used is given by Gaspari and Erič (in this publication). This part therefore concentrates only on presenting the archaeozoological analysis. Animal remains were hand-collected from the deepened parts in the bed of the stream where concentrations of finds were noticed. One concentration represents one basic collection unit, its microlocation being defined by its centroid. In total, more than 120 such concentrations were uncovered along the approximately 80 m long section of the bed, 86 of them containing also bones of large mammals.

All skeletal elements, with the exception of ribs and most vertebrae, have been identified (of the latter, only the atlas and axis were systematically identified). The biometric analysis was carried out according to the guidelines of von den Driesch (1976). The age of the animals at death was determined on the basis of the wear of the cheek teeth. The quantitative comparisons among the taxons are based on the number of identified specimens (NISP; Grayson 1984), while the representation of individual skeletal elements is expressed by the minimal animal unit (MAU; Lyman 1999). The statistical processing was conducted using the StatSoft 2001, STATISTICS for Windows program package, version 6.0.

| Takson / Taxon | Rogovje / Antlers | Cranium | Os maxillare | Mandibula | Dens | Atlas / Axis | Scapula | Humerus | Radius | Ulna | Carpalia | Metacarpalia | Phalanges | Os coxae | Femur | Patella | Tibia | Fibula | Calcaneus | Astragalus | Ostale / Other tars. | Metatarsalia | Indet. metapod. | NISP | % NISP |
|----------------------------|----------------------|---------|--------------|-----------|------|-----------------|---------|---------|--------|------|----------|--------------|-----------|----------|-------|---------|-------|--------|-----------|------------|-------------------------|--------------|-----------------|------|--------|
| <i>Cervus elaphus</i> | 148 | | 2 | 7 | 28 | 2 | 7 | 8 | 14 | 2 | 1 | 6 | | 4 | 3 | 1 | 5 | | 1 | 3 | 1 | 11 | 6 | 260 | 61,6 |
| <i>Sus cf. scrofa</i> | | 3 | 8 | 13 | 37 | 2 | 7 | 6 | 5 | 5 | 1 | 3 | 1 | 5 | 1 | 1 | 6 | 2 | 2 | 5 | 2 | 1 | 6 | 122 | 28,9 |
| <i>Bos</i> sp. | | | | | 4 | | 1 | | | | | 1 | 1 | | | | 1 | | | | | 4 | 1 | 13 | 3,1 |
| <i>Meles meles</i> | | | | 4 | | | | | 1 | 3 | | | | | | | | | | | | | | 8 | 1,9 |
| <i>C. capreolus</i> | | | | | 1 | | | | | | | 2 | | | | | 2 | | | | | | 1 | 6 | 1,4 |
| <i>Castor fiber</i> | | | | | 2 | | 1 | | | 1 | | | | 1 | | | | | | | | | | 5 | 1,2 |
| <i>Felis</i> sp. | | | | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | 3 | 0,7 |
| <i>Ursus arctos</i> | | | | | | | | | | | | | 1 | | | | 1 | | | | | | | 2 | 0,4 |
| <i>Bos</i> s. <i>Bison</i> | | | | | | | | | | | | 1 | | | | | | | | | | | | 1 | 0,2 |
| <i>Capra hircus</i> | | | | | | | | | | | | | | | | | | | 1 | | | | | 1 | 0,2 |
| <i>Equus caballus</i> | | | | | 1 | | | | | | | | | | | | | | | | | | | 1 | 0,2 |
| <i>Martes martes</i> | | | | 1 | | | | | | | | | | | | | | | | | | | | 1 | 0,2 |
| SKUPAJ / TOTAL | 148 | 3 | 10 | 26 | 74 | 5 | 16 | 14 | 20 | 11 | 2 | 13 | 3 | 9 | 5 | 2 | 15 | 2 | 4 | 8 | 3 | 16 | 14 | 423 | 100 |

Tab. 8.1: Zastopanost posameznih taksonov velikih sesalcev in njihovih skeletnih elementov v gradivu z Zaloga.
Tab. 8.1: Representation of individual taxons of large mammals and their skeletal elements within the Zalog assemblage.

3 REZULTATI IN RAZPRAVA

Pridobljeno gradivo vsebuje 863 ostankov velikih sesalcev, od katerih jih je bilo vsaj do nivoja rodu mogoče določiti 429 (tj. 49,7 %). Visok odstotek določljivih najdb je pričakovana posledica načina vzorčenja, saj z ročnim pobiranjem ostankov ni bilo mogoče reprezentativno zaobjeti manjših (pod 1,5 cm velikih) fragmentov (Gaspari, ustno). Sicer pa je v zbranem gradivu zastopanih najmanj 11 vrst velikih sesalcev iz osmih družin (tab. 8.1). Kot posledica izpostavljenosti tekoči vodi s premikajočimi se peščenimi drobcji je mnogo kosti obrušeni; ugotovljeno število primerkov z vidnimi sledmi urezov (16 oz. 1,8 %) in zasekanin (34 oz. 3,9 %) je zato zelo verjetno podcenjeno. Obgrizenih kosti v pregledanem materialu nisva zasledila.

3.1 Taksonomija

Red: Glodalci (Rodentia)

Družina: Bobri (Castoridae)

Castor fiber Linnaeus, 1758

Bober je bil v obravnavanem vzorcu zastopan s petimi najdbami. Komolčnica, katere proksimalna epifiza še ni bila zraščena z diafizo, je domnevno pripadala do okrog enega leta staremu osebkju, že v celoti osificirana stegenica pa več kot tri leta stari živali (Iregren, Stenflo 1982). Pomen bobra za takratno skupnost najverjetneje ni upravičeno omejiti le na pridobivanje kožuhov, ampak tudi mesa. Prav to morda nakazujejo sledi urezov ob proksimalni sklepni

3 RESULTS AND DISCUSSION

The collected material includes 863 fragments of large mammals, 429 of which (i.e. 49.7%) could be identified at least as far as their genus. This high percentage of identifiable remains is an expected consequence of the manner of sampling, since it was not possible to collect a representative number of smaller (less than 1.5 cm in size) fragments by hand-collection (pers. comm. by A. Gaspari). Whatever the case, the collected material includes at least 11 species of large mammals belonging to eight families (Tab. 8.1). The material was exposed to flowing water with moving sand particles which caused many bones to suffer abrasion; the number of fragments with identified cut marks (16 or 1.8%) and chop marks (34 or 3.9%) is therefore most probably underestimated. Gnawed bones have not been identified within the analysed material.

3.1 Taxonomy

Order: Rodents (Rodentia)

Family: Beavers (Castoridae)

Castor fiber Linnaeus, 1758

Within the sample under investigation, beaver remains have been identified in five fragments. The ulna, of which the proximal epiphysis has not yet been fused with the diaphysis, presumably belonged to an individual aged up to a year. The completely fused femur, on the other hand, belonged to an animal of over three years (Iregren, Stenflo 1982). The significance of beavers for the contemporary community is most probably unjustly limited only to their fur, while meat

| Skelet. element | Dimenzija / <i>Dimension</i> | Zalog | Ig |
|-----------------|---|-------|--------------------------|
| | | | Me (n) min-max |
| Ulna | Višina velike sigmoidne vdolbine / <i>Height of large sigmoid cavity</i> | 13,5 | 14,0 (4) 12,5-14,1 |
| Femur | Največja dolžina / <i>Greatest length</i> | 120,5 | 116,2 (7) 111,5-119,0 |
| | Dolžina od kondila navzdol / <i>Length from condyle downwards</i> | 112,0 | 110,4 (5) 107,3-112,6 |
| | Transferzalna širina distalne epifize / <i>Transverse breadth of the distal epiphysis</i> | 38,0 | 38,7 (7) 37,5-42,0 |
| | Dorzo-ventralna širina distalne epifize / <i>Antero-posterior diameter of the distal epiphysis</i> | 28,0 | 28,5 (6) 27,8-30,7 |
| | Transferzalna širina proksimalne epifize / <i>Transverse breath of the proximal epiphysis</i> | 43,0 | 42,6 (4) 41,4-43,2 |

Tab. 8.2: Dimenzije izkopanih ostankov bobra (*Castor fiber*) z Zaloga in z Dežmanovih kolišč pri Igu (eneolitik; Rakovec 1958). Podani so mediana (Me), razpon vrednosti (min-max) in velikost vzorca (N). Vse mere so v mm.

Tab. 8.2: Dimensions of measured beaver (*Castor fiber*) remains from Zalog and from Dežman's pile-dwellings near Ig (Eneolithic; Rakovec 1958), with given median (Me), range (min-max) and sample size (N). All measurements are in mm.

površini komolčnice, ki so verjetno nastali pri kosaњу plena (prim. Zeiler 1987).

Komolčnica in stegnenica iz Zaloga se po svojih dimenzijah ne razlikujeta od primerkov z Dežmanovih kolišč pri Igu (*tab. 8.2*) ter tako v velikosti nekoliko preseagata recentne bobre (Rakovec 1958). Vrsta je sicer poznana še z več drugih prazgodovinskih najdišč Ljubljanskega barja (Drobne 1973; Pohar 1984; Toškan, Dirjec 2004b; 2006).

Red: Zveri (Carnivora)

Družina: Medvedi (Ursidae)

Ursus arctos Linnaeus, 1758

Na holocenskih najdiščih z Ljubljanskega barja splošno prisoten rjavi medved (čeprav vedno le s skromnim številom ostankov) je z dvema najdbama zastopan tudi v gradivu z Zaloga. Ugotovitev potrjuje tezo, da je bil lov na omenjeno zver v prazgodovini razmeroma redek dogodek (Riedel 1989; Bartosiewicz 1999).

Družina: Kune (Mustelidae)

Meles meles (Linnaeus, 1758)

Jazbec je z osmimi najdbami najbolj zastopana zver v obravnavanem vzorcu. Med navedenimi ostanki so kar štiri spodnje čeljustnice (*tab. 8.1*), ki se po dimenzijah umeščajo znotraj variacijske širine mezolitskih primerkov s Krasa (*tab. 8.3*). Vrsta je sicer zastopana v favni številnih mezolitskih najdišč Slovenije in sosednjih regij.

Hüster-Plogmann in sodelavci (1999) nihanje deleža jazbeca v favni švicarskih (e)neolitskih najdišč povezujejo s spreminjanjem obsega gozdnih sestojev v takratni krajini. V nasprotju s tem vidi Miracle (1997) v postopnem večanju števila jazbečevih (in zajčjih) ostankov v mezolitskih plasteh hrvaškega najdišča Pupičina peč pod Učko dokazuje za povečevanje prehrabne pestrosti takratnih ljudi; v tem bi se lahko odražala porast števila prebivalstva in/ali postopen prehod od razmeroma mobilnega k bolj sedentarnemu načinu življenja (npr. Broughton, Grayson 1993; Stiner, Munro 2002). Nihanju deleža ekonomsko manj zanimivih vrst v času mezolitika žal na območju Ljubljanskega barja ni mogoče slediti, saj ustrezni podatki manjkajo. Omeniti pa velja, da je jazbec prisoten v favni večine postneolitskih najdišč z navedenega območja (Drobne 1973; 1974; 1975; Toškan, Dirjec 2004b; 2004c), ko ga v Pupičini peči več ni. Lov nanj očitno ni bil motiviran le s pridobivanjem mesa in maščob, temveč tudi (predvsem?) kožuhov (Zeiler 1987).

production should also be considered. The cut marks on the proximal articular surface of the ulna, probably made while butchering the prey, might indicate just that (cf. Zeiler 1987).

The ulna and the femur from Zalog do not differ in size from the specimens taken at Dežman's pile-dwellings near Ig (*Tab. 8.2*) and are slightly larger than the recent beavers (Rakovec 1985). The species is known also from other prehistoric sites at the Ljubljansko barje (Drobne 1973; Pohar 1984; Toškan, Dirjec 2004b; 2006).

Order: Carnivores (Carnivora)

Family: Bears (Ursidae)

Ursus arctos Linnaeus, 1758

Remains of the brown bear are common (although not numerous) on the Holocene sites of the Ljubljansko barje and have been identified in two fragments also at the Zalog site. This finding confirms the thesis that hunting the brown bear occurred relatively rarely in prehistory (Riedel 1989; Bartosiewicz 1999).

Family: Mustelids (Mustelidae)

Meles meles (Linnaeus, 1758)

The badger, with eight identified finds, is the best represented carnivore within the sample. Four of the fragments are mandibles (*Tab. 8.1*) and fall, in size, within the range of the Mesolithic specimens known from the Kras region (*Tab. 8.3*). The species is also represented in the fauna of numerous Mesolithic sites from Slovenia and surrounding regions.

Hüster-Plogmann and associates link the oscillation of the share of badger remains in the fauna of the Swiss (E)Neolithic sites to the change in the extent of the forest in the contemporary landscape. Contrary to that, the gradual increase in the number of badger (and hare) remains in the Mesolithic layers of the Croatian site of Pupičina peč under Učka led Miracle (1997) to see it as proof of an expanding diet breadth of the contemporary people. Such an increase in the nutritional variety could, furthermore, reflect population growth and/or gradual transition from a relatively mobile to a more sedentary mode of life (for example: Broughton, Grayson 1993; Stiner, Munro 2002). Unfortunately, the oscillation in the share of economically less interesting species throughout the Mesolithic cannot be observed in the Ljubljansko barje area due to a lack of pertinent data. It is worth mentioning, though, that the badger is present in the fauna of most of the post-Neolithic sites from the mentioned area (Drobne 1973; 1974; 1975; Toškan, Dirjec 2004b; 2004c), when

Tab. 8.3: Dimenzije spodnjih čeljustnic jazbeca (*Meles meles*) z Zaloga; podani so velikost vzorca (n), mediana (Me) in razpon vrednosti (min-max). Za primerjavo so prikazane dimenzije spodnjih čeljustnic z mezolitskega najdišča Jama na Sedlu pri Šempolaju (*grotta Benussi*; Riedel 1975). Višina ramusa je definirana kot razdalja med kotnim podaljškom (*processus angularis*) in vrhom kavljestega podaljška (*processus coronoideus*). Vse mere so v mm.

Tab. 8.3: Dimensions of measured badger (*Meles meles*) remains from Zalog, with given sample size (n), median (Me) and range (min-max). Measurements from the Mesolithic site of Jama na Sedlu near Šempolaj are presented for comparison (*grotta Benussi*; Riedel 1975). The ramus height is defined as the distance between the *processus angularis* and the *processus coronoideus*. All measurements are in mm.

| Dimenzija / <i>Dimension</i> | Zalog | Benussi |
|--|-----------------------|------------------------|
| | Me (n) min-max | Me (n) min-max |
| Dolžina P ₂ -M ₃ / <i>Length of P₂-M₃</i> | -- (2) 39,5-41,0 | -- (2) 39,7-42,2 |
| Dolžina P ₂ -P ₄ / <i>Length of P₂-P₄</i> | -- (2) 17,0-18,0 | 20,2 (3) 19,0-20,4 |
| Dolžina M ₁ -M ₃ / <i>Length of M₁-M₃</i> | 22,0 (4) 21,0-23,5 | 22,7 (8) 21,2-23,6 |
| Dolžina M ₁ / <i>Length of M₁</i> | 16,0 (3) 15,0-17,5 | 16,4 (11) 15,1-18,7 |
| Višina ramusa / <i>Ramus height</i> | 36,0 | -- (2) 36,7-37,2 |

Martes martes (Linnaeus, 1758)

Spodnja čeljustnica kune zlatice je edini ostanek omenjene vrste v analiziranem gradivu. Specifično determinacijo omogoča razdalja med bradnima odprtina (*foramen mentale*), ki pri obravnavanem primerku presega 4 mm (prim. Kryštufek 1991). V okviru mezolitskih najdišč Slovenije je vrsta poznana le še z Brega pri Škofljici (Pohar 1984) ter morda z Viktorjevega spodmola pri Famljah (Toškan, Dirjec 2004a).

Družina: Mačke (Felidae)

Felis cf. silvestris Schreber, 1777

Mački sva pripisala nosač, spodnjo čeljustnico ter izoliran zob. Slednja dva izvirata iz iste zbiralne enote (koncentracije), tako da sta morda pripadala istemu osebk. V kolikor so najdbe sočasne z najdiščem, jih lahko z gotovostjo pripiševa divji mački, saj se prvi domestikati na območju srednje Evrope pojavijo šele bistveno kasneje (Clutton-Brock 1999). V to smer kažejo tudi dimenzije spodnje čeljustnice, po katerih se primerki z Zaloga umešča znotraj variacijske širine holocenskih divjih mačk iz Evrope (tab. 8.4).

it no longer appears in the Pupučina peč. Hunting the badger was thus evidently not motivated solely by the exploitation of meat and fat but also (predominantly?) of fur (Zeiler 1987).

Martes martes (Linnaeus, 1758)

The mandible of a pine marten is the only find of this species within the analyzed material. The specific identification is based on the distance between the mental foramina (*foramen mentale*) of the mandible that exceeds 4 mm (cf. Kryštufek 1991). Among other Mesolithic sites in Slovenia the species is only known from Breg near Škofljica (Pohar 1984) and possibly from Viktorjev spodmol near Famlje (Toškan, Dirjec 2004a).

Family: Cats (Felidae)

Felis cf. silvestris Schreber, 1777

Cat remains were identified in an atlas, mandible and an isolated tooth. The two latter originate from the same collection unit (concentration) and might, therefore, even belong to the same individual. If accepted as contemporaneous with the site, these remains can, undoubtedly, be ascribed to a wild cat, since first domesticates do not appear in the Central European area until considerably later (Clutton-Brock 1999). The size of the mandible that places the specimen from Zalog within the variational width of the

Tab. 8.4: Dimenziji spodnje čeljustnice mačke (*Felis* sp.) z Zaloga. Primerjalno so prikazane dimenzije subfosilnih (neolitskih) mačk z Danske ter recentnih primerkov s kontinentalne Evrope (Kurtén 1965). Podani so velikost vzorca (n), mediana (Me) in razpon vrednosti (min-max). Legenda: VzM1 - višina spodnje-čeljustniškega telesa (*corpus mandibulae*) za M₁. Vse mere so v mm.

Tab. 8.4: Dimensions of measured cat (*Felis* sp.) mandible from Zalog. Measurements of subfossil (Neolithic) cats from Denmark and recent specimens from continental Europe are presented for comparison (Kurtén 1965), with given sample size (n), median (Me) and range (min-max). Explanation of abbreviation: VzM1 - height of the *corpus mandibulae* behind M₁. All measurements are in mm.

| Dimenzija / <i>Dimension</i> | Zalog | Subfos. | Recent. |
|---|-------|-----------------------|-----------------------|
| | | Me (n) min-max | Me (n) min-max |
| Dolžina M ₁ / <i>M₁ length</i> | 9,5 | 8,8 (33) 7,5-10,0 | 8,3 (23) 7,4-9,0 |
| VzM ₁ | 12,0 | 11,8 (24) 9,7-14,0 | 11,1 (23) 9,2-13,2 |

V okviru mezolitskih najdišč Slovenije je vrsta poznana le še z Male Triglavce pri Divači (Turk, Toškan, Dirjec 2004).

Red: Lihoprsti kopitarji (Perissodactyla)

Družina: Konji, osli in zebre (Equidae)

Equus caballus Linnaeus, 1758

Konj je bil v obravnavanem gradivu zastopan z izoliranim spodnjim sekalcem (sl. 8.1), ki pa ne sodi v časovni kontekst naselbine Zalog. Najstarejše poznane najdbe domačega konja iz Slovenije so namreč arheološko datirane v končni del bronaste dobe² (npr. Rakovec 1973; Riedel 1977a; Bartosiewicz 1987), podobno pa velja tudi za SV Italijo (Riedel 1986) in Istro (Mihovilić *et al.* 2002). Kam časovno umestiti zob z Zaloga zaenkrat ni mogoče reči, skoraj zagotovo pa gre za kontaminacijo. Izključiti ne gre niti njegove povezave z nekoliko više ob Ljubiji ležečim bronastodobnim najdiščem (Gaspari, v tem zborniku). Zaradi paličaste oblike naj bi bil namreč konjski sekalec zelo izpostavljen transportu z vodnim tokom (Frostick, Reid 1983). V tem smislu je pomenljivo tudi dejstvo, da je bila najdba pobrana na samem začetku transekta, kjer struga seka najdišče Zalog (tj. zbiralna enota LZ-118).



Sl. 8.1: Sekalec konja (*Equus caballus*) z Zaloga (zbiralna enota LZ-118)-distalno. M. = 1 : 1 (Foto: R. Erjavec).
Fig. 8.1: Horse (*Equus caballus*) incisor from Zalog (collection unit LZ-118)-distal aspect. Scale = 1 : 1 (Photo: R. Erjavec).

Red: Sodoprsti kopitarji (Artiodactyla)

Družina: Prašiči ali svinje (Suidae)

Sus scrofa Linnaeus, 1758

Prašič je drugi najbolj zastopan takson v obravnavanem gradivu, saj po številu najdb zaostaja le za jelenom. Kostni z Zaloga se po svojih dimenzijah umeščajo znotraj variacijske širine za prazgodovinske div-

Holocene wild cats from Europe (Tab. 8.4), leads to the same conclusion.

Among the Mesolithic sites of Slovenia beside Zalog, the species is known only from Mala Triglavca near Divača (Turk, Toškan, Dirjec 2004).

Order: Odd-toed ungulates (Perissodactyla)

Family: Horses, asses and zebras (Equidae)

Equus caballus Linnaeus, 1758

Horse remains are represented by an isolated lower incisor (Fig. 8.1). It does not, however, belong to the chronological context of the Zalog site, since the earliest known finds of a domestic horse from Slovenia are archaeologically dated to the final part of the Bronze Age² (for example Rakovec 1973; Riedel 1977a; Bartosiewicz 1987). Similar observations were made for NE Italy (Riedel 1986) and Istria (Mihovilić *et al.* 2002). The chronological determination of the tooth cannot be given as yet, though we are almost surely dealing with contamination. Moreover, the connection of this find to the Bronze Age site, lying slightly further up the Ljubija, cannot be excluded (Gaspari, in this publication). In support of the latter is the stick-like form of the tooth suggesting a potentially heavy exposition to transport by water current (Frostick, Reid 1983), as well as the fact that the find was taken at the very beginning of the transect where the bed crosses the site (i.e. collection unit LZ-118).

Order: Even-toed ungulates (Artiodactyla)

Family: Pigs (Suidae)

Sus scrofa Linnaeus, 1758

The wild boar is the second best represented taxon in the researched material, only falling behind the red deer in number. In size, the bones from the Zalog site fall within the variational width for the prehistoric wild boar from various Central European sites (Tab. 8.5), which makes their identification as *Sus scrofa* seem entirely justified. On the other hand, the measurable specimens exceed the average size of the Roman Age pigs (Fig. 8.2).

Considering the chronological determination of the site, the identification of the material from Zalog as including that of wild boar is expected. In the context of the entire archaeozoological analysis, however,

² V Partih sta bila sicer med ostanki kolov in pretežno eneolitne keramike najdena tudi konjska prstnica in zob, vendar obe najdbi izvirata iz struge Išce, kar prav tako dopušča možnost kontaminacije (Harej 1977).

² A horse phalanx and a tooth were found at Parte, among the remains of piles and predominantly Eneolithic pottery. Both finds, however, originate from the bed of the Iščica Stream, which allows for the possibility of contamination (Harej 1977).

Tab. 8.5: Dimenzije prašičjih ostankov z Zaloga. Za primerjavo so prikazani ustrezni podatki za subfosilne divje (*Sus scrofa*) in domače (*S. domesticus*) prašiče z več srednjeevropskih najdišč. Podani so mera centralne tendence (X – povprečje oz. Me – mediana), razpon vrednosti (min–max) ter velikost vzorca (N). Predstavitev najdišč: Barche di Solferino (starejša bronasta doba; Riedel 1977b), Mondsee (eneolitik; Pucher, Engl 1997), Madžarska – več najdišč (= M. / H.; prazgodovina; Bökönyi 1995), Seeberg (neolitik; Boessneck, Jéquier, Stampfli 1963) ter Ledro (starejša in srednja bronasta doba; Riedel 1977b). Za opredelitev dimenzij glej prilogo. Vse mere so v mm.

Tab. 8.5: Dimensions of wild boar (*Sus cf. scrofa*) remains from Zalog. Data for subfossil wild boar (*Sus scrofa*) and domestic pig (*S. domesticus*) from several Central European sites are presented for comparison, with given measure of central tendency (X – average or Me – median), range (min–max) and sample size (N). Sites presented: Barche di Solferino (Early Bronze Age; Riedel 1977b), Mondsee (Eneolithic; Pucher, Engl 1997), Hungary – various sites (= M. / H.; prehistory; Bökönyi 1995), Seeberg (Neolithic; Boessneck, Jéquier, Stampfli 1963) and Ledro (Early and Middle Bronze Age; Riedel 1977b). Dimensions are explained in the supplement. All measurements are in mm.

| Dimenz. / <i>Dimens.</i> | Zalog | <i>Sus scrofa</i> | | | | <i>Sus domesticus</i> | | | |
|-----------------------------|-----------------------|-----------------------|-----------------------|------------------|------------------------|------------------------|------------------------|------------------|-----------------------|
| | | Barche | Mondsee | M. / H. | Seeberg | Ledro | Mondsee | M. / H. | Seeberg |
| | | Me (N) min–max | X (N) min–max | X (N) min–max | X (N) min–max | Me (N) min–max | X (N) min–max | X (N) min–max | Me (N) min–max |
| M ³ (D) | 36,0 (4) 34,0–40,0 | 38,9 (4) -- | 42,5 (4) 39,5–44,0 | -- 36,0–49,0 | 41,0 (5) 36,0–43,0 | 32,9 (12) -- | 34,3 (59) 29,0–38,5 | -- 23,0–38,0 | 32,5 (4) 31,0–34,5 |
| M ³ (Š) | 22,0 (4) 20,0–23,0 | -- | 22,0 (4) 21,5–22,5 | -- | 22,5 (7) 21,5–25,0 | -- | 18,5 (13) 17,5–21,5 | -- | 18,5 (4) 16,5–19,5 |
| M ₃ (D) | 40,5 (8) 38,0–47,0 | 41,7 (7) -- | 41,5 (3) 39,5–43,5 | -- 40,0–55,0 | 44,0 (20) 40,0–49,0 | 33,3 (34) -- | 35,8 (51) 31,5–40,0 | -- 20,0–42,0 | -- |
| M ₃ (Š) | 18,5 (7) 19,0–20,0 | -- | 18,5 (3) 18,0–19,0 | -- | 19,0 (21) 17,5–21,0 | -- | 15,5 (13) 14,0–17,0 | -- | 15,0 (1) -- |
| Humerus (Bd) | 49,0 (4) 47,0–52,0 | 52,3 (3) 47,2–58,0 | 47,7 (2) 46,5–49,0 | -- 47,0–60,0 | -- | 36,8 (47) 32,5–40,5 | 38,5 (3) 38,0–40,0 | -- 33,0–45,5 | -- |
| Radius (Bp) | 37,5 (1) -- | 38,7 (2) 38,3–39,2 | -- | -- 35,0–43,0 | 32,0 (3) 31,5–37,5 | 27,0 (53) 21,5–32,5 | 29,5 (3) 29,0–33,5 | -- 25,5–36,0 | 24,0 (1) -- |
| Scapula (SLC) | 30,0 (6) 25,0–31,5 | 32,6 (2) 32,0–32,6 | -- | -- 26,0–40,0 | 31,5 (27) 25,0–37,0 | 22,1 (35) -- | 21,3 (20) 19,0–24,0 | -- 18,5–28,5 | 21,5 (5) 20,0–22,0 |
| Tibia (Bd) | 37,0 (3) 31,5–40,0 | 38,5 (2) 36,0–41,0 | 40,0 (3) 40,0–40,5 | -- 35,5–42,0 | -- | 28,2 (21) 25,6–29,6 | 28,1 (5) 26,5–30,1 | -- 25,5–35,0 | -- |
| Talus (GLI) | 51,5 (4) 50,0–52,0 | 51,8 (2) -- | -- | -- 49,0–57,0 | 50,5 (29) 46,0–55,5 | 37,3 (1) -- | 40,5 (3) 39,0–42,0 | -- 37,5–46,5 | 39,0 (2) 39,0–39,0 |
| Talus (DI) | 27,5 (4) 26,0–29,0 | -- | -- | -- 29,0–36,0 | -- | -- | 22,5 (3) 21,5–22,5 | -- 23,0–30,0 | -- |

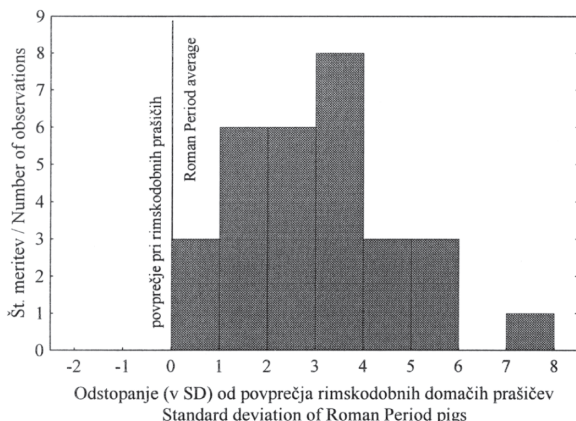
je prašiče z različnih srednjeevropskih najdišč (tab. 8.5), zato se zdi njihova determinacija za *Sus scrofa* povsem upravičena. Nenazadnje merljivi primerki z Zaloga presegajo tudi povprečne dimenzije rimskodobnih domačih prašičev (sl. 8.2).

Ugotovitev, da so v gradivu z Zaloga zastopani prav divji prašiči, je sicer *vis à vis* časovne umestitve najdišča pričakovana. Ker pa so bile najdbe pobrane z dna struge, kar dopušča možnost transporta posameznih kosti z vodnim tokom in posledično kontaminacijo gradiva, je v kontekstu celotne arheozoološke analize zgoraj navedeno spoznanje zelo pomembno. Navkljub posameznim primerkom, ki sicer očitno ne sodijo v kontekst predneolitskega najdišča (npr. konjski sekalec), se zdi torej pomemben del živalskih ostankov vendarle smiselno obravnavati kot avtohtonega.

Analiza obrabe žvekalne površine spodnjih meľjakov prašičev z Zaloga kaže, da so takratni lovci plenili predvsem mlade adultne (tj. 10/14 do 18/26

there is a very important fact to consider. The finds were taken off the floor of the stream bed which allows for the possibility of individual bones being carried by water current and thus contaminated. In view of the supposed absence of pig remains it nevertheless seems reasonable to consider the majority of the animal remains as autochthonous, despite individual specimens evidently do not belong to the context of the pre-Neolithic site (horse incisor, for example).

The tooth wear analysis of the lower molars of pigs from Zalog shows that the contemporary man hunted mostly young adult (i.e. 10/14 to 18/26 months) and adult (i.e. above 18/26 months) animals (Tab. 8.6). In this regard, the only exceptions are a heavily worn third lower molar (ascribed to an individual senile at death), a fourth lower deciduous premolar and a barely erupted second upper molar. The paucity of the remains of juvenile wild boars is confirmed by the rare specimens of bones with the still unfused epiphysis (3x distal radius, distal ulna), and even



Sl. 8.2: Porazdelitev standardiziranih dimenzij merljivih ostankov divjega prašiča z Zaloga. Povprečje rimskodobnih prašičev se nanaša na obsežen vzorec z madžarskega najdišča TÁC-Gorsium (Bökönyi 1984). Izmerjene vrednosti so bile standardizirane po formuli: stand. vrednost = $(X - M) / SD$, kjer X predstavlja posamezno meritev z Zaloga, M in SD pa povprečje oz. standardno deviacijo ustrezne dimenzije pri referenčnem vzorcu.

Fig. 8.2: Distribution of standardized measurements of wild boar remains from Zalog. Average value of Roman Age pigs relates to the extensive sample from the Hungarian site of TÁC-Gorsium (Bökönyi 1984). Measurable values were standardized according to the formula: stand. value = $(X - M) / SD$, where X represents an individual measurement from Zalog, while M and SD represent the average value and standard deviation of the appropriate dimension in the referential sample.

mesecev) in adultne (tj. nad 18/26 mesecev) živali (tab. 8.6). V tem pogledu predstavljajo edine izjeme močno obrabljen tretji spodnji meljak (pripisala sva ga ob poginu senilnemu osebk), mlečni četrti spodnji predmeljak ter komaj izraščajoči drugi zgornji meljak.

Tab. 8.8: Ocenjena višina ob vihru za štiri prašiče z Zaloga. Ocena je bila izpeljana iz dimenzij ustrezno ohranjenih skočnic, pri čemer so bili uporabljeni klasični Teichertovi koeficienti (Teichert 1969) ter njihova modificirana oblika (May, Teichert, Hannemann 1996). Vse mere so v mm.

Tab. 8.8: The estimated withers height for four wild boar (*Sus cf. scrofa*) from Zalog. The estimate was made on the basis of sufficiently preserved astragali by using the classic Teichert's coefficients (Teichert 1969) and their modified form (May, Teichert, Hannemann 1996). All measurements are in mm.

| Vzorec / Sample | Teichert | May <i>et al.</i> | |
|-----------------|----------|-------------------|--------|
| | | Subadult. | Adult. |
| LZ-035 | 922 | 696 | 896 |
| LZ-080 | 895 | 690 | 886 |
| LZ-088 | 922 | 696 | 896 |
| LZ-108 | 930 | 699 | 900 |

Tab. 8.6: Ocena starosti prašičev (*Sus cf. scrofa*) ob upletitvi na osnovi stopnje obrabe grizalne površine spodnjih meljakov. Analiza temelji na navodilih, ki sta jih objavila Rolett in Chiu (1994).

Tab. 8.6: Estimate of the age of wild boars (*Sus cf. scrofa*) at death based on the degree of tooth wear of lower molars. The analysis is based on guidelines published by Rolett and Chiu (1994).

| Zob / Tooth | Obraba / Wear | Starostna skupina / Age group |
|----------------|---------------|-------------------------------|
| M ₁ | E | Mlad adulten / Young adult |
| M ₁ | E | Mlad adulten / Young adult |
| M ₂ | E | Adulten / Adult |
| M ₃ | 0 | Mlad adulten / Young adult |
| M ₃ | 0 | Mlad adulten / Young adult |
| M ₃ | 0-A | Mlad adulten / Young adult |
| M ₃ | 0-A | Mlad adulten / Young adult |
| M ₃ | B | Adulten / Adult |
| M ₃ | B | Adulten / Adult |
| M ₃ | C | Adulten / Adult |
| M ₃ | C | Adulten / Adult |
| M ₃ | D | Senilen / Senile |

Tab. 8.7: Število ostankov prašiča (*Sus cf. scrofa*) z nezraščena ter številu tistih z zraščena epi- in diafizo po starostnih skupinah. Posamezno skupino sestavljajo skeletni elementi, ki popolnoma osificirajo pri isti ontogenetski starosti (tj. v prvem, drugem, tretjem ali po tretjem letu življenja). Podatke o obdobju zraščanja epi- in diafiz podaja Silver (1972).

Tab. 8.7: Number of wild boar (*Sus cf. scrofa*) remains with unfused and those with fused epi- and diaphysis according to age group. Individual group is composed of skeletal elements that fuse at the same ontogenetic age (i.e. in first, second, third or after third year). Data on the period of epi- and diaphysis fusing is given by Silver (1972).

| Starost / Age | Epifiza zraščena / Fused | Epifiza ni zraščena / Unfused |
|----------------|--------------------------|-------------------------------|
| 0-1 | -- | 9 |
| 1-2 | -- | 5 |
| 2-3 | -- | -- |
| 3- | 4 | 10 |
| SKUPAJ / TOTAL | 4 | 24 |

these fuse only after the completed third year of age (Tab. 8.7). It is not as yet possible to say whether the observed age structure is a reflection of age-selective hunting or it is, in fact, more reasonable to link it to taphonomic loss.

Allopatric and allochronic comparisons of the size of wild boar demand more extensive samples than the one taken from Zalog. The results written below are

Maloštevilnost ostankov juvenilnih prašičev potrjujejo tudi redki primerki kosti s še nezraščena epifiza (3x distalna koželjnica, distalna komolčnica), pa še ti popolnoma osificirajo šele po zaključku tretjega leta starosti (tab. 8.7). Ali se v ugotovljeni starostni strukturi odraža starostno-selektiven lov ali pa jo je dejansko bolj upravičeno povezovati s tafonomskimi izgubami, zaenkrat ni mogoče reči.

Alopatrične in alohrone primerjave velikosti divjih prašičev zahtevajo obsežnejše vzorce od tistega z Zaloga, zato so v nadaljevanju navedeni rezultati le informativni. Višino živali ob vihru sva ocenila na osnovi dimenzij štirih ustrezno ohranjenih skočnic, pri čemer sva uporabila klasične Teichertove koeficiente (Teichert 1969) ter njihovo modificirano obliko (May, Teichert, Hannemann 1996). Ocenjene vrednosti se umeščajo znotraj variacijske širine recentnih divjih prašičev ter bistveno presegajo dimenzije prazgodovinskih domačih prašičev s SV Italije (Riedel 1986; 1996; tab. 8.8).

Družina: Jeleni (Cervidae)

Capreolus capreolus (Linnaeus, 1758)

Srna je v analiziranem gradivu zastopana z le šestimi najdbami, pretežno ostanki spodnjih delov okončin. Tako pičlo število najdb je vsaj v določeni meri verjetno smiselno povezovati z etologijo obravnavane vrste, katere osebki so bistveno manj družabni od jelenov in divjih svinj (Kryštufek 1991).

Cervus elaphus Linnaeus, 1758

Jelen je z 260 ostanki daleč najbolje zastopana vrsta v gradivu z Zaloga. Dobro polovico vseh najdb (148 oz 56,9 %) predstavljajo različno veliki odlomki rogovja,³ med katerimi jih je 15 še priraslih na lobanjo. Na mnogih primerkih so opazne sledi obdelovanja, najdenih pa je bilo tudi nekaj (pol)izdelkov. Odsotnost še ne v celoti osificiranih kosti kaže, da v vzorcu prevladujejo ostanki odraslih osebkov. To potrjuje tudi stopnja obrabe žvekalne površine treh tretjih spodnjih meljakov, ki so pripadali med 5 in 6 let starim živalim. Še četrti ohranjen M_3 sva pripisala med dva in tri leta staremu osebkju, saj je bil zob ob uplenitvi ravno v fazi izraščanja. V vzorcu je bil prisoten tudi mlečni četrti spodnji predmeljak, ki je pripadal do 2 leti staremu jelenu (prim. Habermehl 1961). Merljive kosti z Zaloga se v velikosti ne razlikujejo od objavljenih dimenzij mezolitskih jelenov s Slovenije in SV Italije (Riedel 1976; Bosch, Riedel 2000; Toškan, Dirjec 2004a).

³ Med njimi je s posameznimi najdbami morda zastopan tudi los (*Alces alces*), ki je bil v takratnih gozdovih v zaledju Ljubljanskega barja razmeroma pogosten (prim. Pohar 1984; Turk, Vuga 1984; Toškan, Dirjec 2006).

therefore only informative. The withers height of the animals was estimated on the basis of the size of four sufficiently preserved astragali by using the classic Teichert coefficients (Teichert 1969) as well as their modified form (May, Teichert, Hannemann 1996). The estimated values fall within the range of recent wild boar and substantially exceed the size of prehistoric pigs from north-eastern Italy (Riedel 1986; 1996; Tab. 8.8).

Family: Deer (Cervidae)

Capreolus capreolus (Linnaeus, 1758)

Within the analysed material, roe deer is represented by only six fragments, predominantly of lower limbs. It is reasonable to link such a small number, at least to a certain degree, to the ethology of the species, the individuals of which are substantially less sociable than those of red deer and wild boar (Kryštufek 1991).

Cervus elaphus Linnaeus, 1758

Red deer, with 260 fragments, is by far the best represented species at Zalog. A good half (148 or 56.9%) of these represent antler fragments of various sizes,³ fifteen of which were still attached to the skull. The remains include many specimens with traces of working as well as some (semi)products. The absence of incompletely fused bones indicates that the remains of adult individuals predominate in the sample. This is confirmed by the level of tooth wear of three lower third molars, belonging to animals aged 5 to 6 years. The fourth preserved M_3 was attributed to an individual aged 2 to 3 years, since the tooth was just in the phase of eruption at the time of the kill. The sample included a deciduous fourth lower premolar of a red deer of up to 2 years of age (cf. Habermehl 1961). Measurable bones from Zalog do not differ in size from the published sizes of Mesolithic red deer from Slovenia and north-eastern Italy (Riedel 1976; Bosch, Riedel 2000; Toškan, Dirjec 2004a).

Family: Bovids (Bovidae)

Capra hircus Linnaeus, 1758

Beside the above-mentioned horse incisor, the calcaneus of a goat is the only other fragment attributed to domestic animals. The specific identification, often problematic for sheep and goats, does not appear

³ With individual fragments, the remains may include also those of elk (*Alces alces*). This species was relatively common in the contemporary forests in the hinterland of the Ljubljansko barje (cf. Pohar 1984; Turk, Vuga 1984; Toškan, Dirjec 2006).

Družina: Votlorogi (Bovidae)

Capra hircus Linnaeus, 1758

Poleg zgoraj že omenjenega konjskega sekalca je fragment kozje petnice edini ostanek, ki sva ga pripisala domačim živalim. Pri drobnici sicer pogosto problematična specifična determinacija se tokrat ne zdi vprašljiva. Petnično telo (*corpus calcanei*) je namreč pri obravnavanem primerku oblikovano rahlo konveksno in ne konkavno, kot je to značilno za ovce (Prummel, Frisch 1986). Nekoliko težje se je opredeliti do vprašanja, ali kozja petnica sploh sodi v kontekst predneolitske nasselbine? Res je, da se posameznim avtorjem prisotnost ostankov drobnice v mezolitskih plasteh kar nekaj najdišč vzdolž mediteranske obale ne zdi problematična (npr. Geddes 1985; Mlekuž 2003), vendar pa drugi opozarjajo na veliko nevarnost kontaminacije, neprimerno metodologijo izkopavanj in/ali problematično determinacijo (npr. Velušček 1995; Binder 2000; Zilhão 2001). Če ob tem upoštevamo še z eksperimenti podprte dokaze o nadpovprečni mobilnosti petnice v tekoči vodi (Lyman 1999), se zdi obravnavani primerki morda vendarle bolj smiselno obravnavati kot alohtonega.

Bos sp.

Rodu goved sva pripisala 14 najdb, predvsem zob in metapodijev. Z izjemo treh zob so vsi ostanki fragmentirani. Sledi urezov ali zasekanin sicer nisva opazila, sta pa bila dva fragmenta očitno obdelana in uporabljena kot orodje (Gaspari, v tem zborniku, t. 30: 15,16).

Razlikovanje med ostanki domačega goveda (*Bos*

questionable here. The body of the calcaneus (*corpus calcanei*) in question has a slightly convex form rather than a concave one characteristic of sheep (Prummel, Frisch 1986). A more difficult question is whether the goat's calcaneus in fact belongs to the context of the pre-Neolithic settlement at all. Individual authors do not consider the presence of sheep/goat remains in Mesolithic layers of a number of sites along the Mediterranean coast as problematic (for example Geddes 1985; Mlekuž 2003), while others warn against the considerable danger of contamination, inappropriate excavation methodology and/or problematic identification (for example Velušček 1995; Binder 2000; Zilhão 2001). In fact, if considering the experiment-confirmed proofs of the above-average mobility of calcanei in flowing water (Lyman 1999), it would perhaps seem all the more reasonable to treat the specimen in question as an alluvial deposit.

Bos sp.

The *Bos* genus was ascribed 14 finds, mostly teeth and metapodii. With the exception of three teeth, all finds are fragmented. Cut marks or chop marks were not noticed though two fragments were apparently worked and used as tools (Gaspari, in this publication, Pl. 30: 15,16).

Distinguishing between cattle (*Bos taurus* Linnaeus, 1758) and aurochs remains (*Bos primigenius* Bojanus, 1827) is relatively problematic. The specific identification is rendered even more difficult by the high fragmentation of the available material. The findings of the biometric analyses have to be taken with reserve as well, since the size of aurochs females and

Tab. 8.9: Dimenzije bovidnih ostankov z Zaloga. Za primerjavo so prikazani ustrezni podatki za zobra (*Bison bonasus*), tura (*Bos primigenius*) in domače govedo (*Bos taurus*) iz antičnega in več prazgodovinskih najdišč srednje Evrope. Podani so mera centralne tendence (X – povprečje oz. Me – mediana), razpon vrednosti (min–max) ter velikost vzorca (n). Predstavitev najdišč: Seeberg (neolitik; Boessneck, Jéquier, Stampfli 1963), Madžarska – več najdišč (prazgodovina; Bökönyi 1995) ter TÁC-Gorsium (antika; Bökönyi 1984). Razlaga kratic: Bp – širina proksimalne epifize, D – dolžina, Š – širina. Vse mere so v mm.

Tab. 8.9: Dimensions of *Bos* sp. remains from Zalog. Pertinent data for the European bison (*Bison bonasus*), aurochs (*Bos primigenius*) and domestic cattle (*Bos taurus*) from a Roman and several prehistoric sites in Central Europe are presented for comparison, with given measure of central tendency (X – average or Me – median), range (min–max) and sample size (n). Sites presented: Seeberg (Neolithic; Boessneck, Jéquier, Stampfli 1963), Hungary – various sites (prehistory; Bökönyi 1995) and TÁC-Gorsium (Roman period; Bökönyi 1984). Dimensions are explained in the supplement. All measurements are in mm.

| Skelet. el. | Dimenzija / Dimension | Zalog | Seeberg | | | Madžarska / Hungary | | TÁC-Gors. |
|----------------|-----------------------|-------|------------------------|-----------------------|------------------------|---------------------|------------------|-------------------------|
| | | | <i>Bison</i> | <i>B. primig.</i> | <i>B. taurus</i> | <i>B. primig.</i> | <i>B. taurus</i> | <i>B. taurus</i> |
| | | | Me (n) min–max | Me (n) min–max | Me (n) min–max | min–max | min–max | X (n) min–max |
| Metatarsus | Bp | 61,5 | 52,0 (5) 51,0–61,0 | 41,0 (7) 39,0–42,0 | 53,0 (11) 48,0–59,0 | 55,0–71,0 | 37,5–59,0 | 48,8 (328) 38,0–61,0 |
| Phalanx I | Bp | 25,0 | 33,5 (48) 29,0–46,0 | | 26,1 (19) 23,5–29,0 | -- | -- | -- |
| P ₃ | D | 24,0 | -- | -- | -- | -- | -- | -- |
| | Š | 14,5 | -- | -- | -- | -- | -- | -- |

taurus Linnaeus, 1758) in tura (*Bos primigenius* Bojanus, 1827) je dokaj problematično, velika fragmentiranost razpoložljivega gradiva pa specifično determinacijo le še otežuje. Z rezervo je treba jemati tudi izsledke biometričnih analiz, saj se dimenzije turovih samic in govejih samcev delno prekrivajo (Rowley-Conwy 1995). Upoštevajoč metrične podatke iz *tabele* 8.9 pa bi bilo fragment stopalnice vendarle smiselno pripisati vrsti *Bos primigenius*. V največji širini proksimalne epifize namreč naveden primerek ne presega le stopalnic domačega goveda iz švicarskega neolitskega najdišča Seeberg Burgäschisee-süd, temveč tudi tiste iz antičnega TÁC-Gorsiuma, kjer so našli predvsem ostanke velikih rimskih pasem (Bökönyi 1984). Ker se determinacija obravnavanega primerka za zobra ne zdi verjetna (prim. Boessneck, Jéquier, Stampfli 1963), lahko na favnistični seznam najdb z Zaloga upravičeno dodava tudi vsaj en ostanek tura.

Bos seu *Bison*

Distalni primerek bovidne dlančnice iz zbiralne enote LZ-085 v velikosti presega prazgodovinske in celo antične primerke domačega goveda (*tab.* 8.10), vendar pa zanesljiva determinacija do nivoja vrste vseeno ni mogoča. Sala (1986) sicer navaja, da postaja dlančnica pri rodu *Bos* distalno z dorzalne in volarne strani postopoma vse širša, medtem ko dosega pri rodu *Bison* največjo širino na prehodu iz diafize v epi-

cattle males partially overlap (Rowley-Conwy 1995). Considering the metric data from *Table* 8.9, however, it would be reasonable to attribute the metatarsus to the *Bos primigenius*. The maximum width of its proximal epiphysis does not only exceed that of the cattle metatarsii from the Swiss Neolithic site of Seeberg Burgäschisee-süd, but also those from the Roman period site of TÁC-Gorsium, where mostly large Roman forms were found (Bökönyi 1984). Since the identification of the metatarsus as belonging to the European bison does not seem probable (cf. Boessneck, Jéquier, Stampfli 1963), an aurochs find can justifiably be added to the faunistic list of finds from Zalog.

Bos s. *Bison*

The distal fragment of a bovine metacarpus from the LZ-085 collection unit exceeds in size the prehistoric and even Roman period specimens of cattle (*Tab.* 8.10). In spite of that, a reliable identification to the level of species is still not possible. Sala (1986) does state that the metacarpus of the *Bos* genus gradually widens distally from both the dorsal and the volar sides, while with the *Bison* genus it reaches maximum width at the transition from the diaphysis to the epiphysis. The fragment from Zalog, though, is unfortunately so water-worn (*Fig.* 8.3) that a reliable distinction between the *Bos primigenius* and *Bison bonasus* (Linnaeus, 1758), species based on the above-stated criterion, is not possible.

Tab. 8.10: Širina proksimalne epifize bovidne dlančnice z Zaloga. Za primerjavo so prikazani ustrezni podatki za zobra (*Bison bonasus*), tura (*Bos primigenius*) in domače govedo (*Bos taurus*) iz antičnega in več prazgodovinskih najdišč srednje Evrope. Podani so mediana (Me), razpon vrednosti (min–max) ter velikost vzorca (n). Predstavitev najdišč: Seeberg (neolitik; Boessneck, Jéquier, Stampfli 1963), Madžarska – več najdišč (= Mad/Hun; prazgodovina; Bökönyi 1995) ter TÁC-Gorsium (antika; Bökönyi 1984). Vse mere so v mm.

Tab. 8.10: Breadth of proximal end of a bovid metacarpus from Zalog. Pertinent data for the European bison (*Bison bonasus*), aurochs (*Bos primigenius*) and domestic cattle (*Bos taurus*) from a Roman and several prehistoric sites from Central Europe are presented for comparison, with given median (Me), range (min–max) and sample size (n). Sites presented: Seeberg (Neolithic; Boessneck, Jéquier, Stampfli 1963), Hungary – various sites (= Mad/Hun; prehistory; Bökönyi 1995) and TÁC-Gorsium (Roman period; Bökönyi 1984). All measurements are in mm.

| Dimenzija / <i>Dimension</i> | Zalog | <i>B. bonasus</i> | <i>Bos primigenius</i> | | <i>Bos taurus</i> | | |
|---------------------------------|-------|-----------------------|------------------------|-------------------|-----------------------|-------------------|-------------------------|
| | | Seeberg | Seeberg | Mad / Hun | Seeberg | Mad / Hun | TÁC |
| | | Me (N) min-max | Me (N) min-max | Me (N) min-max | Me (N) min-max | Me (N) min-max | Me (N) min-max |
| Mc (Bd) | 77,5 | 63,7 (4) 62,0–74,0 | 66,0 (6) 62,0–74,0 | – 68,5–88,0 | 53,0 (6) 52,0–56,0 | – 35,0–74,0 | 61,1 (352) 45,5–77,0 |



Sl. 8.3: Bovidna dlančnica z Zaloga (zbiralna enota LZ-085)-volarno. M. = 1 : 2 (Foto: R. Erjavec).

Fig. 8.3: Bovid metacarpus from Zalog (collection unit LZ-085)-volar aspect. Scale = 1 : 2 (Photo: R. Erjavec).

fizo. Žal pa je primerek z Zaloga toliko obrušen (sl. 8.3), da zanesljivo razločevanje med vrstama *Bos primigenius* in *Bison bonasus* (Linnaeus, 1758) na osnovi navedenega kriterija ni mogoče.

Med mezolitskimi najdišči na Slovenskem je tur poznan še iz Male Triglavce pri Divači (Pohar 1990) in Viktorjevega spodmola pri Famljah (Toškan, Dirjec 2004a), zober iz Male Triglavce (Pohar 1990) in Brega pri Škofljici (Pohar 1984), vsaj ena od obeh vrst pa tudi iz spodmola Pod Črmukljo pri Šembijah (Pohar 1986). Tako tur kot zober sta zastopana tudi v favni nekaterih mlajših prazgodovinskih najdišč z območja Ljubljanskega barja (npr. Rakovec 1952; Drobne 1973; ead. 1974).

Nedoločljivi ostanki

Približno polovico (434 oz. 50,3 %) vseh pridobljenih živalskih ostankov nisva uspela določiti niti do nivoja rodu. V skladu s pričakovanji prevladujejo ostanki vretenc ($n = 47$) in reber ($n = 43$), saj navedene skeletne elemente sploh nisva določevala (izjemi sta le nosač in okretlač). Pretežni del nedoločljivih najdb (304 oz. 70,0 %) pa je vendarle tako fragmentiran, da se ni bilo mogoče opredeliti niti do tega, za kateri skeletni element pravzaprav gre. Sledi urezov sva zasledila na osmih primerkih, usekov na dveh, med nedoločljivim gradivom pa so prisotne tudi tri koščene konice (Gaspari, v tem zborniku, t. 31: 19-21).

3.2 Tafonomija

Arheozoološki vzorci, pri katerih bi razmerje v številu posameznih skeletnih elementov vsaj približno ustrezalo anatomskim pričakovanjem, so izjemno redki. Ugotovljene odklone lahko običajno pripišemo kateremu od naslednjih štirih vzrokov: 1. neustrezno vzorčenje, 2. različna stopnja ohranitve kostne substance posameznih skeletnih elementov zaradi delovanja specifičnih abiotskih dejavnikov in/ali zveri, 3. selektivni transport posameznih anatomskih regij plena s strani človeka ter 4. človekovo selektivno razbijanje različnih skeletnih elementov. V primeru živalskih ostankov z Zaloga se je potrebno ustaviti že pri prvem od njih: vzorčenju. Kostni so bile namreč pobrane ročno iz poglobitev v dnu rečne struge, kjer so bile zapažene koncentracije najdb. To pa pomeni, da je delež zastopanoosti manjših živali (ter tudi manjših kosti večjih živali) v razpoložljivem gradivu zagotovo podcenjen (prim. Turk, Toškan, Dirjec 2004; Toškan, Dirjec 2004a).

Manj problematičen se zdi vpliv, ki so ga na sestavo vzorca imeli posamezni abiotski dejavniki. Odsotnost statistično značilne korelacije med deležem zastopanoosti posameznih skeletnih elementov jelena in njihovo strukturno gostoto⁴ (Spearman $R = 0,399$;

⁴ Podatke o strukturni gostoti jelenjih kosti podaja Lyman (1999).

Of the Mesolithic sites in Slovenia besides Zalog, the aurochs is known also from Mala Triglavca near Divača (Pohar 1990) and Viktorjev spodmol near Famlje (Toškan, Dirjec 2004a), while the European bison is known also from Mala Triglavca (Pohar 1990) and Breg near Škofljica (Pohar 1984). At least one of these species is also known from the Pod Črmukljo rock shelter near Šembije (Pohar 1986). Aurochs and European bison are represented also in the fauna of some of the later prehistoric sites from the Ljubljansko barje area (for example Rakovec 1952; Drobne 1973; 1974).

Unidentifiable remains

Approximately half (434 or 50.3%) of all the uncovered animal remains could not be identified as to their genus. As expected, remains of vertebrae ($n = 47$) and ribs ($n = 43$) predominate among the latter, since these skeletal elements were not systematically identified (with the exception of the atlas and axis). A large part of the unidentifiable finds (304 or 70.0%) is so fragmented that not even their skeletal element could be identified. Cut marks were observed on eight specimens, chop marks on two. The unidentifiable material includes also three bone points (Gaspari, in this publication, Pl. 31: 19-21).

3.2 Taphonomy

Archaeozoological remains, where the relationship in the number of individual skeletal elements would at least approximately correspond to anatomical expectations, are extremely rare. The observed deviations may normally be attributed to one of these four causes: 1. inappropriate sampling, 2. different preservation levels of bone substance of individual skeletal elements due to the effects of specific abiotic factors and/or carnivores, 3. selective transport of individual anatomic regions of prey by humans and 4. human selective breaking of various skeletal elements. For the animal remains from Zalog, already the first cause needs to be looked at: sampling. The bones were hand-collected from the deepened areas at the bottom of the river bed wherever concentrations of finds were observed. This signifies that the share of representation for the small animals (as well as small bones of larger animals) within the available material is undoubtedly underestimated (cf. Turk, Toškan, Dirjec 2004; Toškan, Dirjec 2004a).

The influence of various abiotic factors on sample composition seems less problematic. The absence of a statistically significant correlation between the number of individual skeletal elements of red deer and their structural density⁴ (Spearman $R = 0,399$; $p = 0,100$) shows that the differences in durability of

⁴ Data on the structural density of red deer bones is given by Lyman (1999).

$p = 0,100$) kaže, da v primeru gradiva z Zaloga razlike v obstojnosti ostankov niso bistveno vplivale na frekvenco njihovega pojavljanja. Teže je oceniti, do kolikšne mere se v sestavi vzorca odraža vodni transport najdb (npr. konjski sekalec, verjetno tudi kozja petnica). Da moteč vpliv navedenega dejavnika morda vendarle ni bil zelo očiten, med drugim nakazuje domnevna odsotnost ostankov (samic) domačega prašiča, ki bi jih sicer naplavilo z nekoliko više ob toku Ljubije ležeče bronastodobne naselbine. Omeniti pa velja še ugotovitev, da številčnost v tekoči vodi nadpovprečno mobilnih skeletnih elementov (npr. vretenca, skočnica, medenica, lopatica) bistveno ne zaostaja za frekvenco pojavljanja tistih (npr. nosač, okretač, rebra, prstnice), ki naj bi jih odplaval šele bistveno močnejši tok⁵ (tab. 8.1; Coard 1999).

Zanimivi so z eksperimenti (Payne, Munson 1985) in z etnološkimi študijami (Brian 1981) pridobljeni podatki o selektivni destrukciji kosti s strani psov. Na prvi pogled se namreč zdi, da so imeli na zastopanost posameznih skeletnih elementov v gradivu z Zaloga odločilen vpliv prav psi in/ali volkovi. Vendar pa popolna odsotnost njihovih ostankov in celo kakršnih koli obgrizenih kosti naveden podatek močno relativizira. Res je, da so najdbe kanidov v mezolitskih najdiščih tudi sicer praviloma pičle (Pohar 1990; Toškan, Dirjec 2004a) ter da se iz deleža obgrizenih ostankov ne da vedno sklepati na obseg pasjega/volčjega prazaporejanja kosti v prostoru (npr. Kent 1981). Glede na velikost vzorca pa bi v primeru tesnejše povezave med zastopanostjo posameznih skeletnih elementov in pa aktivnostjo kanidov vendarle pričakovali tudi kak primerek z vidnimi odtiski zob (prim. Pohar 1984; Toškan, Dirjec 2004b; Toškan 2005).

3.3 Ekonomska vloga najdišča

Prepoznati vlogo zgoraj obravnavanih poodložitvenih dejavnikov je pomemben sestavni del vsakršne arheozoološke raziskave, pri oceni ekonomske vloge najdišča pa igrajo ključno vlogo vendarle sledi človekove aktivnosti. V tem smislu se veliko pozornosti namenja vzorcu zastopanosti posameznih skeletnih elementov *vis à vis* domnevnemu pomenu različnih anatomskih regij uplenjene živali za obravnavano skupnost (npr. Straus 1987; Rowley-Conwy 1994-95; Legge 2000; Gidney 2000; Miracle 2002). Ker lahko nereprezentativen vzorec močno popači končne sklepe (prim. Turner 1989), sva v najinem primeru obravnavala le ostanke jelena in divjega prašiča. Navedeni vrsti namreč skupaj predstavljata dobrih 90 odstotkov vseh določljivih najdb, upoštevajoč dimenzije njunih kosti

the Zalog remains did not significantly influence the frequency of their appearance. What is more difficult to assess is the degree to which water transport of the finds (for example horse incisor, probably also goat calcaneus) is reflected in sample composition. That the disturbing influence of this factor is not evident, might be, among other things, shown also by the supposed absence of the remains of (female) domestic pigs that would otherwise be transported to the Zalog site from the Bronze Age site, lying further upstream. An observation worth mentioning at this point is the number of the skeletal elements with an above-average mobility in flowing water (for example vertebrae, astragali, pelvis, scapula), which does not substantially lag behind the frequency of appearance of those (for example atlas, axis, ribs, phalanges) that are supposedly carried only by a strong water current⁵ (Tab. 8.1; Coard 1999).

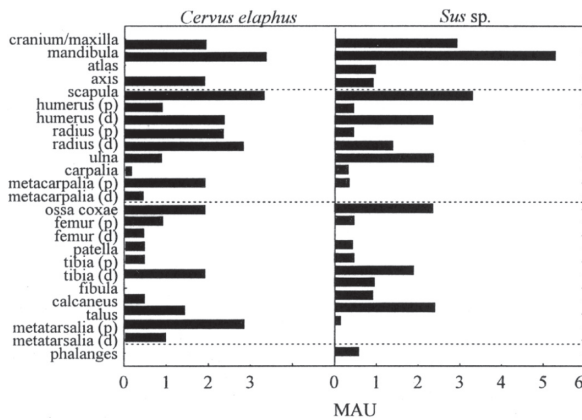
The data on the selective destruction of bones by dogs, obtained by experiments (Payne, Munson 1985) and ethnologic studies (Brian 1981), proved interesting. At first sight it seems that, of all the above enumerated factors, the most important influence on the representation of individual skeletal elements in the Zalog material are none other than dogs/wolves. However, the complete absence of their remains or even any gnawed bones strongly relativizes the above stated information. It is true that, on Mesolithic sites, dog / wolf finds are usually scarce (Pohar 1990; Toškan, Dirjec 2004a) and that the share of gnawed remains is not conclusive as to the extent of spatial redistribution of bones on the part of dogs (for example, Kent 1981). Considering the size of the sample, one would nevertheless expect some material evidence indicating a closer connection between the representation of individual skeletal elements and canide activity (cf. Pohar 1984; Toškan, Dirjec 2004b; Toškan 2005).

3.3 Economic role of the site

Recognizing the role of the above enumerated post-depositional factors is an important constituent part of any archaeozoological research. In estimating the economic role of a site, however, the key role is still played by traces of human activity. In that regard, a great deal of attention is paid to the representation pattern of individual groups of skeletal elements *vis à vis* the supposed significance that different anatomic regions of the killed animal had for the community under research (for example Straus 1987; Rowley-Conwy 1994-95; Legge 2000; Gidney 2000; Miracle 2002). Since an unrepresentative sample can strongly distort the final conclusions (cf. Turner 1989), it was decided,

⁵ Ne gre pa pozabiti, da na številčnost posameznih skeletnih elementov vplivajo še mnogi drugi dejavniki.

⁵ We should keep in mind that the number of individual skeletal elements is influenced by many other factors.



pa lahko pričakujemo tudi manjšo napako zaradi načina vzorčenja.

Zastopanost posameznih (delov) skeletnih elementov je pri obeh vrstah podobna (sl. 8.4), nekaj manjših odklonov (npr. večje število jelenjih metapodijev) pa gre verjetno pripisati razlikam v velikosti in vsebnosti kostnega mozga. Sicer pa v obeh primerih prevladujejo ostanki spodnjih čeljustnic, lopatic ter distalnih delov nadlahtnic, koželjnic in golenic, medtem ko so nosač, stegnenica, proksimalni del nadlahtnice in koželjnica, distalni del metapodijev, zapestnice in prstnice zastopane z bistveno nižjimi MAU vrednostmi. Glede na odsotnost statistično značilne soodvisnosti med frekvenco pojavljanja posameznih skeletnih elementov in njihovo strukturno gostoto se skromno število ostankov manjših skeletnih elementov ne zdi upravičeno razlagati z njihovo slabšo obstojnostjo v sedimentu (Lyman 1985). Verjetneje je, da se v navedeni ugotovitvi odraža kombinacija metodološke napake pri vzorčenju (prim. Toškan, Dirjec 2004a) in ekonomske vloge najdišča. Večje vrednosti MAU indeksa prstnic, zapestnic, dlančnic, nartnic in stopalnic namreč praviloma najdemo le na konkretnih mestih uplenitve živali, saj jih kot ekonomsko nezanimive ni smiselno prenašati drugam (npr. Binford 1978a; Prummel *et al.* 2002). Upoštevajoč celoten spekter in količino najdb pa se takšne vloge najdišču Zalog ne zdi upravičeno pripisati.

Poleg slabe zastopanosti ostankov ekonomsko nezanimivih skeletnih elementov je mogoče s slike 8.4 razbrati tudi skorajšnjo odsotnost kosti z najbolj mesnatih anatomskih regij plena. Znano je, da odločitev o transportu določenega skeletnega elementa pogosto ni odvisna le od njegovega neposrednega ekonomskega pomena.⁶ Da bi upoštevala tudi to dejstvo, sva si v nadaljevanju ogledala odnos med frekvenco pojavljanja posameznih kosti in ustreznimi vrednostmi indeksa hranljive uporabnosti (*Food Utility Index* oz.

⁶ Anatomsko bližina energetsko bolj in tistih manj zanimivih skeletnih elementov lahko botruje odločitvi o transportu tudi ekonomsko sicer manj pomembnih kosti (t.i. »jezdecik«).

Sl. 8.4: Frekvenca zastopanosti posameznih skeletnih elementov jelena (*Cervus elaphus*) in divjega prašiča (*Sus scrofa*) z Zaloga, izražena z indeksom najmanjšega števila živalskih enot (MAU). Za opredelitev navedenega indeksa glej besedilo.

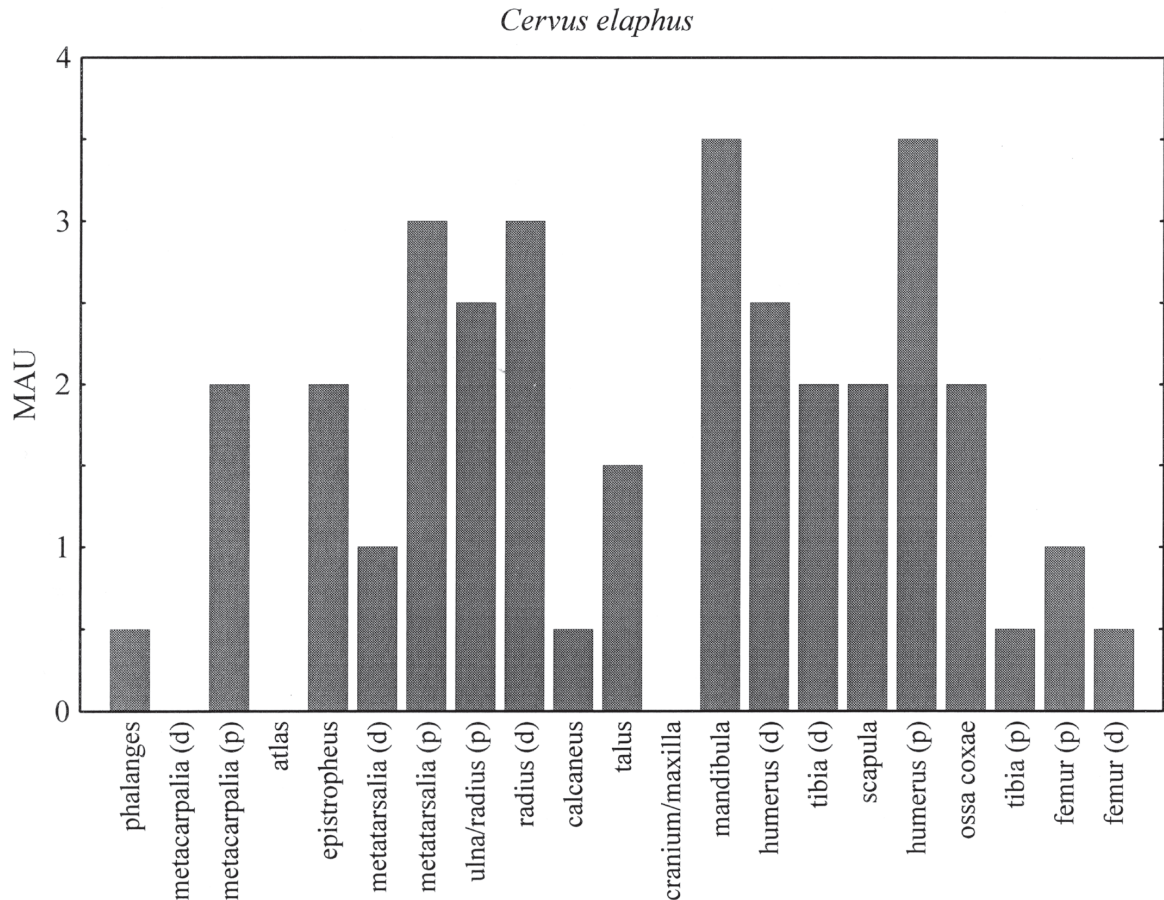
Fig. 8.4: Number of individual skeletal remains of red deer (*Cervus elaphus*) and wild boar (*Sus scrofa*) from Zalog, expressed with the index of minimal animal unit (MAU). For index definition see the text.

in this particular case, to treat only red deer and wild boar remains. These two species together represent over 90% of all identifiable finds. Furthermore: Considering the size of their bones, only a slight error due to sampling method can be expected.

The representation of individual (parts of) skeletal elements is similar for the two species (Fig. 8.4), with the few small deviations (for example the higher number of red deer metapodia) probably ascribable to the differences in size and content of bone marrow. In both cases, the remains of mandibles, scapulas and distal parts of humeri, radii and tibiae predominate. The atlas vertebrae, femuri, proximal parts of humeri and radii, distal parts of metapodia, carpal bones and phalanges, on the other hand, are represented by a substantially lower MAU values. Considering the absence of statistically significant interdependence between the number of individual skeletal elements and their structural density, we are not justified in explaining the paucity of the remains of small skeletal elements with their poorer durability in the sediment (Lyman 1985). It is more probably a reflection of a combination of methodological error in sampling (cf. Toškan, Dirjec 2004a) and economic role of the site. Higher MAU values for the index of phalanges, carpal, metacarpal, tarsal and metatarsal bones can, as a rule, be found only on the actual killing sites of the animals, since it is not viable to transport them elsewhere as economically uninteresting (for example Binford 1978a; Prummel *et al.* 2002). Taking into account the entire spectre and quantity of bone finds, it does not seem justified to ascribe such a role of a killing site to Zalog.

Figure 8.4 shows a poor representation of the economically uninteresting skeletal remains as well as an almost complete absence of bones from the most meat-bearing anatomical regions of the prey. It is known that the decision to transport a particular skeletal element is often independent of its direct economic significance.⁶ To take into account this fact as well,

⁶ The anatomical vicinity of those energetically more and those less interesting skeletal elements may be responsible for the decision to transport the economically less important bones as well (the so-called riders).



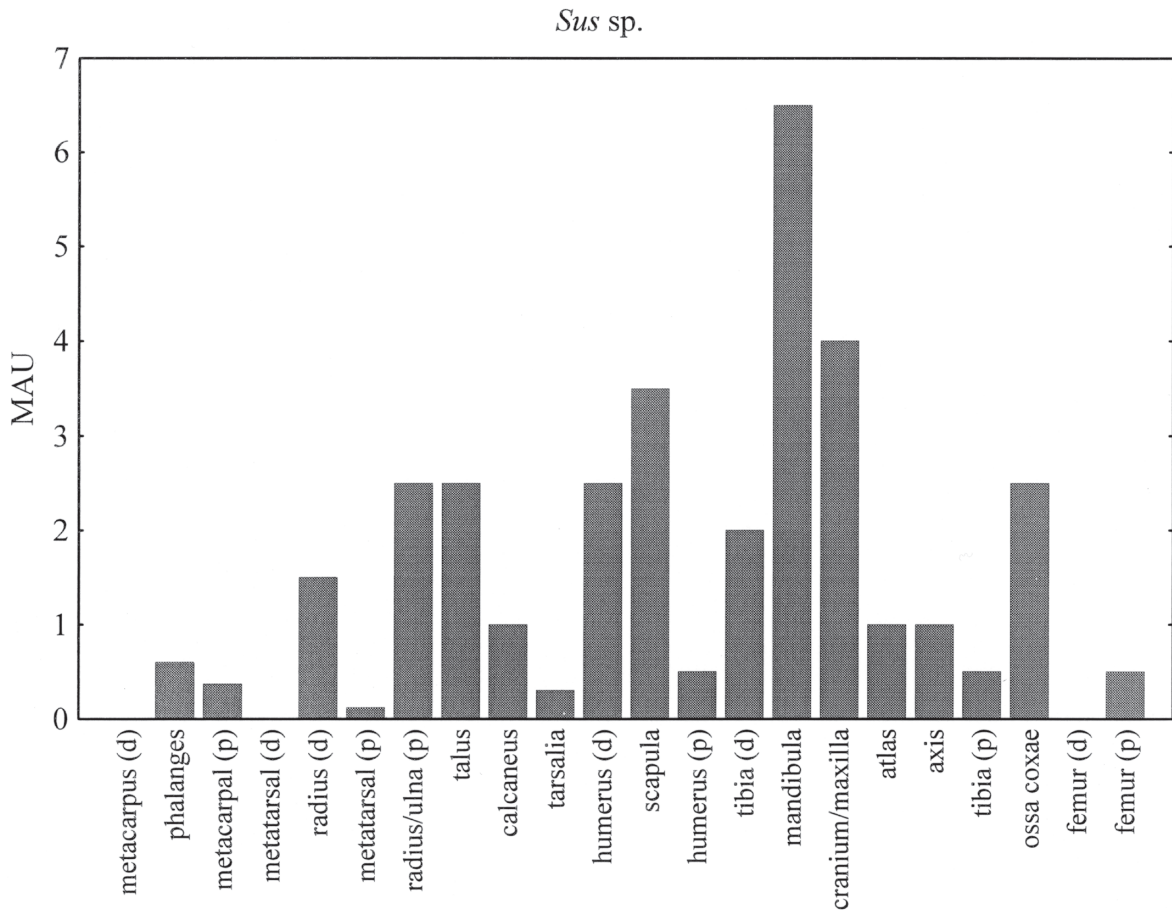
Sl. 8.5: Zastopanost posameznih skeletnih elementov gozdnega jelena (*Cervus elaphus*) z Zaloga glede na ustrezne vrednosti indeksa hranljive uporabnosti (FUI) pri severnem jelenju (Lyman 1999). Za opredelitev navedenega indeksa glej besedilo. Skeletni elementi so nanizani v skladu z lastnimi FUI vrednostmi: manj uporabni na levi in bolj uporabni na desni.

Fig. 8.5: Relationship between the MAU values of individual skeletal remains of red deer (*Cervus elaphus*) from Zalog and pertinent values of the food utility index (FUI) for reindeer (Lyman 1999). For index definition see the text. Skeletal elements are arranged according to own FUI values: less useful on the left and more useful on the right.

FUI; Lyman 1992). Rezultati za jelenje (sl. 8.5) in prašičje (sl. 8.6) ostanke nedvoumno kažejo na prevlado kosti z vmesnimi FUI vrednostmi. Upoštevajoč etnološke (Binford 1978) in arheološke (npr. Legge, Rowley-Conwy 1988; Rowley-Conwy, Halstead, Collins 2002) primerjalne podatke bi bilo ob predstavljenih rezultatih Zalog tako še najbolj smiselno obravnavati kot lovski tabor. Med daljšimi lovskimi pohodi naj bi namreč mezolitski ljudje oblikovali začasne postojanke (Rowley-Conwy 2001), kjer so najbolj mesnate dele plena (npr. zgornje dele prednjih in zadnjih okončin) pripravljali za končni transport do matične naselbine. Med bivanjem v takšnih taborih naj bi se skupinice lovcev prehranjevale z nekoliko manj mesnatimi deli uplenjenih živali ter tako oblikovale akumulacije kostnih odpadkov, kakršna je tista z Zaloga.

Kot opozarja Rowley-Conwy (1996), je sicer pičlost ostankov skeletnih elementov iz ekonomsko najzanimivejših anatomskih regij mogoče razložiti tudi z

we looked at the relationship between the frequency of appearance of individual bones and pertinent values of the food utility index (FUI; Lyman 1992). The results for the red deer (Fig. 8.5) and pig remains (Fig. 8.6) undoubtedly indicate a predominance of bones with intermediary FUI values. In view of comparable ethnologic (Binford 1978) and archaeological (for example Legge, Rowley-Conwy 1988; Rowley-Conwy, Halstead, Collins 2002) data, it would be all the more reasonable to treat the Zalog site as a hunting camp. During the long hunting expeditions, the Mesolithic people set up temporary camps (Rowley Conwy 2001), where they prepared the most meat-bearing parts of the prey (for example upper parts of front and hind limbs) for final transport to the base settlement. During their stay in such camps the small groups of hunters would feed on the less meat-bearing parts of the killed animals and thereby formed accumulations of bone waste, such as the one at Zalog.



Sl. 8.6: Zastopnost posameznih skeletnih elementov divjega prašiča (*Sus scrofa*) z Zaloga glede na ustrezne vrednosti indeksa hranljive uporabnosti (FUI) pri isti vrsti (Rowley-Conwy, Halstead, Collins 2002). Za opredelitev navedenega indeksa glej besedilo. Skeletni elementi so nanizani v skladu z lastnimi FUI vrednostmi: manj uporabni na levi in bolj uporabni na desni.

Fig. 8.6: Relationship between the MAU values of individual skeletal remains of wild boar (*Sus scrofa*) from Zalog and pertinent values of the food utility index (FUI) for the same species (Rowley-Conwy, Halstead, Collins 2002). For index definition see the text. Skeletal elements are arranged according to own FUI values: less useful on the left and more useful on the right.

večjo intenzivnostjo njihovega razbijanja, do katerega bi lahko prihajalo v okviru baznih taborov.⁷ Namen takšnega početja tiči v večjem izkoristku kostne mase, njegov stranski učinek pa je seveda tudi slabša določljivost ostankov. V primeru gradiva z Zaloga se intenzivnosti razbijanja posameznih kosti ne da oceniti z ugotavljanjem deleža zastopnosti ostankov različnih velikostnih razredov, saj so razmerja med njimi porušena zaradi metodologije vzorčenja najdb. Vendar pa primerjava razpoložljivega gradiva z vzorci iz

As warned by Rowley-Conwy (1996), the paucity of remains of skeletal elements from the economically most interesting anatomical regions may be explained also by more intense breaking of bones that occurred at base camps.⁷ The purpose of such behaviour is in the higher yield of bone fat, its side effect of course being a poorer identification of the remains. For the Zalog material, the intensity of breakage of individual bones cannot be estimated by observing the representation share of the remains of various size classes,

⁷ Kot kažejo etnološke študije, je potrebno upoštevati tudi možnost prenašanja hrane med baznimi tabori (Binford 1978a), neenoten vzorec procesiranja trupel uplenjenih živali med različnimi človeškimi skupnostmi (Domínguez-Rodrigo 1999) ter število lovcev in količino časa, ki ga ti lahko prebijejo na mestu uplenitve (Monahan 1998).

⁷ Ethnological studies show that we need to take into consideration also the food transport among base camps (Binford 1978a), differences in prey processing techniques between different human societies (Domínguez-Rodrigo 1999) as well as the number of hunters and amount of time they can spend (or could have spent) at a killing site (Monahan 1998).

Tab. 8.11: Obseg korelacije med zastopanostjo posameznih skeletnih elementov jelena (*Cervus elaphus*) oz. divjega prašiča (*Sus scrofa*) v vzorcu iz Zaloga ter njihovo frekvenco pojavljanja v mezolitskih najdiščih Star Carr (Legge, Rowley-Conwy 1988), Ringkloster (Rowley-Conwy, Halstead, Collins 2002) in Pečina pri Bjarču (Riparo di Biarzo; Rowley-Conwy 1996). Za razlago glej besedilo.

Tab. 8.11: Extent of correlation between the number of individual skeletal elements of red deer (*Cervus elaphus*) or wild boar (*Sus scrofa*) in the Zalog sample and their number in the Mesolithic sites of Star Carr (Legge, Rowley-Conwy 1988), Ringkloster (Rowley-Conwy, Halstead, Collins 2002) and Pečina near Bjarč (*Riparo di Biarzo*; Rowley-Conwy 1996). For explanation see text.

| Najdišče / Site | Zalog | |
|-------------------|------------|-----------|
| | Spearman R | p |
| Cervus elaphus: | | |
| Star Carr | R = 0,52 | p = 0,019 |
| Ringkloster | R = 0,26 | p = 0,282 |
| Pečina pri Bjarču | R = -0,11 | p = 0,625 |
| Sus scrofa: | | |
| Ringkloster | R = 0,76 | p = 0,000 |
| Pečina pri Bjarču | R = 0,37 | p = 0,093 |

nekaterih drugih mezolitskih najdišč kaže, da je zastopanost posameznih skeletnih elementov v Zalogu bližje tistim z domnevnih lovskih postojank (npr. Star Carr, Ringkloster), kot onim z baznih taborov (npr. Pečina pri Bjarču, Faraday Road; tab. 8.11). V tem smislu pa je vsekakor pomenljiva tudi odsotnost statistično značilne soodvisnosti med fragmentiranostjo skeletnih elementov z Zaloga (ocenjeno z indeksom $NISP/MNE$) in njihovo vsebnostjo kostnega mozga (Spearman $R = -0,069$; $p = 0,788$; podatke o vsebnosti kostnega mozga podajata Jones in Metcalfe (1988)). Res pa je, da je zaradi metodologije vzorčenja najdb (npr. odsotnost sejanja sedimenta) zelo verjetno do neke mere popačeno tudi razmerje med vrednostma NISP in MNE.

3.4 Rogovinasta in koščena orodja

Med ostanki z Zaloga je veliko takih, ki kažejo očitne sledi obdelave. Izstopajo predvsem fragmenti jelenjega rogovja, med katerimi je tudi nekaj poškodovanih ali še ne v celoti izdelanih sekir (Gaspari, v tem zborniku, t. 25-29). Čeprav so posamezni primerki obdelanih koščeni in/ali rogovinastih ostankov poznani z več mezolitskih najdišč na Slovenskem (npr. Culiberg, Turk, Vuga 1984; Pohar 1984; Leben 1988; Toškan, Dirjec 2004a), pa je bilo njihovo množično pojavljanje doslej ugotovljeno le v spodmolu Mala Triglavca pri Divači (Turk, Toškan, Dirjec 2004). Da so bile v navedenem spodmolu obrtne delavnice za izdelke iz jelenjega rogovja, dokazuje tudi veliko število majhnih fragmentov rogovine (tj. odpadkov), ki predstavljajo kar 82 odstotkov vseh favnističnih najdb (Turk, Toškan, Dirjec 2004).

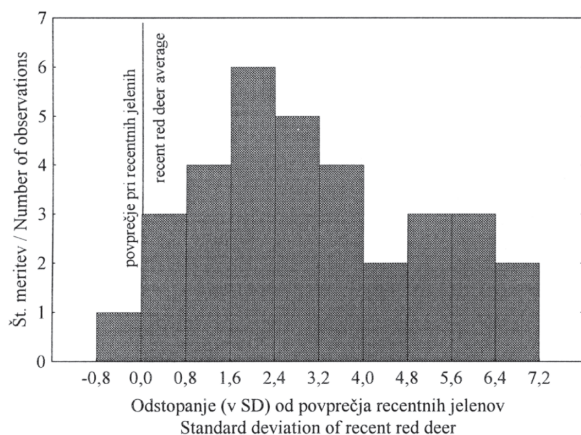
Čeprav različni metodologiji terenskega dela onemogočata neposredno primerjavo številčnosti roženih fragmentov med Malo Triglavco in Zalogom, pa podatek, da ostanki rogovja v tukaj obravnavanem najdišču predstavljajo dobro polovico (tj. 52 %) vseh jelenjih najdb, vendarle kaže na izvajanje določenih

since the relationships among these are destroyed due to the methodology of find sampling. A comparison of the available material with samples from some other Mesolithic sites nevertheless shows that the representation of individual skeletal remains at Zalog is closer to those of the supposed hunting camps (for example Star Carr, Ringkloster) than to those of base camps (for example Riparo di Biarzo, Faraday Road; Tab. 8.11). In that respect the absence of statistically significant interdependence between the fragmentation of skeletal elements represented at Zalog (marked with the $NISP/MNE$ index), and their content of bone marrow, is quite telling (Spearman $R = -0,069$; $p = 0,788$; data on bone marrow content was taken from Jones, Metcalfe (1988)).

3.4 Antler and bone tools

The remains from Zalog include many finds that show apparent signs of working. Of these, antler fragments are particularly prominent, including also some damaged or incompletely finished axes (Gaspari, in this publication, Pl. 25-29). Though individual specimens of worked bone and/or antler remains are known from several Mesolithic sites in Slovenia (for example Culiberg, Turk, Vuga 1984; Pohar 1984; Leben 1988; Toškan, Dirjec 2004a), their mass appearance has so far only been observed at the Mala Triglavca rock shelter near Divača (Turk, Toškan, Dirjec 2004). A workshop of antler products at the above mentioned site is proven also by a large number of small antler fragments (i.e. scrap), which represent an amazing 82% of all the faunistic finds (Turk, Toškan, Dirjec 2004).

Different methodologies of field work prevent a direct comparison of the number of antler fragments between Mala Triglavca and Zalog. Nevertheless, the information of antler remains representing a good half (i.e. 52%) of all red deer finds at Zalog indicates certain workshop activities there as well. A similar conclusion could be drawn from the relatively numerous fragments of antler burrs ($NISP = 20$) that probably represent waste material (cf. Clason 1983). Five of these could be treated as remains of already shed antler which undoubtedly signifies intentional collection



obrtnih dejavnosti tudi v Zalogu. Podobno bi lahko sklepali na osnovi razmeroma številnih odlomkov rogovjih rož (NISP = 20), ki verjetno predstavljajo odpadni material (prim. Clason 1983). Pet izmed njih lahko obravnavava kot ostanke že odpadlega rogovja, to pa nedvomno dokazuje namerno zbiranje te surovine. V to smer kaže tudi skupna številčnost vseh odpadlih in neodpadlih ostankov rogovja (MAU = 10), ki močno presega MAU vrednosti za katerega koli od ostalih jelenov pripisanih skeletnih elementov v vzorcu (MAU_{max} = 3,5).

Da pomemben del na najdišču prisotnih fragmentov rogovja dejansko ne gre povezovati z ostanki uplenjenih živali, je lepo razvidno tudi s *slike 8.7*. Na njej prikazana porazdelitev standardiziranih dimenzij⁸ jelenjih skeletnih elementov je namreč izrazito bimodalna. Ker so bili v analizo vključeni le popolnoma osificirani primerki, je bipolarnost smiselno interpretirati kot odraz spolnega dimorfizma (prim. Mariezkurrena, Altuna 1983), ki med uplenjenimi živalmi dokazuje rahlo prevlado košut. Takšno razmerje med spoloma pa le še bolj očitno izpostavlja razkorak med številom samcem pripisanih kosti (MAU_{♂max} = 3,5)⁹ in številom še neodpadlih (!) rogovij (MAU = 7,5). Res je, da gre pri tem lahko predvsem za odraz neenakomerne prostorske porazdelitve ostankov. Po drugi strani pa na osnovi razpoložljivih podatkov ne moreva izključiti niti možnosti, da so v okviru najdišča Zalog obdelovali (skladiščili?) odpadla rogovja ter rogovja drugod uplenjenih in razkosanih samcev.

⁸ Dimenzije sva standardizirala po formuli: *standardizirana vrednost* = $(x-m)/s$, kjer x predstavlja dimenzijo primerka z Zaloga, m in s pa povprečje in standardno deviacijo iste dimenzije pri referenčnem vzorcu iz Španije (Mariezkurrena, Altuna 1983).

⁹ Najvišja MAU vrednost za kosti (brez rogovja) jelenov in košut znaša 3,5 (spodnje čeljustnice, lopatice; *slika 8.4*). Tudi če bi vse spodnje čeljustnice/lopatice pripadale le samcem (kar pa je glede na *sliko 8.7* malo verjetno), bi torej največja možna MAU vrednost za samce (le kosti) ne presejala MAU vrednosti za rogovje.

Sl. 8.7: Porazdelitev standardiziranih dimenzij merljivih ostankov jelena (*Cervus elaphus*) z Zaloga. Povprečje recentnih jelenov se nanaša na obsežen vzorec iz Španije (Mariezkurrena, Altuna 1983). Izmerjene vrednosti so bile standardizirane po formuli: *stand. vrednost* = $(X - M) / SD$, kjer X predstavlja posamezno meritev z Zaloga, M in SD pa povprečje oz. standardno deviacijo ustrezne dimenzije pri referenčnem vzorcu. V analizo so bili vključeni le popolnoma osificirani primerki, od katerih je vsak zastopan s po eno meritvijo.

Fig. 8.7: Distribution of standardized measurements of red deer remains (*Cervus elaphus*) from Zalog. The average value of recent red deer relates to the extensive sample from Spain (Mariezkurrena, Altuna 1983). Measured values were standardized according to the formula: *stand. value* = $(X - M) / SD$, where X represents an individual measurement from Zalog, while M and SD represent the average value or standard deviation of the appropriate measurement in the referential sample. The analysis includes only fused specimens, of which each is represented by a single measurement.

of this raw material. Additional proof is provided by the number of all (i.e. shed and unshed) antler remains (MAU = 10) that strongly exceeds the MAU values of any other skeletal element in the sample attributed to red deer (MAU_{max} = 3.5).

An important part of burr fragments at the site can actually not be connected with the remains of killed animals. This is clearly visible from *Figure 8.7*. The distribution of standardized measurements⁸ of skeletal elements of red deer, showed on the cited figure, is distinctly bimodal. The analysis included only fused specimens. It is therefore reasonable to interpret the bipolarity as an expression of sexual dimorphism (cf. Mariezkurrena, Altuna 1983), thus indicating a slight prevalence of hind among the killed animals. Such a relationship between the sexes emphasized even further the discrepancy between the number of bones ascribed to males (MAU_{♂max} < 3,5)⁹ and the number of unshed (!) antlers (MAU = 7,5). It is true that such a discrepancy could be foremost a reflection of unequal spatial distribution of the remains. On the basis

⁸ Standardised measurements were obtained according to the formula: *standardized value* = $(x-m)/s$, where x stands for the dimension of a specimen from Zalog, while m and s stand for the mean value and standard deviation of the same dimension in the referential sample from Spain (Mariezkurrena, Altuna 1983).

⁹ The highest MAU value for red deer male and female remains (not counting antlers) equals 3,5 (*Fig. 8.4*). Thus, even if all the mandibulae and scapulae fragments belong to males, which is highly improbable (*Fig. 8.7*), the MAU value of red deer males in the Zalog sample would not exceed the MAU value for antlers.

3.5 Sezona bivanja

Obdobje leta, v katerem so se mezolitski ljudje zadrževali na območju Zaloga, je zelo težko oceniti. Sicer številni fragmenti rogovja so v pričujočem primeru neuporabni, saj jih zaradi že predstavljenih dokazov o namernem zbiranju odpadlih primerkov ni mogoče neposredno povezovati s sezono človekovega zadrževanja na najdišču. Na osnovi stopnje izraščanja in/ali obrabe grizalne površine sedmih prašičjih in enega jelenjega meljaka bi sicer obdobje zasedbe domnevnega lovskega tabora lahko omejili na le nekaj jesensko-zimskih mesecev (sl. 8.8), vendar pa pičlost najdb ter variabilnost v mesecu kotitve pri recentnih populacijah divjih prašičev nikakor ne izključuje drugačnih vzorcev aktivnosti. Še najbolj verodostojen kazalec obdobja bivanja v Zalogu tako zaenkrat ostajajo ptičje kosti (Janžekovič, Malez, v tem zborniku). Med njimi prevladujejo ostanki vrst, ki se na Slovenskem pojavljajo v migracijskem obdobju (pomlad ali jesen). Ker v gradivu sesalske makrofavne nisva prepoznala ostankov pomladi uplenjenih živali, bi torej predstavljeni podatki lahko kazali na (vsaj) jesensko prisotnost človeka na najdišču.

Sl. 8.8: Ocena sezone aktivnosti mezolitskih ljudi v Zalogu na osnovi izraščanja zob in/ali stopnje obrabe njihovih grizalnih površin pri divjem prašiču (polna črta) in jelenu (prekinjena črta). Vsak za oceno starosti primeren meljak je predstavljen s črto, ki označuje najverjetnejšo sezono uplenitve. Vsaka čeljustnica je zastopana le s po enim zobom. Pri oceni starosti sva se naslonila na smernice, ki sta jih objavila Higham (1967) in Habermehl (1961). Jesenski in zimski meseci so osenčeni.

Fig. 8.8: Estimate of the season of occupation of the Zalog site on the basis of teeth eruption and/or degree of tooth wear for wild boar (unbroken line) and red deer (broken line). Every molar suitable for the age estimate is presented with a line that marks the most likely season of kill. Every mandible is represented by one tooth only. In estimating the age, we leaned onto guidelines published by Higham (1967) and Habermehl (1961). Autumn and winter months are shaded.

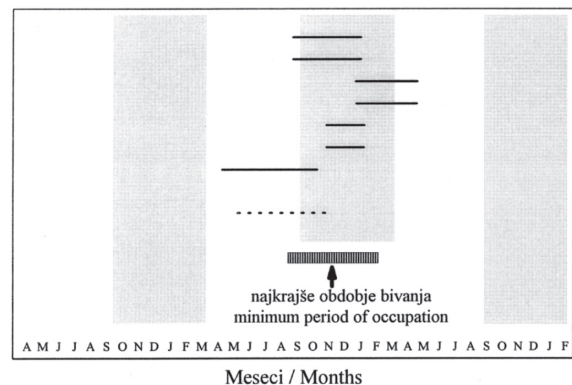
4 ZAKLJUČEK

Zastopanost posameznih skeletnih elementov jelena in divjega prašiča z Zaloga se ujema s sliko, ki jo kažejo nekatere domnevne postojanke mezolitskih lovcev po Evropi (npr. Star Carr, Ringkloster). Ob opredelitvi Zaloga za lovski tabor pa vendarle naletiva na dve težavi: 1. z metodologijo terenskega dela in potencialnim vodnim transportom najdb povezana vprašljiva reprezentativnost vzorca ter 2. veliko število ostankov

of the available data, however, not even the possibility of working (storing?) of antlers of males killed and dismembered at another place can be excluded.

3.5 Habitation season

It is very difficult to determine the time of year in which the Mesolithic hunters occupied the Zalog area. The numerous antler fragments are of no use for this purpose, since the data on the intentional collection of shed specimens, presented above, cannot be directly connected to the season of human presence at the site. Based on the degree of eruption and/or wear of the molars of seven pigs and one red deer, the period of occupation of the supposed hunting camp could be limited to only a few autumn and winter months (Fig. 8.8). The paucity of finds and the variability in the month of birth for the recent population of wild boar in no way excludes different activity patterns. At this point, the most credible indicator of the occupation period at Zalog are bird remains (Janžekovič, Malez, in this publication). Predominant among these are the remains of species that appear in Slovenia during the migration period (autumn or spring). Since animals killed in spring could not be identified within the material of mammal macrofauna, the above presented results may indicate an (at least) autumnal human presence at the site.



4 CONCLUSION

The representation of individual skeletal elements of red deer and wild boar from Zalog corresponds to that observed in certain supposed camps of Mesolithic hunters across Europe (for example Star Carr, Ringkloster). The determination of Zalog as a hunting camp, however, presents two problems: 1. questionable representation of the sample due to the field work methodology and the potential water transport of

rogovja z neizpodbitnimi sledmi obdelave. Kljub do neke mere nedvomno podcenjenemu deležu manjših kosti in kostnih fragmentov meniva, da neustrezno vzorčenje ni odločilno prispevalo k ugotovljenim razlikam v MAU vrednostih npr. distalnih delov nadlahtnic, koželjnic in golenic na eni strani in njihovimi proksimalnimi deli (kot ostanki najbolj mesnatih delov plena) na drugi. Nenazadnje soodvisnost med intenzivnostjo razbijanja posameznih (delov) skeletnih elementov in njihovo vsebnostjo maščob ni statistično značilna, enako pa velja tudi za korelacijo med številčnostjo ostankov in njihovo strukturno gostoto. Morda se v zastopanosti posameznih skeletnih elementov bistveno ne odraža niti vodni transport najdb, o katerem sicer pričata konjski zob in (verjetno tudi) kozja petnica. Številčnost relativno mobilnih kosti namreč ne zaostaja za frekvenco pojavljanja tistih, ki jih domnevno odplavi šele razmeroma močan tok (Coard 1999; Lyman 1999), pomenljiva pa je tudi odsotnost (samic) domačega prašiča.

V kontekstu opredelitve najdišča Zalog za lovsko postojanko se zdi tako bolj moteča množična prisotnost ostankov rogovja s sledmi obdelave, med katerimi so tudi nekateri (pol)izdelki. Veliko število (obdelanih) fragmentov jelenjega rogovja je bilo najdenih tudi v zgoraj omenjenih Star Carru in Ringklostru. Avtorja analiz živalskih ostankov (Legge, Rowley-Conwy 1988; Rowley-Conwy 1994-95; 1998) najdišči kljub temu obravnavata kot domnevni lovski postojanki, saj etnološke (npr. Binford 1978b) in arheološke (npr. Straus 1987) študije ne izključujejo povezave lova in izdelovanja (ne le lovu namenjenih) orodij v okviru istega tabora. Nenazadnje so tako Zalog kot tudi Star Carr in Ringkloster v mezolitiku ležali v neposredni bližini jezera, kjer bi ljudje lahko namakali rogovje in s tem olajšali njegovo naknadno obdelavo (prim. Semenov 1973).

Večjo previdnost pri opredelitvi funkcije navedenih najdišč priporočajo Mellars (1998) ter Conneller in Schadla-Hall (2003). Navedeni avtorji pri tem v ospredje postavljajo za lovsko postojanko preveč bogato zbirko kamenih artefaktov, od katerih številni (npr. vbadala, orodja za obdelavo kože ipd.) domnevno bolje ustrezajo kontekstu baznega tabora. Podobno naj bi mnogi z lovom povezani kamni artefakti v okviru mezolitskega najdišča Faraday Road (Ellis *et al.* 2003) dokazovali njegovo uporabo kot lovsko postojanko, čeprav med živalskimi ostanki prevladujejo kosti najbolj mesnatih anatomskih regij plena. Dvome o upravičenosti takšnih zaključkov vzbuja Mala Triglavca, ki v mezolitskih plasteh združuje številna lovna kamena orodja (predvsem trapezi, a tudi trikotniki in klinice s hrbtom in prečno retušo; Turk, M., I. Turk 2004) in prek 2.200 fragmentov jelenjega rogovja (tj. 82 % vseh favnističnih ostankov; Turk, Toškan, Dirjec 2004), ob katerih je bilo izkopanih tudi nekaj z

finds and 2. a large number of antler remains with irrefutable traces of working. Despite the share of small bones and bone fragments undoubtedly being partly underestimated, we nevertheless believe that the inappropriate sampling did not significantly contribute to the discovered differences in MAU values of, for example, distal parts of humeri, radii and tibiae, on the one hand, and their proximal parts (as remains of most meat-bearing parts of the prey), on the other. Furthermore, the interdependence between the intensity of breakage of individual (parts of) skeletal elements and their fat content is not statistically significant. A similar observation could also be made for the correlation between the number of the remains and their structural density. The representation of individual skeletal elements probably wasn't significantly distorted by the water transport of finds neither, otherwise proved by the horse tooth and (probably also) goat calcaneus; the number of the relatively mobile bones does not, in fact, lag behind the number of those that are supposedly washed away only by a relatively strong current (Coard 1999; Lyman 1999). The absence of (female) domestic pigs is also telling.

In the context of defining the Zalog site as a hunting camp, the presence of worked antler remains including also some (semi)products is more disturbing. A high number of (worked) antler fragments was found also at the above-mentioned sites of Star Carr and Ringkloster. Despite this, Legge and Rowley-Conwy treat the sites as supposed hunting camps (Legge, Rowley-Conwy 1988; Rowley-Conwy 1994-95; 1998). Namely, both ethnological (for example Binford 1978b) and archaeological (for example Straus 1987) studies do not exclude a connection between hunting and (not exclusively hunting) tool production within a single camp. Moreover, the Zalog, Star Carr as well as Ringkloster sites were all located in the immediate vicinity of a lake where the people could soak the antler and thereby facilitate its further processing (cf. Semenov 1973).

Mellars (1998) as well as Conneller and Schadla-Hall (2003) recommend a more careful definition of the cited sites, pointing to a collection of stone artefacts too rich for a hunting camp. Of the artefacts, numerous ones (for example burins, hide processing tools and others) supposedly better suit the context of a base camp. Similarly, numerous hunting-related stone artefacts within the Mesolithic site of Faraday Road (Ellis *et al.* 2003) supposedly proved its use as a hunting camp despite the fact that bones from the most meat-bearing anatomical regions of prey predominate. Doubts as to the justification of such conclusions is raised by the Mala Triglavca site that combines numerous stone hunting tools (mostly trapezes but also triangles as well as backed and truncated bladelets; Turk, Turk 2004) and over 2,200 fragments of antler

okraševanjem in razvedrilom povezanih najdb (Turk, M., I. Turk 2004; Mikuž, Turk 2004). Nenazadnje pa moramo v zvezi z obravnavano problematiko dopustiti tudi možnost, da se je namembnost posameznega najdišča v nekem obdobju pač spreminjala ter s tem prispevala k večji pestrosti najdb (Miracle *et al.* 2000; Conneller, Schadla-Hall 2003).

V primeru Zaloga je analiza kamenih artefaktov izpostavila prevladovanje enostavnih primerkov, katerih produkcija ni zahtevala večjega časovnega vložka, medtem ko kompleksni izdelki manjkajo (Kavur, v tem zborniku). Paleta arheoloških najdb torej načeloma ne nasprotuje opredelitvi najdišča kot lovske postojanke. Vsekakor pa lahko zanesljivejši in podrobnejši vpogled v vlogo posameznih mezolitskih taborov, obdobjem leta, v katerem so bili ti naseljeni, ter spekter aktivnosti, ki so jih lovsko-nabiralniške skupnosti tam izvajale, ponudijo šele sistematične arheološke in arheozoološke raziskave regije v celoti (npr. Rowley-Conwy 1993; Miracle 1994-95; Conneller, Schadla-Hall 2003).

Zahvala

Zahvaljujeva se Andreju Gaspariju, ki nama je omogočil študij favnističnega gradiva. Alfredu Riedlu in Francescu Boschinu sva hvaležna za kritično komentiranje prve verzije rokopisa.

(i.e. 82% of all faunistic remains; Turk, Toškan, Dirjec 2004). The material from this site includes also some finds related to decoration and pass-time (Turk, Turk 2004; Mikuž, Turk 2004). Finally, for this particular problem we should also allow for the possibility of the changing nature of a camp during a certain period of time which contributed to the greater variety of finds (Miracle *et al.* 2000; Conneller, Schadla-Hall 2003).

The analysis of stone artefacts from Zalog revealed the predominance of simple objects, the production of which did not demand a higher input of time, while the more complex specimens are missing (Kavur, in this publication). The array of archaeological finds therefore does not, in principle, contradict the definition of the site as a hunting camp. It is the systematic archaeological and archaeozoological research in the region as a whole that can provide a more reliable and detailed insight into the role of Mesolithic camps, the season of their occupation and the spectre of activities that the hunter-gatherer communities undertook there (for example Rowley-Conwy 1993; Miracle 1994-95; Conneller, Schadla-Hall 2003).

Acknowledgements

We would like to thank Andrej Gaspari for the opportunity to study this faunistic material. We are also thankful to Alfredo Riedel and Francesco Boschin, who provided critical comments on an earlier draft.

Priloge

Tab. 8.A: Dimenzije izmerljivih ostankov jelena (*Cervus elaphus*) z Zaloga. Meritve so bile izvedene po navodilih von den Driesch (1976) in so razložene na koncu priloge. Vse mere so v mm.

Tab. 8.A: Dimensions of measured remains of red deer (*Cervus elaphus*) from Zalog. Measurements were taken according to the guidelines of von den Driesch (1976) and are explained at the end of the supplement. All measurements are in mm.

| Skelet. el. | Dimen. | Mere / Measurements | | | | | | | | | | | | | | | |
|-----------------------------|--------|---------------------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Rogovje / <i>Antlers</i> | ONR | 190 | 189 | 178 | 146 | 191 | 172 | 196 | 142 | 210 | 195 | 180 | 172 | 167 | 165 | 140 | 145 |
| | OR. | 218 | 222 | 210 | 194 | 226 | 220 | 236 | -- | 245 | -- | 240 | -- | 207 | 185 | -- | -- |
| | OPR | 145 | 98 | 145 | 127 | 158 | 146 | 157 | 120 | 142 | 175 | 156 | -- | -- | -- | -- | -- |
| M ₃ | D | 32 | 34 | 34,5 | 31,5 | 29,5 | 38 | | | | | | | | | | |
| | Š | 12,5 | 14,5 | 14 | 14,5 | 13 | 17 | | | | | | | | | | |
| Scapula | GB | 37,5 | 46 | 41 | 42,5 | 45 | | | | | | | | | | | |
| | GL | 42 | 51 | 43 | 49,5 | 48 | | | | | | | | | | | |
| | SLC | 34,5 | 41 | 37 | 37 | 37 | | | | | | | | | | | |
| | GLP | -- | 62 | 58 | 62 | 64 | | | | | | | | | | | |
| Humerus | Bd | 61 | -- | 63 | 62 | 54 | | | | | | | | | | | |
| | BT | 58 | 56,5 | 58,5 | 57 | 52 | | | | | | | | | | | |
| Radius | Bp | 51 | 47 | 46 | 53 | | | | | | | | | | | | |
| | Bd | 60,5 | 50 | 61 | -- | | | | | | | | | | | | |
| Ulna | BPC | 30,5 | 29,5 | | | | | | | | | | | | | | |
| Metacarpus | Bp | -- | 33 | 43 | 38 | | | | | | | | | | | | |
| | Bd | 44 | -- | -- | -- | | | | | | | | | | | | |
| Femur | DC | 35 | | | | | | | | | | | | | | | |
| Patella | GB | 41 | | | | | | | | | | | | | | | |
| Tibia | Bd | 51,5 | 46 | 46 | 43 | | | | | | | | | | | | |
| | Dd | 40 | 36 | 36 | 36 | | | | | | | | | | | | |
| Calcaneus | GL | 115 | | | | | | | | | | | | | | | |
| | GB | 35 | | | | | | | | | | | | | | | |
| Talus | GLI | 52,5 | 54 | 58,5 | | | | | | | | | | | | | |
| | GLm | 49 | 49,5 | 52 | | | | | | | | | | | | | |
| | DI | 28 | 28,5 | 31 | | | | | | | | | | | | | |
| | Dm | 27,5 | 29 | 31 | | | | | | | | | | | | | |
| | Bd | 31 | 33 | 35,5 | | | | | | | | | | | | | |
| Centrotars. | GB | 44,5 | | | | | | | | | | | | | | | |
| Metatarsus | Bp | -- | -- | 34 | 33 | | | | | | | | | | | | |
| | Bd | 40,5 | 41 | -- | -- | | | | | | | | | | | | |

Tab. 8.B: Dimenzije izmerljivih ostankov divjega prašiča (*Sus cf. scrofa*) z Zaloga. Meritve so bile izvedene po navodilih von den Driesch (1976) in so razložene na koncu priloge. Vse mere so v mm.

Tab. 8.B: Dimensions of measured remains of wild boar pig (*Sus cf. scrofa*) from Zalog. Measurements were taken according to the guidelines of von den Driesch (1976) and are explained at the end of the supplement. All measurements are in mm.

| Skelet. el. | Dimen. | Mere / <i>Measurements</i> | | | | | | | |
|----------------|--------|----------------------------|------|------|------|----|------|------|----|
| Maxilla | M28 | 47 | -- | | | | | | |
| | M29 | -- | 83,5 | | | | | | |
| M ³ | D | 36 | 34 | 40 | 36 | | | | |
| | Š | 20 | 23 | 23 | 21 | | | | |
| M ₃ | D | 47 | 38 | 40 | 38,5 | 45 | 44 | 40,5 | 41 |
| | Š | 19 | 18 | -- | 18 | 20 | 18 | 19 | 19 |
| Axis | LCDe | 51 | | | | | | | |
| | BFcr | 55,5 | | | | | | | |
| Scapula | BG | 25 | 34 | 30 | 29 | -- | 32 | | |
| | LG | 29,5 | -- | -- | 35 | 31 | 35,5 | | |
| | GLP | 36 | -- | -- | 42,5 | -- | 46 | | |
| | SLC | 26 | 30 | 30 | 30 | 25 | 31,5 | | |
| Humerus | Bd | 52 | 47 | 51 | 47 | | | | |
| | BT | 42,5 | 38 | 42,5 | 38 | | | | |
| Radius | Bp | -- | 33,5 | | | | | | |
| | Bd | 37,5 | -- | | | | | | |
| Ulna | DPA | 50 | | | | | | | |
| | SDO | 37 | | | | | | | |
| Mc II | GL | 72,5 | | | | | | | |
| | Bd | 13 | | | | | | | |
| Phalanx II | Bp | 19 | | | | | | | |
| | Bd | 16 | | | | | | | |
| Tibia | Bd | 40 | 31,5 | 37 | | | | | |
| | Dd | 34 | -- | 31 | | | | | |
| Talus | GLl | 51,5 | 50 | 51,5 | 52 | | | | |
| | Glm | 47 | 44,5 | 44 | -- | | | | |
| | Dl | 27 | 28 | 26 | 29 | | | | |
| | Dm | -- | -- | 28 | -- | | | | |
| | Bd | 29 | 27 | 32 | 30 | | | | |
| Mt III | Bp | 19 | | | | | | | |

Tab. 8.C: Dimenzije izmerljivih ostankov srne (*Capreolus capreolus*) z Zaloga. Meritve so bile izvedene po navodilih von den Driesch (1976) in so razložene na koncu priloge. Vse mere so v mm.

Tab. 8.C: Dimensions of measured remains of roe deer (*Capreolus capreolus*) from Zalog. Measurements were taken according to the guidelines of von den Driesch (1976) and are explained at the end of the supplement. All measurements are in mm.

| Skelet. el. | Dimen. | Mere / <i>Measurements</i> | |
|-------------|--------|----------------------------|------|
| Metacarpus | Bd | 22 | |
| Tibia | Bd | 28 | 27,5 |
| | Dd | -- | 21 |

Tab. 8.D: Dimenzije izmerljivih ostankov divje mačke (*Felis cf. silvestris*) z Zaloga. Meritve so bile izvedene po navodilih von den Driesch (1976) in so razložene na koncu priloge. Vse mere so v mm.

Tab. 8.D: Dimensions of measured remains of wild cat (*Felis cf. silvestris*) from Zalog. Measurements were taken according to the guidelines of von den Driesch (1976) and are explained at the end of the supplement. All measurements are in mm.

| Skelet. el. | Dimenzija / Dimensions | Mere / Measurements |
|-------------|------------------------|---------------------|
| Mandibula | M7 | 9,5 |
| | M9 | 12 |

Tab. 8.E: Dimenzije izmerljivih ostankov kune zlatice (*Martes martes*) z Zaloga. Meritve so bile izvedene po navodilih von den Driesch (1976) in so razložene na koncu priloge. Vse mere so v mm.

Tab. 8.E: Dimensions of measured remains of pine marten (*Martes martes*) from Zalog. Measurements were taken according to the guidelines of von den Driesch (1976) and are explained at the end of the supplement. All measurements are in mm.

| Skelet. el. | Dimenzija / <i>Dimension</i> | Mere / <i>Measurements</i> |
|----------------|------------------------------|----------------------------|
| Mandibula | M10 | 15,5 |
| | M18 | 26 |
| | M19 | 9 |
| M ₁ | D | 11,5 |
| | Š | 4 |

OSTANKI PTIC

BIRD REMAINS

Franc JANŽEKOVIČ in Vesna MALEZ

Izvleček

Na arheološkem najdišču Zalog pri Verdu je bilo najdenih 38 ptičjih kosti, med katerimi je bilo anatomsko in sistematsko prepoznanih 31 kosti. Življenjska okolja ptic z najdišča v Zalogu obsegajo večje stoječe ali počasi tekoče vode, plitvine z bogato vegetacijo, mokrišča z nizko vegetacijo in obsežne močvirne gozdove.

Ključne besede: Slovenija, Ljubljansko barje, mezolitik, ptice (*Aves*), arheozoologija

Abstract

The archaeological site of Zalog near Verd yielded 38 bird bones, of which 31 were anatomically and systematically identified. The habitats of the birds from the Zalog site include large still or slow flowing waters, shallows with rich vegetation, wetlands with low-growing vegetation and vast marshy forests.

Key words: Slovenia, the Ljubljansko barje, Mesolithic, birds (*Aves*), archaeozoology

1 UVOD

Na arheološkem najdišču v strugi potoka Ljubija ob ledini Zalog pri Verdu je bilo najdenih 38 ptičjih kosti, med katerimi je bilo anatomsko in sistematsko prepoznanih 31 kosti. Skupno je bilo določenih najmanj 16 osebkov ptic, ki so pripadali 11 vrstam: *Podiceps cristatus*, *Phalacrocorax carbo*, *Cygnus olor*, *Anser anser*, *Anser* sp., *Anas platyrhynchos*, *Anas querquedula*, *Anas clypeata*, *Aythya ferina*, *Aythya fuligula*, *Haliaeetus albicilla* in *Tetrao tetrix*. Zbrane kosti ptic izvirajo, tako kot ostanke drugih živali in različni predmeti, iz odplavljene kulturne plasti, ki verjetno predstavlja ostanke lovskega tabora iz kamene dobe. Domnevamo, da gre za ostanke prehranjevanja kamenodobnih ljudi. Življenjska okolja ptic z najdišča v Zalogu obsegajo večje stoječe ali počasi tekoče vode, plitvine z bogato vegetacijo, mokrišča z nizko vegetacijo in obsežne močvirne gozdove. V ekološkem smislu odstopa od vodnih ptic ruševac *Tetrao tetrix*, ki naseljuje travišča nad gozdno mejo. Recentne ptice istih vrst kot z najdišča Zalog imajo različni status prisotnosti na Barju: stalnice, zimski gosti in selivke. V povezavi z dolžino trajanja tabora in letnim časom prisotnosti ptic na barju sta možni dve razlagi. Po prvi možnosti je šlo za časovno relativno kratkotrajno jesensko ali pomladansko obdobje aktivnosti, druga možnost predvideva celoletno aktivnost kamenodobnih ljudi.

V analizah zooarheoloških najdb ptic z neolitskih in bakrenodobnih koliščarskih naselbin na Ljubljan-

1 INTRODUCTION

The archaeological site in the bed of the Ljubija Stream at the Zalog near Verd yielded 38 bird bones, of which 31 were anatomically and systematically identified. In total at least 16 bird individuals were identified, belonging to 11 species: *Podiceps cristatus*, *Phalacrocorax carbo*, *Cygnus olor*, *Anser anser*, *Anser* sp., *Anas platyrhynchos*, *Anas querquedula*, *Anas clypeata*, *Aythya ferina*, *Aythya fuligula*, *Haliaeetus albicilla* and *Tetrao tetrix*. The collected bird bones originate, as do the remains of other animals and various artefacts, from the cultural layer, subsequently washed away, that most probably represented the remains of a hunting camp of the Stone Age. The bird bones, we suppose, represent their food remains. The habitats of the birds from the Zalog site include large still or slow flowing waters, shallows with rich vegetation, wetlands with low-growing vegetation and vast marshy forests. From the ecological perspective, black grouse *Tetrao tetrix* stands out among the aquatic birds, since its habitat is the grassland above the tree-line. Recent birds of the same species as those from the Zalog site have various statuses of presence at the Ljubljansko barje: residents, winter visitors and migratory birds. The duration of the camp, on the one hand, and the seasonal presence of the birds at the Ljubljansko barje, on the other, lead to two possible interpretations: either the duration of the Stone Age people's activity was short lived during the spring or the autumn seasons or their activity was of a longer duration throughout the year.

The analyses of the zooarchaeological bird finds

skem barju je bilo do leta 2004 ugotovljenih 36 vrst ptic. V ekološkem smislu prevladujejo vrste vodnih in močvirnih habitatov, nekaj pa je tudi vrst, značilnih za kopenske, predvsem gozdne habitate. Časovni okvir najdb sega od druge polovice 5. do druge polovice 2. tisočletja pr. n. št. Raziskovalci so mnenja, da je kosti ptic mogoče interpretirati kot ostanke prehrane ljudi. Glede na pogostost ptičjih kosti so ptice predstavljale znaten vir hrane, v ekonomiji naselja so najbrž zasedale položaj dopolnilne hrane (Janžekovič, Malez, Velušček 2004 in tam citirana literatura).

V tem prispevku predstavljamo najdbe ptičjih kosti z arheološkega najdišča Zalog pri Verdu.

2 METODE

V letu 2004 je potekala zaščitna arheološka raziskava struge Ljubije ob ledini Zalog, nedaleč od vasi Verd na skrajnem zahodnem robu Ljubljanskega barja. V okviru intenzivnega pregleda dna struge je bilo zbrano večje število kamnitih odbitkov, roženih in koščenin izdelkov, človeška lobanja ter kosti različnih živali, med njimi tudi kosti ptic. Z radiokarbonsko analizo vzorcev lobanje in hrastovega debla so ugotovili, da najdbe sodijo v sredino 8. tisočletja pr. n. št. (Gaspari, Erič, v tem zborniku). V tem primeru gre za eno najstarejših znanih arheoloških najdišč na Ljubljanskem barju.

Kosti ptic smo determinirali s pomočjo literature (Baumel 1979) in primerjalnim materialom osteološke zbirke recentnih ptic Zavoda za paleontologijo in geologijo kvartara Hrvatske akademije znanosti in umetnosti (determinirala V. Malez). Določili smo število primerkov - ŠDP. ŠDP izraža skupno število kosti ali njihovih fragmentov v vzorcu, ki jih z gotovostjo pripišemo posameznemu taksonu, in velja za najpreprostejši kazalec gostote posameznih vrst pri arheozooloških analizah. Najmanjše število osebkov - NŠO smo določili na osnovi količnika med najmanjšim številom posameznih elementov v vzorcu in številom enakih delov skeleta obravnavane vrste (Reitz, Wing 1999).

Iz ekoloških potreb posameznih vrst ptic in njihove izbire življenjskega okolja (Gregori, Krečič 1979; Cramp 1994) sklepamo na okolje v preteklosti.

3 REZULTATI IN DISKUSIJA

Na arheološkem najdišču Zalog pri Verdu je bilo zbranih ter anatomsko in taksonomsko prepoznanih 38 ptičjih kosti. Skupno je bilo prepoznanih 16 osebkov ptic, ki so pripadali 11 vrstam (*tab. 9.1*). Sistematski zoološki pregled najdb in kratka ekološka oznaka vrst za recentne živali:

from the Neolithic and Copper Age pile-dwelling settlements at the Ljubljansko barje enabled, until 2004, the identification of 36 bird species. From the ecological perspective, bird species of aquatic and marshy habitats predominate. There are also some species that are characteristic of dry-land, mostly forest habitats. The time frame of the finds spans from the second half of the 5th to the second half of the 2nd millennium BC. The researchers are of the opinion that the bird bones may be interpreted as human food remains. Considering the frequent occurrence of bird bones, the birds must have represented a significant food source, probably a supplementary food source within the settlement's economy (Janžekovič, Malez, Velušček 2004 and cited literature).

This article presents the finds of bird bones at the archaeological site of Zalog near Verd.

2 METHODS

Rescue archaeological investigation of the Ljubija bed at the Zalog fallow, not far from the Verd village on the western edge of the Ljubljansko barje, took place in 2004. The intensive survey of the stream bed yielded a large number of stone flakes, horn and bone products, a human skull as well as bones of various animals, among them also birds. The radiocarbon dating of the samples of the skull and the oak tree trunk indicated that the finds belonged to the mid 8th millennium BC. Zalog is thereby one of the earliest known archaeological sites at the Ljubljansko barje (Gaspari, Erič, in this publication).

Bird bones were identified with the help of the literature (Baumel 1979) and the comparative material from the osteological collection of the Institute for the Palaeontology and the Geology of the Quaternary Period at the Croatian Academy of Sciences and Arts (identified by V. Malez). The number of identified specimens - NISP - has been determined which indicates the total number of bones or their fragments in a sample that can reliably be ascribed to a particular taxon and is considered as the simplest indicator of the density of individual species in archaeozoological analyses. The minimum number of individuals - MNI - has also been determined on the basis of the quotient between the smallest number of individual elements in a sample and the number of equal parts of a skeleton of a particular species (Reitz, Wing 1999).

The ecological needs of individual bird species and their choice of habitat (Gregori, Krečič 1979; Cramp 1994) then form the basis for supposing the past environment.

3 RESULTS AND DISCUSSION

The archaeological site of Zalog near Verd yielded 38 anatomically and taxonomically identified bird bones.

Tab. 9.1: Zalog pri Verdu. Število kostnih ostankov ptic (ŠDP) in najmanjše število osebkov (NŠO). Legenda: C-coracoid, Fi-fibula, H-humerus, K-kljun, Mc-metacarpus, Ph-phalanx, Sc-scapula, Tm-tarsometatarsus, TI-tibiotarsus, U-ulna, X-neprepoznane ptičje kosti, V-vretence.

Tab. 9.1: Zalog near Verd. Number of identified specimens of birds (NISP) and minimum number of individuals (MNI). C-coracoid, Fi-fibula, H-humerus, K-beak, Mc-metacarpus, Ph-phalanx, Sc-scapula, Tm-tarsometatarsus, Ti-tibiotarsus, U-ulna, X-unidentified bird bones, V-vertebra.

| Elementi / Elements | H | C | Sc | U | Mc | Fi | TI | Tm | Ph | V | K | X | NŠO / MNI |
|-----------------------------|----|---|----|---|----|----|----|----|----|---|---|---|-----------|
| Vrste / Species | | | | | | | | | | | | | |
| <i>Podiceps cristatus</i> | 1 | | | | | | | | | | | | 1 |
| <i>Phalacrocorax carbo</i> | 4 | 2 | | | | | 2 | | | | | | 3 |
| <i>Cygnus olor</i> | | 1 | | | | | 1 | | | | | | 1 |
| <i>Anser anser</i> | | 1 | | | | | | | | | | | 1 |
| <i>Anser</i> sp. | | | 1 | | | | | | | | | | 1 |
| <i>Anas platyrhynchos</i> | 2 | | | | | | | | | | | | 2 |
| <i>Anas querquedula</i> | 1 | | | | | | | | | | | | 1 |
| <i>Anas clypeata</i> | 2 | | | | | | | | | | | | 2 |
| <i>Aythya ferina</i> | | 1 | | | | | | | | | | | 1 |
| <i>Aythya fuligula</i> | 1 | | | | | | | | | | | | 1 |
| <i>Haliaeetus albicilla</i> | | 1 | | 1 | 2 | | 1 | 1 | 4 | | | | 1 |
| <i>Tetrao tetrix</i> | | | | 1 | | | | | | | | | 1 |
| Aves indet. | | | | | | 1 | | | | 1 | 1 | 4 | |
| ŠDP / NISP: | 11 | 6 | 1 | 2 | 2 | 1 | 4 | 1 | 4 | 1 | 1 | 4 | 38/16 |

Razred: Ptiči (Aves)

Red: **Ponirki** (Podicipediformes)

Čopasti ponirek *Podiceps cristatus* (Linnaeus, 1758)

Recentno: Stalnica, gnezdi in prezimuje na večjih stoječih vodah, prehranjuje se z ribami in drugimi vodnimi živalmi.

Red: **Veslonožci** (Pelecaniformes)

Veliki kormoran *Phalacrocorax carbo* (Linnaeus, 1758)

Recentno: Prezimuje na večjih tekočih in stoječih vodah, prehranjuje se z ribami.

Red: **Plojkokljuni** (Anseriformes)

Labod grbec *Cygnus olor* (Gmelin, 1789)

Recentno: Gnezdi in prezimuje ob večjih vodah, vsejed, hrano nabira v vodi.

Siva gos *Anser anser* (Linnaeus, 1758)

Recentno: Prezimuje ob večjih vodah, preletnik, vsejed, hrano nabira v plitvi vodi in mokriščih.

Gos *Anser* sp.

Recentno: Prezimuje ob večjih vodah, preletnik, vsejed, hrano nabira v plitvi vodi in mokriščih.

Mlakarica *Anas platyrhynchos* Linnaeus, 1758

Recentno: Gnezdi in prezimuje ob vseh vodah, vsejed, hrano nabira v vodi in mokriščih.

Reglja *Anas querquedula* Linnaeus, 1758

Recentno: Redek gnezdilec na stoječih vodah, selivka, vsejed, prehranjuje se v plitvinah z bogato vodno vegetacijo.

Raca žličarica *Anas clypeata* Linnaeus, 1758

Recentno: Redek gnezdilec na stoječih vodah, seliv-

In total there were 16 bird individuals identified, belonging to 11 species (Tab. 9.1). Here is the zoological overview of the finds and a short ecological species description for the recent birds:

Class: **Birds** (Aves)

Order: Podicipediformes)

Great crested grebe *Podiceps cristatus* (Linnaeus, 1758)

Recent: Resident, nests and winters on large still waters, feeds on fish and other aquatic animals.

Order: Pelecaniformes

Cormorant *Phalacrocorax carbo* (Linnaeus, 1758)

Recent: Winters on large flowing or still waters, feeds on fish.

Order: Anseriformes

Mute swan *Cygnus olor* (Gmelin, 1789)

Recent: Nests and winters near large bodies of water, omnivore that feeds in water.

Greylag goose *Anser anser* (Linnaeus, 1758)

Recent: Winters near large bodies of water, passage migrant, omnivore that feeds in shallow water and wetlands.

Geese *Anser* sp.

Recent: Winters near large bodies of water, passage migrant, omnivore that feeds in shallow waters and wetlands.

Mallard *Anas platyrhynchos* Linnaeus, 1758

Recent: Nests and winters near all types of waters, omnivore that feeds in water and wetlands.

Garganey *Anas querquedula* Linnaeus, 1758

ka, vsejed, prehranjuje se v plitvinah z bogato vodno vegetacijo.

Sivka *Aythya ferina* Linnaeus, 1758

Recentno: Gnezdilec na stoječih vodah, zimski gost, vsejed, prehranjuje se v plitvinah in s potapljanjem.

Čopasta črnica *Aythya fuligula* (Linnaeus, 1758)

Recentno: Gnezdilec ob vodah, zimski gost, vsejed, prehranjuje se v plitvinah in s potapljanjem.

Red: **Ujede** (Falconiformes)

Belorepec *Haliaeetus albicila* (Linnaeus, 1758)

Recentno: Gnezdilec, zimski gost, naseljuje obsežna mokrišča, prehranjuje se pretežno z ribami.

Red: **Kure** (Galliformes)

Ruševac *Tetrao tetrix* (Linnaeus, 1758)

Recentno: Stalnica, živi na travniških nad gozdno mejo, vsejed, prehranjuje se z jagodičevjem in drugimi plovci ter z žuželkami.

3.1 Ekološka oznaka avifavne

V vzorcu iz Zaloga so zastopane ptice, ki naseljujejo vodne in močvirne življenjske prostore. Ekološki razpon habitatov, ki jih zasedajo obravnavane vrste, obsega velike stoječe ali počasi tekoče vode (čopasti ponirek, kormoran, čopasta črnica, sivka), plitvine z bogato vegetacijo (labod grbec, reglja), mokrišča z nizko vegetacijo (gosi) in obsežne močvirne gozdove (belorepec). V ekološkem vidiku od preostalih vodnih vrst izstopa ruševac, njegov habitat so travniška nad gozdno mejo.

Recentni statusi ugotovljenih vrst na najdišču Zalog so glede na letni čas prisotnosti na Barju različni in obsegajo več oblik. Nekatere vrste so stalnice: mlakarica, čopasti ponirek (gnezdijo na obravnavanem območju in se skozi celotno sezono zadržujejo v širši okolici gnezdišča), nekaj vrst je selivk: reglja, raca žličarica (gnezdijo na obravnavanem območju, pred zimo se odselijo v južnejše kraje, v obdobju selitev se jim pridružijo seleči se osebkovi severnejših populacij), prisotni so tudi zimski gosti: kormoran, gosi (na obravnavano območje pridejo samo v zimskem času, praviloma gnezdijo severneje).

Iz prisotnosti različnih ekoloških kategorij ptic glede na njihov status oz. letni čas, v katerem se posamezne vrste zadržujejo na Barju, lahko sklepamo na obdobje, v katerem so bile ptice ulovljene. V vzorcu iz Zaloga so z vidika obdobja prisotnosti na Barju zastopane tako vrste, ki so na Barju samo v poletnem času,

Recent: Rarely nests near still waters, migratory bird, omnivore that feeds in shallows with rich aquatic vegetation.

Shoveler *Anas clypeata* Linnaeus, 1758

Recent: Rarely nests near still waters, migratory bird, omnivore that feeds in shallows with rich aquatic vegetation.

Common pochard *Aythya ferina* Linnaeus, 1758

Recent: Nests on still waters, winter visitor, omnivore that feeds in shallows and by diving.

Tufted duck *Aythya fuligula* (Linnaeus, 1758)

Recent: Nests on water, winter visitor, omnivore that feeds in shallows and by diving.

Order: Falconiformes

White-tailed eagle *Haliaeetus albicila* (Linnaeus, 1758)

Recent: Inhabits and nests on vast wetlands, winter visitor, feeds predominantly on fish.

Order: Galliformes

Black grouse *Tetrao tetrix* (Linnaeus, 1758)

Recent: Resident, lives on grassland above the tree-line, omnivore that feeds on berries and other fruit as well as insects.

3.1 Ecological description of the avifauna

The sample from Zalog includes birds that inhabit aquatic and marshy habitats. The ecological range of the habitats of the species under investigation includes large still or slow flowing waters (great crested grebe, cormorant, tufted duck, common pochard), shallows with rich vegetation (mute swan, garganey), wetlands with low-growing vegetation (geese) and vast marshy forests (white-tailed eagle). Ecologically speaking, black grouse stands out from other aquatic species, since its habitat is grassland above the tree-line.

The identified species on the Zalog site show various recent statuses, based on the seasonal presence at the Ljubljansko barje, and include several forms. Some species are residents: mallard, great crested grebe (nesting in the area and staying in the surrounding area throughout the season), some species are migratory: garganey, shoveler (nesting in the area and migrating to the south before winter, joined in their migration by individuals of the northern populations), and some species are winter visitors: cormorant, geese (come to the area only in winter and usually nest more to the north).

The presence of various ecological categories of birds according to their status or season in which a particular species stays at the Ljubljansko barje allows for a supposition as to the season in which the birds were caught. The Zalog site yielded species which appear at the Ljubljansko barje either in summer or in winter

kot vrste zimskega obdobja, pa tudi vrste, ki so na Barju celo leto. Na vprašanje, ali imamo na najdišču v Zalogu opravka s kratkotrajno ali časovno dolgoživo naselbino, se ponujata dve razlagi. Po prvi možnosti je bila naselbina obljudena skozi vse letne čase, kar pomeni, da so se ljudje na njej zadrževali vsaj eno sezono. Po drugi možnosti je bila naselbina aktivna krajše obdobje v prehodnem obdobju pomladi ali jeseni, v tem obdobju se ptice selijo. Dvome glede časovnega razpona obstoja naselbine bi najlažje razrešili z obsežnim izkopavanjem najdišča.

3.2 Pomen ptic v prehrani ljudi

Domnevamo, da so kosti ptic in drugih živali ostanki prehrane mezolitskih ljudi. V prid domnevi o ostankih prehranjevanja govorijo sočasne najdbe številnih kamnitih in koščenih izdelkov ter kosti sesalcev. Število najdenih ptičjih kosti ni visoko ($\text{ŠDP}_{\text{ptičji}}=38$), prav tako ni visok delež ptic v primerjavi s sesalci ($\text{ŠDP}_{\text{sesalci}}=423$) (Toškan, Dirjec, v tem zborniku). Med ostanki sesalcev prevladujejo kosti jelenov in divjih prašičev, njihova masa in količina mesa bistveno presegata maso ptičev. Glede na relativno nizko zastopnost ptičjih kosti v primerjavi z drugimi živalskimi ostanki sklepamo, da so ptice predstavljale dopolnilni vir hrane.

3.3 Primerjava z dosedanjimi raziskovanji in recentno avifauna

Na arheoloških najdiščih na Ljubljanskem barju je bilo do leta 2004 ugotovljenih 36 vrst ptic (Janžekovič, Malez, Velušček 2004). Iz ostankov tabora mezolitskih lovcev v Zalogu smo ugotovili 3 nove vrste za seznam arheo-avifaune (čopasti ponirek, belorepec in ruševca). Ekološke značilnosti večine ptic iz dosedanjih arheoloških najdišč pa tudi iz Zaloga izkazujejo prilagoditve na vodne in močvirne biotope.

V primerjavi z recentno favno je danes belorepec izjemno redek gost. Prisotnost ruševca, ki živi na planinskih travnikih, na Barju ni bila pričakovana. Razlaga za prisotnost ruševca je možna v slučajnem priletu ruševca na Barje, kjer je postal plen lovcev, ali pa so ga ulovili na bližnjih planinah in ga prinesli s seboj. Preostale ptice iz arheološkega obdobja so bolj ali manj pogosto zastopane tudi v današnjem času.

only as well as species that appear here throughout the year. This, in turn, offers two interpretations as to the duration of the site. According to the first interpretation, the site was settled for a longer period, at least throughout one season. The second interpretation of a short-lived settlement signifies human presence in a transitory period in either spring or autumn when the birds migrate. Questions as to the time span of the settlement would most easily be resolved with further excavation of the site.

3.2 Significance of birds in human diet

It is supposed that the bones of birds and other animals represent the food remains of the Mesolithic people. This would be confirmed by contemporary finds of numerous stone and bone products as well as bones of mammals. The number of identified specimens is not high ($\text{NISP}_{\text{birds}}=38$), the share of birds in comparison with mammals is also not high ($\text{NIS}_{\text{mammals}}=423$) (Toškan, Dirjec, in this publication). Of the mammal remains red deer and wild boar remains predominate, their weight and quantity of meat substantially exceeds that of the birds. The relatively low presence of bird bones in comparison to other animal remains enables the supposition that the birds represented a supplementary food source.

3.3 Comparison with existing research and recent avifauna

Until 2004, 36 bird species were identified at the archaeological sites of the Ljubljansko barje (Janžekovič, Malez, Velušček 2004). The remains of the Mesolithic hunting camp at Zalog yielded 3 new species to be added to the list of the archaeo-avifauna (great crested grebe, white-tailed eagle and black grouse). Ecological characteristics of most birds from the previously discovered archaeological site as well as from Zalog exhibit adaptations to aquatic and marshy biotopes.

In comparison to the recent fauna, the white-tailed eagle is nowadays an extremely rare visitor at the Ljubljansko barje. The presence of the black grouse at the Ljubljansko barje, on the other hand, was not expected, since it otherwise inhabits mountain grassland. Their presence can be explained in two ways: either the individual bird had accidentally flown into the Ljubljansko barje where it then fell prey to the hunters or the latter had caught the bird in the near-by mountains and then brought it with them. Other birds from the archaeological period in question are more or less frequent also today.

10

OSTANKI RIB

FISH REMAINS

Marijan GOVEDIČ

Izvleček

Na arheološkem najdišču Zalog pri Verdu je bilo najdenih več lobanjskih kosti rib in eno vretence. Vsi ostanki v vzorcu pripadajo ščuki.

Ključne besede: Slovenija, Ljubljansko barje, mezolitik, ribe (*Pisces*), arheozoologija

Abstract

The archaeological site of Zalog near Verd yielded several fish skull bones and a vertebra. All remains in the sample belong to the pike.

Key words: Slovenia, the Ljubljansko barje, Mesolithic, fish (*Pisces*), archaeozoology

1 UVOD

Arheološko najdišče Zalog pri Verdu je eno izmed mnogih arheoloških najdišč iz predkovinskih obdobjih prazgodovine na Ljubljanskem barju, vendar je bil kostni material tokrat prvič pobran pri podvodnih raziskavah. Ostanki recentnih vrst rib so bili do sedaj sistematično pobrani le na koliščarskih najdiščih Hočevarica (Govedič 2004) in Črešnja (Velušček *et al.* 2004). Ribji ostanki na ostalih koliščih (Ižanska kolišča, Notranje Gorice) so bili pobrani naključno, kar se odraža tudi v manjšem številu vrst rib (Dežman 1875; Rakovec 1955; Drobne 1973; Greif 1998; Govedič 2005). Do sedaj je z najdišč na Ljubljanskem barju poznanih 7 vrst rib: krap (*Cyprinus carpio* Linnaeus, 1758), ščuka (*Esox lucius* Linnaeus, 1758), som (*Silurus glanis* Linnaeus, 1758), rdečeperka (*Scardinius erythrophthalmus* (Linnaeus, 1758)), navadni ostriz (*Perca fluviatilis* Linnaeus, 1758), rdečeoka (*Rutilus rutilus* (Linnaeus, 1758)) in linj (*Tinca tinca* (Linnaeus 1758)). Vse te vrste na območju Ljubljanskega barja živijo še danes.

2 METODE

Arheološko najdišče Zalog pri Verdu datira v zgodnji holocen in leži v strugi potoka Ljubija ob ledini Zalog pri Verdu (Gaspari, Erič, v tem zborniku). V pregled sem dobil že sortirano frakcijo, v kateri so bili večji ribji ostanki (*tab. 10.1*). Material sem določil s pomočjo

1 INTRODUCTION

The archaeological site of Zalog near Verd is one of a number of archaeological sites dating from the pre-metal periods of prehistory at the Ljubljansko barje, but it is the first where the bone material has been collected in underwater research. So far, the remains of recent fish species were systematically collected only at the pile dwellings of Hočevarica (Govedič 2004) and Črešnja (Velušček *et al.* 2004). Fish remains at other sites (the Ig pile dwellings, Notranje Gorice) were collected by chance, which is reflected also in a low number of fish species (Dežman 1875; Rakovec 1955; Drobne 1973; Greif 1998; Govedič 2005). Up to the present moment, there are 7 fish species recorded on the sites of the Ljubljansko barje: carp (*Cyprinus carpio* Linnaeus, 1758), pike (*Esox lucius* Linnaeus, 1758), wels (*Silurus glanis* Linnaeus, 1758), rudd (*Scardinius erythrophthalmus* (Linnaeus, 1758)), perch (*Perca fluviatilis* Linnaeus, 1758), roach (*Rutilus rutilus* (Linnaeus, 1758)) and tench (*Tinca tinca* (Linnaeus 1758)). All these species still live in the area today.

2 METHODS

The Zalog near Verd archaeological site dates to the Early Holocene and lies in the bed of the Ljubija Stream at the Zalog near Verd fallow (Gaspari, Erič, in this publication). A previously sorted fraction of the material was given to be analysed, containing large

| Vzorec št. / <i>Sample no.</i> | Kost / <i>Bone</i> | Osebek / <i>Individual</i> |
|-----------------------------------|---|-------------------------------|
| LZ 120 | <i>Os palatinum</i> | C |
| LZ 108 | <i>Os palatinum</i> (leva / <i>left</i>) | C |
| LZ 034 | <i>Os palatinum</i> | A |
| | <i>Vertebra</i> | A |
| | <i>Os dentale</i> (leva / <i>left</i>) | A |
| LZ 084 | <i>Os dentale</i> (leva / <i>left</i>) | B |
| LZ 074 | <i>Os dentale</i> (desna / <i>right</i>) | C |
| LZ 106 | <i>Os dentale</i> (desna / <i>right</i>) | D |

lastne primerjalne zbirke in literature (Mehner 1990). Nomenklatura rib je povzeta po Povž (1999).

3 REZULTATI IN RAZPRAVA

Vsi ostanki rib v vzorcu pripadajo ščuki. Najdene so bile nebne kosti - nebica (*os palatinum*), spodnja čeljust (*os dentale*) ter eno vretence. Na podlagi velikosti kosti ocenjujem, da so bili najdeni ostanki najmanj štiri osebkov ščuk (*tab. 10.1*). Razlog, da so se ohranile oziroma bile najdene samo te kosti ni naključen. Nebnice in spodnje čeljusti so poleg vretenc ene izmed bolj masivnih kosti, predvsem pa imajo ugodno (majhno) razmerje med površino in volumnom. Tako so manj podvržene razkroju ali lomu.

Ostanki ščuke so bili na Ljubljanskem barju najdeni tudi na najdišču Hočevarica in Črešnja pri Bistri, prav tako pa so ostanki ščuke prisotni med Dežmanovimi izkopaninami z izjanskimi kolišč (Dežman 1875; Govedič 2004; Velušček *et al.* 2004). Ker je Zalog izmed teh najdišč najstarejše, so to najstarejši dokumentirani ostanki ščuke na ozemlju Slovenije. Ščuka je bila najdena tudi na številnih drugih najdiščih po Evropi, od mezolitika do bronaste dobe (Nalbant 1970; Prinz 1987; Torke 2000; Hüstler-Plogmann, Leuzinger 1995).

Iz velikosti najdenih fragmentov ocenjujem, da so ti pripadali več kilogramov težkim ščukam. Podobno velike ostanke je izkopal Dežman (1875). Po ponovnem pregledu materiala s Hočevarice, ki ni bil biometrično obdelan (Govedič 2004), sklepam, da so osebki z najdišča Zalog pri Verdu večji kot tisti s Hočevarice.

Ščuko uvrščamo med vrhunske plenilce. Večji del svojega življenja preživi v zavetju rastlin, kjer preži na plen. Naseljuje namreč z rastlinami zaraščene predele večjih stoječih in tekočih voda, na rastline pa odlaga tudi ikre. Drsti se od februarja do aprila v priobalnem pasu plitvih, mirnejših in z rastlinjem zaraščenih voda, lahko tudi na poplavljenih travnikih. To je čas, ko se topita sneg in led, okolica pa je lahko deloma še vedno pokrita s snegom. Ščuka se namreč drsti pri temperaturi vode 8-10 °C. V času drsti pa jo je bilo verjetno ljudem tudi najlažje ujeti. V času drsti je verjetno lov na ščuko predstavljal alternativo lovu

Tab. 10.1: Ostanki ščuk z najdišča Zalog pri Verdu. Podana je tudi ocena minimalnega števila različnih osebkov. *Tab. 10.1*: Pike remains from the Zalog near Verd site. The minimal animal unit estimate is also given.

fish remains: skull bones and a vertebra (*Tab. 10.1*). The material was identified with the aid of our own comparative collection and with the literature (Mehner 1990). Fish nomenclature is taken from Povž (1999).

3 RESULTS AND DISCUSSION

All fish remains in the sample belong to the pike. They include palatine bones (*os palatinum*), dentaries (*os dentale*) and a vertebra. Based on bone size, I estimate that the recovered bones belong to at least four pike individuals (*Tab. 10.1*). It is not a coincidence that only these particular bones came to be preserved. Palatine bones and dentaries are, beside vertebrae, the most massive bones and, more importantly, they have an advantageous (small) surface to volume ratio. They are, therefore, less prone to decay or breakage.

At the Ljubljansko barje, pike remains were so far found at the sites of Hočevarica and Črešnja near Bistra and were also present among Dežman's finds from the Ig pile dwellings (Dežman 1875; Govedič 2004; Velušček *et al.* 2004). Since the Zalog near Verd is the oldest of the enumerated sites, its remains are, therefore, the oldest documented pike remains on the Slovene territory. Pike was found on numerous other sites across Europe, dating from the Mesolithic to the Bronze Age (Nalbant 1970; Prinz 1987; Torke 2000; Hüstler-Plongmann, Leuzinger 1995).

The size of the collected fragments indicates that they belonged to pikes weighing several kilograms. Similarly large remains were excavated by Dežman (1875). Based on a re-examination of the material from Hočevarica that has not yet been biometrically analysed (Govedič 2004), I conclude that the individuals from the Zalog near Verd site are larger than those found at Hočevarica.

The pike ranks among top predators. The large part of its life it spends in the shelter of aquatic plants where it lurks for its prey. It inhabits standing and flowing waters with rich vegetation and deposits its eggs onto plants around it. It spawns from February to April along the banks of shallow, calm waters with rich vegetation, even on flooded grassland, at temperatures of 8-10 °C. This is the period of melting snow and ice while the banks of the waters are still covered by ice. It is also the period when the pike was an easy

na sesalce. Belo meso ščuke je sicer visoko cenjeno a pusto in v primeru ujetja pred drstjo so prišli tudi do pomembnega zgodnjepomladanskega vira maščob (ikre). Slednji je bil še posebej pomemben, saj so ptice selivke v tem času že zapuščale prezimovališča, ptice gnezdilke pa še niso gnezdile in ptičja jajca, ki predstavljajo pomemben vir beljakovin in maščob, niso bila dostopna.

Kakšen je bil posredni ali neposredni pomen rib za ljudi, ni znano, saj se tej tematiki ni posvečalo dovolj pozornosti. Prinz (1987) za mezolitsko najdišče Vlasac ob reki Donavi ocenjuje, da je bil ribolov vsekakor mnogo bolj pomemben v primerjavi z lovom na sesalce. Lov nekaterih vrst rib, še posebej na drstiščih, je mogoč z enostavnimi metodami, kot je pobiranje s koli, kamni ali skalami.

Na Ljubljanskem barju z najdiščem Zalog pri Verdu časovno okvirno sovпада najdba harpune (Turk 2004), ki jo lahko povežemo predvsem z lovom na večje ribe, med katere uvrščamo tudi ščuke.

Največji pomen, tudi z biološkega stališča, pomeni starost najdbe. Klimatsko gledano 8. tisočletje pr. n. št. uvrščamo v obdobje boreala. Spremembe po zadnji ledeni dobi na kopnem, predvsem s stališča vegetacije, so v literaturi dobro dokumentirane. O dogajanju v vodnih ekosistemih je znanega zelo malo. Z modernimi genetskimi metodami danes lahko sklepamo o dogajanju v preteklosti, samih materialnih dokazov pa je zelo malo. Najdbo ščuke tako lahko uvrstimo med prve dokazane vrste rib, ki so naselile to območje po zadnji ledeni dobi. Danes je ščuka razširjena v celotni Evropi, živi tudi v jezerih na Finskem in Švedskem. Za primerjavo z današnjim stanjem povejmo, da ščuko najdemo v Blejskem jezeru, v reki Savi pa dol vodno od Kranja (Šumer, Povž 1997). Na območju Ljubljanskega barja živi danes v Ljubljanici in večjih pritokih.

prey to humans. During the spawning period, pike fishing probably represented an alternative to mammal hunting. The white meat of a pike is highly sought after but fatless. If caught before spawning, however, its eggs represent an important source of fat during the early spring period. This was all the more important, since migratory birds were already leaving their wintering nests at this time while the nesting birds did not yet begin to nest, hence their eggs, an important source of albumen and fat, were not yet available.

The importance, direct or indirect, of fish for human nutrition cannot be assessed, since the topic has not been given enough attention. For the Mesolithic site of Vlasac at the Danube River, Prinz (1987) estimates that fishing was certainly of a much higher importance in comparison to mammal hunting. Fishing for certain species, particularly in spawning ground, is possible by using simple methods such as killing with sticks, stones or rocks.

The Mesolithic harpoon, found at the Ljubljansko barje (Turk 2004), is approximately contemporary with the site of Zalog near Verd while its use is tied mainly to hunting for large fish, such as, in fact, the pike.

The greatest importance, from the biological as well as other standpoints, represents the age of the find. Climatically, the 8th millennium BC falls in the time of the Boreal period. The changes that occurred after the last ice age, particularly concerning vegetation, are well documented in the literature. Very little, however, is known of the situation in water ecosystems. Modern genetic methods allow for conclusions to be drawn for the past while the material evidence, on the other hand, is scarce. The find of the pike can, therefore, be classified among the first documented fish species that populated this area after the last ice age. The pike is nowadays present across Europe and lives also in the lakes in Finland and Sweden. In Slovenia, it may be found in Lake Bled and in the Sava River, downstream from Kranj (Šumer, Povž 1997). In the Ljubljansko barje area, the pike nowadays lives in the Ljubljanica River and its large tributaries.

ZALOG PRI VERDU. BAZNI TABOR LOVCEV NA OBREŽJU JEZERA?

ZALOG NEAR VERD. HUNTERS' BASE CAMP ON THE SHORES OF A LAKE?

Andrej GASPARI in Boris KAVUR

Izvleček

Zalog pri Verdu je prvo kamenodobno najdišče v Sloveniji, ki je bilo odkrito in raziskano v okviru podvodnih raziskav, hkrati pa sodi med najstarejše zanesljivo datirane sledove človeške prisotnosti na Ljubljanskem barju. Uničen in raziskan manjši del večjega najdišča, pri čemer lahko, upoštevajoč podatke o odkriti favni, koščenih in kamnitih orodjih, določimo tudi funkcijo dela najdišča. Domnevamo, da gre za poseben prostor aktivnosti, na katerem so razkosavali prinesen lovski plen. V kontekstu dejavnosti, ki so se odvijale na dokumentiranem delu najdišča, je intrigantna prisotnost lobanje 20 do 34 let stare ženske.

Ključne besede: Ljubljansko barje, arheologija, mezolitik

Zalog pri Verdu je prvo kamenodobno najdišče v Sloveniji, ki je bilo odkrito in raziskano v okviru podvodnih raziskav, hkrati pa sodi med najstarejše zanesljivo datirane sledove človeške prisotnosti na Ljubljanskem barju. Plasti s kulturno vsebino je razkrilo migriranje struge Ljubije, ki na tem mestu danes tvori velik okljuk. Sodeč po obsegu plasti in razprostranjenosti artefaktov v strugi je očitno, da gre za najdišče v obsegu več sto kvadratnih metrov, ki se širi vsaj proti vzhodu, zelo verjetno pa tudi na zahodni breg potoka. Razmeroma ostro zamejen pojav artefaktov, ostanek navpičnega lesenega nosilca ter koncentriranje večjih kamnov, interpretiranih kot ostankov struktur, dopuščajo sklepanje, da najdbe ob odkritju niso ležale daleč od svojega originalnega položaja.

Kljub omejenemu naboru podatkov, s katerimi razpolagamo po prvi fazi raziskav, je moč na podlagi predstavljenih naravoslovnih študij podati nekaj domnev o procesih, ki so preoblikovali prvotne kontekste in privedli do dokumentirane podobe najdišča in okolice. V dinamiki okoljskih sprememb je igralo ključno vlogo rečno preoblikovanje površja, ki ga v poenostavljeni interpretativni shemi označujemo z

Abstract

Zalog near Verd is the first Stone Age site in Slovenia that was discovered and investigated using underwater research methodology. Only a small part of a larger site was destroyed, its remains subsequently researched and its function determined using the data from the uncovered fauna as well as bone and stone tools. The site is supposed to represent a special area of activity where the hunting prey was butchered. The context of the activity that took place on the documented part of the site includes an intriguing find of a skull belonging to a 20- to 34-year-old woman.

Key words: Slovenia, the Ljubljansko barje, archaeology, Mesolithic

Zalog near Verd is the first Stone Age site in Slovenia that was discovered and investigated using underwater research methodology. It is also one of the earliest securely dated traces of human presence at the Ljubljansko barje. The discovery of the layers with cultural content occurred due to the migrations of the Ljubija Stream bed that forms, at present, a large bend at the site. The extent of the layers as well as the distribution of the artefacts clearly show that the site extended over several hundred square metres and continued towards the east and very probably also to the west bank of the stream. The relatively sharply limited appearance of artefacts and the remains of a vertical wooden post on the one hand, and the concentration of large stones, on the other, allow for the conclusion that at the time of discovery the finds did not lie far from their original position.

The first phase of research yielded only limited data. Nevertheless, the above-presented scientific studies allow for certain suppositions as to the processes that altered the original contexts and brought about the documented state of the site and its surroundings. It is known, however, that the dynamics of the environmental change were largely influenced

dvema nizoma erozijskih in akumulacijskih procesov.

Na prvi dogodek oz. zaporedje dogodkov opozarja stratigrafska lega arheoloških najdb na ostrem prehodu med jezerskimi sedimenti iz konca glaciala ali preboreala in peščeno-glinastimi naplavinami, ki so se odlagale v poplavni ravnini. Intenzivnost procesa erozije nakazuje paleobotanična analiza, iz katere je razvidno, da poleg sedimentov iz časa trajanja najdišča manjkajo tudi sedimenti s pelodom primarnih gozdnih združb iz končnih faz pleistocena (*Pinus-Betula*).

Med naplavljenim materialom, ki tvori horizont s presedimentiranimi predmeti, so bile poleg peloda, plodov, semen in listov že povsem toplodobne kopenske vegetacije ugotovljene tudi alge in semena vodnih rastlin, značilnih za stoječe ali počasi tekoče vode, ter poklopci hišic vodnih polžkov. Sodeč po starosti organskega derita iz najnižjega dela horizonta na južnem delu najdišča, se proces formiranja horizonta s kulturnim inventarjem ni zaključil pred 5500 PS. Domnevamo, da gre pri horizontu naplavin s kulturno vsebino za odraz širših klimatskih sprememb.

Zanimiva je primerjava s sedimentacijo na območju bližnjega kolišča Hočevarica, kjer se jezerski in močvirski sedimenti vrstijo še dobra dva metra proti površju, gledano absolutno. Precejšnja debelina izmenjujočih fluvialnih depozitov in pokopanih tal (več kot 3 m), ki v Zalogu prekrivajo kamenodobni horizont kot najnižji del tega niza, ne preseneča, saj sta bila erozija in posebej naplavljanje najintenzivnejša ravno v bližini izvirov predhodnikov Ljubljance in njenih pritokov.

Do resedimentiranja dela najdb iz pokopanih plasti v današnjo strugo je prišlo kot posledica drugega sklopa poodložitvenih procesov, erozijskega delovanja Ljubije. Ozko zamejen pojav najdb po toku navzdol od horizonta s kulturno vsebino izpričuje, da ti procesi niso imeli bistvenjšega vpliva na distribucijo najdb. Opazovan vzorec kaže dokaj enotno razprostranjenost vseh velikostnih razredov kamnitega gradiva ter enakomerno zastopanost favnističnih skeletnih elementov različne mobilnosti, kar bi lahko kazalo na podobne hidrološke razmere, kot so vladale v času erozije originalnih plasti s kulturnim inventarjem.

V prizmi odsotnosti primarnih kontekstov (ostanki hodnih površin in sedimentov, ognjišča, bivalne strukture...) nam pri opredelitvi značaja najdišča služijo njegov obseg, radiokarbonske datacije, opredelitev artefaktnega zbira ter njegova distribucija, analiza določljivih skeletnih ostankov živali ter domnevni ostanki struktur iz lesa in kamna.

Radiokarbonska datacija kolagena iz človeške lobanje je pokazala konvencionalno starost 8745 ± 35 PS, lesenega pilota 7964 ± 39 PS in enega od debel v paleostrugi 8415 ± 30 PS. Medtem ko lahko za pilot sklepa-

by surface transformation through river activity that is characterized, within a simplified interpretative framework, with two sets of processes, those of erosion and accumulation.

The first event or series of events is indicated by the stratigraphic position of archaeological finds on the sharp transition between the lacustrine sediments from the end of the Glacial or Pre-Boreal and the sandy-clayey alluvia deposited on the floodplain. It is the palaeobotanic analysis that indicated the intense process of erosion there by showing that the sediments from the time of the duration of the site are lacking those with the pollen of the primary forests from the final phases of the Pleistocene (*Pinus-Betula*).

The alluvial material forming the horizon with the resedimented finds contained pollen, fruits, seeds and leaves of a completely warm-period land vegetation, found together with algae and seeds of water plants, characteristic of still or slowly flowing waters, as well as opercula of water snails. The age of the organic detritus from the lowest part of the horizon on the southern part of the site indicate that the process of horizon formation with its cultural contents did not terminate prior to 5500 BP.

The comparison with the sedimentation on the area of the near-by pile-dwelling site of Hočevarica is also telling. There the lacustrine and moory sediments succeed each other, in absolute terms, over two metres towards the surface. The considerable thickness of the alternating fluvial deposits and buried soil (over 3 m), that cover the Mesolithic horizon at Zalog as the lowest lying part of the series, is not surprising, since the erosion and particularly the alluviation was most intense precisely in the vicinity of the sources where the predecessors of the Ljubljana and its tributaries sprang up. It is supposed that the alluvial horizon with its cultural contents reflects wider climatic changes.

The resedimentation of a part of the finds from the buried layers into the present bed occurred due to the second set of post-depositional processes, that is the erosive action of the Ljubija. The distinctly limited appearance of finds downstream from the horizon with the cultural contents indicates that these processes did not greatly influence the distribution of the finds. The observed sample shows a fairly uniform distribution of all size classes of stone material as well as an even representation of faunistic skeletal elements of varied mobility. This would indicate comparable hydrological conditions as those in the time of erosion of the original layer with the Mesolithic contents.

In the absence of primary contexts (remains of floor surfaces and sediments, hearths, residential structures, other), the identification of the nature of the site is aided by its extent, the radiocarbon dates, the determination of the artefact assemblage and its distribution, the analysis of identifiable skeletal re-

mo na okvirno sočasnost z ostalim arheološkim gradivom, pa za domnevo o vodoravno ležečih kosih lesa in deblih v polnilu paleostruge kot ostankih konstrukcij še ni trdnejših dokazov. Večja debela v zgornjem delu sekvence peščenih sedimentov so bila skoraj zagotovo naplavljena.

Odrpto ostaja tudi vprašanje, ali so najdbe sočasne ali pripadajo različnim časovnim intervalom in izvirajo iz več zaključenih stratigrafskih kontekstov. Vsekakor ni izključena možnost, da gre za lokacijo, ki je bila obiskovana oz. poseljena skozi daljše časovno obdobje.

Glede na dokaj enakomerno distribucijo najdb v strugi in sedimentih kulturnega horizonta lahko podamo oceno, da velikost najdišča bistveno presega 500 m², s čimer bi se Zalog uvrščal med obsežnejša plana najdišča zgodnjega holocena (prim. Kind 2003, 276).

Najdišče leži na prisojni lokaciji in je tristo metrov oddaljeno od strmega severovzhodnega pobočja Javorča, ki je bilo v borealu kot ostalo obrobje Ljubljanskega barja poraslo z mešanim gozdom (*Quercetum mixtum*) brešta, lipe, hrasta, jesena in javorja. Poleg glavnih elementov so ga sestavljali še bor, smreka, breza, vrba in jelša, že od prej pa so bile prisotne leska, bukev in jelka (Šercelj 1996, 28-36,56,57).

Na pomen gozda v ekonomiji obravnavane skupnosti opozarja analiza skeletnih ostankov živali, ki je pokazala na izrazito prevlado jelena (61,6 %) in divjega prašiča (28,9 %), z več najdbami pa so zastopani še tur, jazbec, srna, bober, divja mačka in rjavi medved.

O dopolnilnih virih hrane, ki so jih zagotavljali vodni in močvirski habitati v okolici, smemo domnevati na podlagi kvantitativno precej skromnejših ostankov ptic in rib, ki pripadajo več kilogramov težkim ščukam. Med ptiči so v vzorcu iz Zaloga zastopani čopasti ponirek, kormoran, čopasta črnica, sivka, labod grbec, reglja, gosi in belorepec, v ekološkem smislu pa izstopa ruševca, ki živi na travniških nad gozdno mejo in za katerega lahko najverjetneje domnevamo transport z bolj oddaljenih lovišč. Ne gre spregledati, da so velik del dnevnih potreb po kalorijah verjetno zagotovili z nabranimi rastlinami, žabami, polži in ličinkami, ki v arheološkem zapisu manjkajo.

Že izkoriščanje lokalnih virov surovin za kamnita orodja nakazuje, da skupnost ni bila rezidenčno mobilna, temveč specializirana za dolgotrajno izkoriščanje lokalno omejenih virov. Na podlagi številnih kostnih ostankov sklepamo o prostoru posebnih dejavnosti, ki so se domnevno odvijale v okviru trajnejše semisidentarne naselbine večjega obsega. Načelno lahko za končni paleolitik in zgodnji mezolitik glede na majhne količine odkritih orodij na posameznih najdiščih domnevamo visoko stopnjo rezidenčne mobilnosti, hkrati pa se moramo zavedati tudi izjem - pa naj gre za velike kompleksne naselbine (Zemona II, Zalog pri

mains of animals as well as the supposed remains of structures of wood and stone.

The radiocarbon analysis of the collagen from the human skull has provided the conventional age of 8745±35 BP, wooden post of 7964±39 BP, while one of the trunks from the palaeochannel provided the date of 8415±30 BP. The post can be considered as approximately contemporary to the other archaeological material. Other horizontally lying pieces of wood and trunks in the fill of the palaeochannel, on the other hand, cannot as yet be confirmed as the remains of structures of the site due to the lack of hard evidence; the large trunks in the upper part of the sequence of sandy layers could easily be considered as alluvium. Another question that must remain unanswered is whether the finds are contemporary or belong to different time intervals and thereby originate from more than one closed stratigraphic context. The possibility of the site as a location that was visited or settled through a longer period is certainly not to be excluded.

Based on the fairly even distribution of finds in the bed and in the sediments of the cultural horizon, we may estimate that the size of the site substantially exceeds 500 m². This would classify Zalog among the more extensive plain sites of the Early Holocene (cf. Kind 2003, 276).

The site lies on a sun-exposed location within a three-hundred-metre distance from the steep north-eastern slope of Javorč. As all outskirts of the Ljubljansko barje during the Boreal, Javorč as well as overgrown with a mixed oak forest (*Quercetum mixtum*) of elm, lime, oak, ash and maple. The forest was further composed of pine, spruce, birch, willow and alder as well as hazel, beech and fir, the latter three present even previously (Šercelj 1996, 28-36,56,57).

The significance of the forest for the economy of the community in question is indicated by the analysis of the skeletal remains of animals that shows an overwhelming predominance of red deer (61.6%) and boar (28.9%), followed by aurochs, badger, roe deer, beaver, wild cat and brown bear, represented by several finds each.

Food supplement was provided by water and moor habitats in the vicinity, as may be conjectured on the basis of the remains, quite limited in quantity, of birds and fish, the latter belonging to pikes weighing several kilograms. The birds of the Zalog sample include great crested grebe, cormorant, tufted duck, common pochard, mute swan, garganey, geese, white-tailed eagle and black grouse, the latter standing out in the ecological sense, since it lives on grassland above the tree-line and for which transport from more distant hunting sites can be supposed. We have also to take into account the probability of most of the daily calorie intake being provided by gathered plants, frogs, snails and grub that are missing from the archaeological record.

Verdu) ali pa za točke, ki so tisočletja dolgo vedno znova privlačile poselitev (Breg pri Škofljici).

V primeru Zaloga pri Verdu je bil uničen in raziskan manjši del večjega najdišča, pri čemer lahko, upoštevajoč podatke o odkriti favni, koščenih in kamnitih orodjih, določimo tudi funkcijo dela najdišča. Funkcionalna jasnost najdišča pa predstavlja problem za kulturno opredelitev odkritih ostankov, saj je ta na podlagi kamnitih orodij težavna, nekoliko bolj izpovedna pa so orodja iz rogovine.

V mezolitiku smo na prostoru nekdanjega tardigravettiana priča tako fragmentaciji tradicionalnih kulturnih krogov kot tudi krizi interpretacij arheoloških ostankov. Očitno se v 9. tisočletju PS v osrednjem delu Balkana izoblikuje specifičen kulturni fenomen, ki je drugačen tako od mezolitika jadranskega prostora kot tudi od mezolitika Podonavja, ki oba temeljita na mikrolitizirani tradiciji tardigravettiana in vsebujeta številna geometrijska orodja. Na najdiščih s področja Železnih vrat in Ljubljanskega barja so bile odkrite kamnite industrije, kjer so skupnosti izkoriščale predvsem lokalne surovine slabše kvalitete. Vsem industrijam je skupno, da so temeljile na izdelavi odbitkov in ne klin ter da so vsebovale le redka geometrijska orodja.

Obdelava odkritega skupka kamnitih orodij je pokazala, da v izdelavo posebnih oblik ni bilo vložena veliko časa in energije - večino orodij predstavljajo retuširani odbitki. Na podlagi interpretacije tipoloških značilnosti kamenih orodij, vzorca vzdrževanja uporabljanih orodij, vzorca popravljanja poškodovanih orodij in vzorca izdelave in uporabe odbitkov lahko domnevamo, da najdišče predstavlja prostor aktivnosti, kjer so se pretežno izdelovala in uporabljala generalna in večnamenska orodja. Posebne oblike kamenih orodij se niso intenzivneje vzdrževale in uporabljale, drugače pa je bilo z generalnimi oblikami orodij, ki kažejo zraven višje odstotne zastopanosti tudi višjo stopnjo fragmentacije, ki jo lahko razložimo z intenzivnejšo uporabo. Domnevamo, da gre za poseben prostor aktivnosti, na katerem so razkosavali prinesen lovski plen. Taki prostori dejavnosti so se navadno nahajali na robu naselij oziroma izven naselij ob tekoči vodi. Na njih se odkriva generalne orodne tipe ter malo projektivov in specialnih orodij. Prisotna je predvsem izdelava večjih grobih orodij iz manj kvalitetnih surovin, odsotna pa je izdelava specialnih oblik orodij. Vzorci fragmentacije velikokrat kažejo, da so na najdišču prisotni odlomljeni deli orodij, poškodovana orodja pa so popravljali na drugih krajih.

Posebnost Zaloga so tudi bogate najdbe industrije iz kosti in rogovine, med katerimi izstopajo dvojne konice, v katerih lahko prepoznamo osti kopij, ter orodja z odprtino za pritrđitev na toporišče, ki bi jim še najbolj ustrezal izraz sekira. Poleg obdelave lesa in razkosavanja plena lahko njihovo uporabo verjetno

The exploitation of the local sources of raw material for stone tools indicates that the community was not residentially mobile but rather specialized for a long-term exploitation. The numerous bone remains reveal an area of special activities that presumably took place within a semi-sedentary settlement of a longer duration and larger extent. In principle, a high level of residential mobility may be supposed for the End Palaeolithic and Early Mesolithic considering the small amounts of uncovered tools on individual sites. At the same time, we should be aware of exceptions - whether large complex settlements (Zemona II, Zalog near Verd) or points that attracted settlement through millennia (Breg near Škofljica).

At Zalog near Verd, only a small part of a larger site was destroyed, its remains subsequently researched and its function determined using the data from the uncovered fauna as well as bone and stone tools. The functional clarity of the site, however, renders the cultural determination of the uncovered remains more difficult. The stone tools are of little help in that respect, while the antler tools are somewhat more telling.

The area of the former Tardi-Gravettian witnessed, during the Mesolithic, a fragmentation of traditional cultural circles which causes difficulties in interpreting the archaeological remains. Apparently, a particular cultural phenomenon emerged in the 9th millennium BP in the central Balkan area that was different from the Mesolithic of the Adriatic area or of the Danube basin; both based on the microlithic tradition of the Tardi-Gravettian and containing numerous geometric tools. The sites from both the Iron Gates and the Ljubljansko barje yielded stone industries for which the local communities primarily used local raw material of poorer quality. A common characteristic of these industries is that they were all based on the production of flakes instead of blades and included only few geometric tools.

The analysis of the uncovered assemblage of stone tools revealed that there was not much time or energy spent in producing specialized forms, since most tools are retouched flakes. Based on the interpretation of typological characteristics of stone tools, the maintenance pattern of tools used, the repair pattern of damaged tools and the pattern of production and use of flakes, we may suppose that the site represents an area of activity where general and multi-purpose tools were produced and used. Specialized forms of stone tools were not subjected to a more intense maintenance or use. The general tool forms, on the other hand, are represented in a higher number and show a higher level of fragmentation, which may be explained through a more intensive use. For the Zalog site, it is supposed that it represents a special area of activity where the hunting prey was dismembered. Such areas

povežemo z izkopavanjem korenin, vodnega rastlinja in živali, lukenj za pasti in podobno. Sekire imajo kljub ogromnemu številu sorodnih najdb v severni in zahodni Evropi neposredne analogije le v gradivu z okvirno sočasnih najdišč v Železnih vratih, kar skupaj s podobnostmi v kamnitem inventarju opozarja na pripadnost istemu kulturnemu krogu.

Večina podatkov napeljuje na sklep, da imamo v primeru najdišča v strugi Ljubije ob ledini Zalog opravka z robnim delom trajnejšega tabora, ki je ležal v bližini manjšega vodotoka ali jezera. Domnevne strukture iz lesa in kamna bi lahko pogojno interpretirali kot ostanke ploščadi, na kateri so razkosavali lovski plen ter obdelovali kost in roževino, bivalni del tabora pa bi morali iskati vstran od vode. Domnevo o trajnejšem značaju tabora do neke mere relativizira majhna zastopanost ostankov ekonomsko nezanemljivih skeletnih elementov in odsotnost kosti z najbolj mesnatih delov. To bi nakazovalo, da gre za začasni tabor, kjer se so se najbolj kvalitetni kosi plena pripravljali za transport do bazne naselbine. Po drugi strani predstavljajo ostanki rogovja kar dobro polovico vseh jelenjih najdb, kar nam skupaj s prisotnostjo odpadnega materiala in že odpadlih rogovij kaže na načrtno zbiranje te surovine.

Glede na odsotnost zoglenelega rastlinskega materiala nam lahko na vprašanje po obdobju leta, v katerem so se ljudje zadrževali na območju Zaloga, najbolj verodostojne odgovore ponudi analiza ostankov avifaune. Sodeč po rezultatih je bil tabor obljuden bodisi skozi vse letne čase ali pa le v prehodnem obdobju pomladi ali jeseni. Ker v gradivu sesalske makrofavne ni bilo mogoče prepoznati ostankov pomladi uplenjenih živali, sklepamo na jesensko zadrževanje na najdišču. V prid tej sezoni bivanja govori tudi obdelava jelenovih rogovij uplenjenih živali, ki premorejo največjo trdnost prav v zgodnji jeseni.

V kontekstu dejavnosti, ki so se odvijale na dokumentiranem delu najdišča, je intrigantna prisotnost lobanje 20 do 34 let stare ženske. Lobanja ne kaže nobenih posebnih sledi, ki bi pomagale pojasniti primarni kontekst najdbe. Na podlagi podobnih primerov z drugih kamenodobnih najdišč bi jo lahko uvrstili v skupino izoliranih človeških kostnih ostankov. Natančnejša uvrstitev v eno izmed podskupin - med kosti, katerih vzorci distribucije se ne razlikujejo od vzorcev distribucije favne ter predstavljajo ostanke neritualne manipulacije s človeškimi ostanki, ali med kosti, katerih konteksti nakazujejo posebno skrb pri depoziciji v okviru najdišča, ni mogoča. Naša interpretacija se nagiba v prid drugi trditvi, saj bi se v primeru manipulacije, ki ne predvideva posebne skrbi za kostne ostanke (npr. v okviru kanibalizma), lobanja najverjetneje razbila. Dejstvo, da ostali deli skeleta niso bili odkriti, govori proti možnosti, da je šlo za pokop. To velja tudi za domnevo o posebni odložitvi

were usually located on the edges or even outside the settlements, near flowing water. They yield general tool types as well as rare projectiles and specialized tools. The production process primarily offers large rough tools made of a poorer quality raw material, while specialized tool forms are absent. Patterns of fragmentation often indicate that such sites yield the tool parts that were broken off, while the damaged tools were repaired elsewhere.

A particular characteristic of the Zalog site are rich finds of bone and antler industry. A particularity of these is the double points, identified as spear heads, and the tools with a perforation for fitting on a helve that would most suitably be identified as axes. Beside wood working and butchering of prey, their use may probably be tied to digging up of roots, water plants, animals, holes for traps and the like. Despite the enormous amount of similar finds in Northern and Western Europe, the direct analogies can only be found in the material from the approximately contemporary sites from the Iron Gates area. This, together with the similarities in the stone finds, indicates the appartenance to the same cultural circle.

Most data support the supposition of the site in the Ljubija bed along the Zalog fallow as the marginal part of a more permanent camp, located in the vicinity of a smaller body of flowing water or a lake. The presumable wood and stone structures could conditionally be interpreted as the remains of a platform on which the hunted prey was dismembered and bone and antler were worked, while the residential part of the camp should be sought away from water. The supposition of the camp's more permanent character is made relative to a certain point by the small representation of the remains of the economically uninteresting skeletal elements as well as the absence of bones of the more fleshy parts. This would rather point to the site as a temporary camp, where the best parts of the prey were readied for transport to the base settlement. On the other hand, the remains of antlers represent a good half of all red deer finds, which indicates, together with the presence of the waste material and the shed antlers, a systematic collection of the raw material.

In the absence of charred plant material, the question as to the time of the year when the Zalog area was inhabited is answered most credibly by the analysis of the avifauna remains. The results of this analysis indicate that the camp was inhabited either throughout the seasons or in a transitory period in either spring or autumn. The material of the mammal macrofauna does not include the remains of animals caught in spring, which leads to the conclusion that the site was inhabited in autumn. The latter could be confirmed by the finds of red deer antlers that are hardest precisely in early autumn.

The context of the activity that took place on the

lobanje, ki je v kontekstu dejavnosti (razkosavanje) manj verjetna. Očitno so v procesu manipulacije tkiva previdno odstranili z lobanje, vendar so jo kljub vsemu zavrgli.

Odkritje v strugi Ljubije ob ledini Zalog pri Verdu je opozorilo na veliko uporabnost podvodnih raziskav barjanskih vodotokov pri odkrivanju najdišč iz starejših obdobij prazgodovine. Zaradi zaščitne narave arheološkega posega so bila terenska dela omejena izključno na dokumentiranje, zbir izpostavljenih najdb na dnu struge in odvzem vzorcev za naravoslovne analize. Iz vidika dokaj jasne stratigrafske situacije, ostro zamejenega pojava najdb in zanemarljivega števila predmetov mlajše provenience ni bilo v tej fazi raziskav nobene potrebe za posege v nedotaknjene plasti, še posebej če upoštevamo, da bi izkopavanje obrežja nekajkrat povečalo učinke erozijskega spodjedanja trenutno stabilnega profila. Načrtovalci morebitnih raziskovalnih sondiranj oz. obsežnejših izkopavanj morajo vsekakor računati z zahtevno logistiko, ki jo narekujejo velika debelina naplavljenih plasti nad kulturnim horizontom (ta se uvršča med največje na znanih planih najdiščih v Sloveniji) ter njegova konstantna lega pod vodno gladino. Med posege, ki jih načrtujemo v nadaljevanju spomeniško varstvenih raziskav, sodijo ciklična spremljava struge na območju najdišča z namenom analize stopnje erozije in dinamike plavljenja različnih kategorij gradiva ter izvedba vrtin v mreži na obeh bregovih za potrebe ugotovitve obsega najdišča oziroma prisotnosti arheološko zanimivih plasti *in situ*.

documented part of the site includes an intriguing find of a skull belonging to a 20- to 34-year-old woman. The skull does not reveal particular traces that would help to explain the primary context of the find. Based on similar examples from other Stone Age sites, the find may be classified into a group of isolated human bone remains. Unfortunately, it is not possible to further classify the skull into one of the subgroups – either among bones, for which the pattern of distribution does not differ from those of fauna and represent the remains of a non-ritual manipulation with human remains, or among bones, for which the contexts indicate a special care taken during their deposition within the site. The interpretation here is inclined towards the second subgroup, since the skull would probably have shattered had there been no special care taken during manipulation (in the case of cannibalism, for example). The fact that other parts of the skeleton were not recovered speaks against the possibility of a burial. In the context of the documented activity at the site (butchering), a special deposition of the skull also seems less likely. It should be noted that the tissues of the skull must have been carefully removed during the process of manipulation, but the skull was nevertheless cast away.

The discovery in the Ljubija demonstrated the great usefulness of underwater research of the waters of the Ljubljansko barje in discovering sites from the early periods of prehistory. Due to the rescue nature of the archaeological intervention at Zalog, the field work was strictly limited to documenting, collecting the exposed finds on the floor of the bed and taking samples for subsequent scientific analyses. The fairly clear stratigraphic situation, the clearly delimited appearance of finds as well as the negligible number of objects of a later date there was no need, at this stage of research, to disturb the intact layers, particularly considering the fact that excavation of the bank would substantially increase the erosive undermining of the temporarily stable profile. The possible future research trenching or more extensive excavations must certainly take into account the demanding logistics, dictated by the great thickness of the alluvial layers above the cultural horizon (this ranks among the largest among the known plain sites in Slovenia) as well as its constant underwater position. The future interventions foreseen within the monument protection activities include regular surveillance of the bed within the area of the site in order to analyze the degree of erosion and the transport dynamics of the various categories of material as well as core-drillings within a grid on both banks in order to establish the extent of the site and the presence of archaeologically interesting layers *in situ*.

BRONASTODOBNE NAJDBE IZ POTOKA LJUBIJA PRI VERDU

BRONZE AGE FINDS FROM THE LJUBIJA STREAM NEAR VERD

Andrej GASPARI

Izvleček

Prispevek obravnava bronastodobne najdbe z arheološkega najdišča Zalog (I) pri Verdu. Glede na analogije z gradivom z bližnjih naselbin ter bolj oddaljenih najdišč na severovzhodu in v zaledju severnega Jadrana se nagibamo k mnenju, da gre za ostanke kratkotrajne naselbine nekje iz časa med vključno mlajšim delom srednje bronaste dobe (Bd C2) in mlajšo bronasto dobo (Bd D-Ha A1).

Ključne besede: Slovenija, Ljubljansko barje, bronasta doba

Abstract

The article deals with the Bronze Age finds from the site of Zalog (I) near Verd site, comprising of forty-two fragments of handmade ceramic vessels, ten tools and flakes of stone and an animal bone. The analogies with the material from the near-by settlements as well as more distant sites to the northeast and in the hinterland of the northern Adriatic suggest that these are the remains of a settlement of a short duration dating from and including the later part of the Middle (Bd C2) and the Late Bronze Age (Bd D-Ha A1).

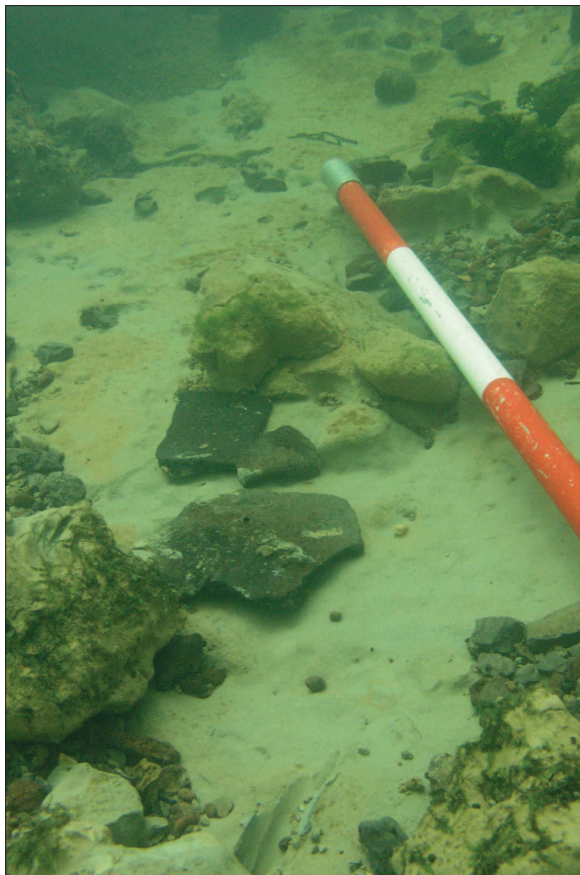
Key words: Slovenia, the Ljubljansko barje, Bronze Age

1 OPIS NAJDIŠČA

Mlajše najdišče ob ledini Zalog leži v zgornjem in osrednjem delu prekopa, s katerim so ob gradnji avtoceste Ljubljana-Postojna leta 1972 skrajšali zahodni del meandra Ljubije. Nekdanji potek večjega zavoja, ki je s svojim skrajno zahodnim delom prvotno potekal le nekaj metrov v stran od prvih hiš, je danes na terenu viden kot polkrožna, okoli 1 m globoka depresija. S posegom so izravnali tudi dol vodno ležeč manjši zavoj, vendar ta zaradi recentnega nasipanja ni več viden. Levo brežino novo izkopane struge so utrdili z nasipom iz velikih apnenčastih lomljencev. Sodeč po izraziti brežini, ki loči površje ledine Zalog (ca 292,1 m nm. v.) od nove struge in območja nekdanjega meandra (ca. 291,1-291,3 m nm. v.), ni izključeno, da so pri njenem izkopu sledili nekemu starejšemu koritu. V novi strugi razen kamnitih blokov ni opaziti sledov, ki bi pričali o njeni umetni naravi, saj je voda v njenem glinenem dnu oblikovala vse, za naravne tokove običajne erozijske oblike. Dno in podvodne brežine struge sestavlja večinoma siva meljasta glina, ki je zaradi prisotnosti železovega hidroksida na površini rjavo obarvana. V brežini se pojavljajo tudi lečasti vložki organskih naplavin, na nekaterih mestih na dnu pa med

1 DESCRIPTION OF THE SITE

The chronologically later site at the Zalog fallow is situated in the upper and central parts of a canal built during the construction of the Ljubljana-Postojna highway in 1972. The aim of the latter was to shorten the western part of the Ljubija meander. The former course of the large bend there had passed, with its westernmost part, only a few metres from the nearest houses and is now only visible as a semi-circular depression of approximately 1m in depth. During the intervention, a smaller bend further downstream was also straightened, no longer visible nowadays due to recent gravelling. The left bank of the newly dug bed was then reinforced by a dam of large limestone blocks. The distinctive bank that separates the surface of the Zalog fallow (approx. 292.1 m above sea level) from the new bed and the area of the former meander (approx. 291.1-291.3 m above sea level) may possibly indicate that the digging traced an earlier bed. The new bed, however, does not show any traces of artificiality apart from the stone blocks, having already formed on its clayey bottom all erosive forms typical for natural water courses. The bottom and the underwater banks of the bed are mostly composed of grey silty clay,



Sl. 12.1: Odlomki bronastodobnih posod. Območje 3 (foto: Andrej Gaspari).

Fig. 12.1: Fragments of Bronze Age vessels. Area 3 (photo: Andrej Gaspari).

dvema plastema gline srečamo bolj peščene, sivkasto obarvane sedimente. V nobeni od plasti v profilu nismo ugotovili arheološko zanimivega materiala.

Najdbe, ki obsegajo 42 odlomkov prostoročno izdelanih keramičnih posod, 10 orodij in odbitkov iz kamna ter 1 živalsko kost, se pojavljajo na razdalji 60 m v štirih koncentracijah, od katerih prve tri (območje 1, 2, 3) ležijo v novo izkopani strugi, četrta (obm. 4) pa v večjem tolmunu z ravnim dnom na začetku meandra (Gaspari, Erič, v tem zborniku, *sl. 1.5a*).

Na območju glavne koncentracije najdb (obm. 1, 2, 3) vzporedno s prvim zavojem je bilo skupno odkritih 34 odlomkov keramike in 10 sileksov. Velikost fragmentov posod, ki imajo razmeroma ostre odlome in praktično ne kažejo sledi abrazije, sega od 2 x 3 cm do 11,4 x 9,5 cm, s težiščem pri srednjih vrednostih (*sl. 12.1;12.2*).

Vse najdbe so ležale bodisi prosto na sprani glini ali pa pod tanko plastjo fino zrnatega peščenega nanosa s kosi odplavljene gline, pri čemer je opazno težišče pojavljanja na desni strani korita. Večina najdb izvira iz ravne razširitve v izmeri 3 x 2 m (obm. 2: 25 odlomkov keramike, 3 odbitki), ostale pa iz nekaj



Sl. 12.2: Odlomek globoke skodele z ročajem. Območje 2 (foto: Andrej Gaspari).

Fig. 12.2: Fragment of a deep cup with a handle. Area 2 (photo: Andrej Gaspari).

coloured brown on the surface due to the presence of iron hydroxide. There are also lentiform insertions of organic sediments visible in the banks and at places on the bottom slightly sandier, grey coloured sediments visible between two layers of clay. None of the layers in the observed profiles revealed archaeologically interesting material.

The Bronze Age finds include forty-two fragments of handmade ceramic vessels, ten tools and flakes of stone and an animal bone. They appear in the length of 60 m in four concentrations, first three of which (areas 1, 2, 3) lie in the newly-dug bed and the fourth (area 4) in a large pool with a flat bottom at the beginning of the meander (Gaspari, Erič, in this publication, *Fig. 1.5a*).

The area of the main concentrations of finds (areas 1, 2, 3), parallel to the first bend, yielded thirty-four pottery fragments and five stone flakes. The size of the pottery fragments with relatively sharp breaks and practically without abrasion marks varies from 2 x 3 to 11.4 x 9.5 cm, with most being in the middle of the value scale (*Figs. 12.1;12.2*).

The finds were found lying either on the washed-off clay or underneath a thin layer of fine-grained sandy alluvium with pieces of clay, predominantly on the right side of the bed. Most of the finds originate from the flat widening measuring 3 x 2 m (area 2: 25 fragments of pottery, 3 stone finds), others from a narrow channel terminating in a clay riffle a few metres downstream (area 1: 3 fragments of pottery) and from

metrov nižje ležečega ozkega kanala, ki se zaključi z glinenim pragom (obm. 1: 3 odlomki keramike) ter iz plitve kotanjaste poglobitve okoli 8 m gor vodno od glavne koncentracije (obm. 3: 6 odlomkov keramike, 2 odbitka).

Vsi odlomki razen treh pripadajo 9 ali 10 keramičnim posodam iz prečiščene, kvalitetno žgane gline z zelo temno sivim do zelo temno rjavim prelomom in s primesmi drobnega peska. Med oblikami najdemo npr. latvico z vodoravno apliko (3 odlomki; *t. 32: 2*), skledo z nizkim usločenim vratom in majhnim ročajem (4 odlomki; *t. 32: 1; sl. 12.3*), skledo s klekastim trupom in fasetiranim ustjem (1 odlomek; *t. 32: 4*), globoko skodelo s polkrožnim trakastim ročajem (3 odlomki; *t. 32: 6*), lonec z usločenim vratom in izvihanim ustjem ter ohranjenim pritrđiščem ročaja (1 odlomek; *t. 32: 5*), tri velike trebušaste lonce z navpičnim vratom in vodoravnim plastičnim rebrom z odtisi prstov (skupno 22 odlomkov; *t. 33: 12-14*) in lonec z navpičnim, odebeljenim ustjem (1 odlomek; *t. 32: 5*). Posode označuje dokaj gladka površina, ki je v nekaterih primerih nekoliko svetleje žgana ali pa lisasta. Enak prelom ima še odlomek skleda ali skodele z vbočenim dnom, ki je bil najden 40 m nižje od območja 1 in sicer na terasi ob desnem bregu (obm. 5; *t. 32: 3; sl. 1.5a: 5*), pa tudi 8 odlomkov z najdišča Zalog II (*t. 32: 7,8; Gaspari, Erič, v tem zborniku, sl. 1.10*).

Na območju 4, ki obsega večjo kotanjo na nereguliranem začetku meandra, okoli 50 m nad glavno koncentracijo (*sl. 5a: 4*), je bilo najdenih šest odlomkov keramike ter pet kamnitih orodij, med njimi dve strgali in dva svedra. Dve ostenji loncev sta po fakturi enaki posodam iz nižje ležeče koncentracije, štirje fragmenti pa pripadajo dnom dveh loncev iz porozne, temno do rdeče rjavo žgane gline s primesmi peska in organskih pustil (*t. 33: 10,11*). Eden od loncev ima površino okrašeno s poševnim metličanjem. Podoben prelom imajo tudi trije odlomki poševno izvihanega ustja lonca z območja 3 (*t. 33: 9; sl. 5a: 3*).

a shallow, basin-like depression approximately 8 m upstream from the main concentration (area 3: 6 fragments of pottery, 2 stone finds).

All but three fragments belong to nine or ten ceramic vessels made of refined, well fired clay with a very dark grey to very dark brown break and inclusions of fine sand. The forms include a shallow bowl with a horizontal appliqué (3 fragments; *Pl. 32: 2*), a bowl with a low curved neck and a small handle (4 fragments; *Pl. 32: 1; Fig. 12.3*), a bowl with carinated walls and a faceted rim (1 fragment; *Pl. 32: 4*), a deep cup with a semi-circular strap handle (3 fragments; *Pl. 32: 6*), a pot with a curved neck, an everted rim and the attachment spot for a handle (1 fragment; *Pl. 32: 5*), three large globular pots with a vertical neck and a horizontal plastic rib with finger impressions (22 fragments in total; *Pl. 33: 12-14*) as well as a pot with a thickened vertical rim (1 fragment; *Pl. 32: 5*). The vessels are characterized by a fairly smooth surface that is, in some cases, fired somewhat lighter or speckled. The same break as on these vessels can be observed on a fragment of a bowl or a cup with a concave base, found 40 m downstream from area 1 on the right bank terrace (area 5; *Pl. 32: 3*), as well as on 8 fragments from the Zalog II site (*Pl. 32: 7,8; Gaspari, Erič, in this publication, Fig. 1.10*).

Area 4, comprising a large basin on the unregulated beginning of the meander approximately 50 m upstream from the main concentration, yielded six pottery fragments and five stone tools, among which two scrapers and two drills. Two wall parts of pots are equal in fabric to the vessels from the concentration further downstream, while four fragments belong to bases of two pots made of porous clay fired dark to red brown with inclusions of sand and organic temper (*Pl. 33: 10,11*), while the surface of one of the pots bears obliquely executed combed decoration. A similar break can also be observed on three fragments of an obliquely everted rim of a pot from area 3 (*Pl. 33: 9*).

2 KATALOG

2.1 Keramika

1. Skleda; štirje odlomki; bikonično ostenje z nizkim usločenim vratom, kratkim izvihanim ustjem in rahlo vbočenim dnom; pod vratom ostanek dvojne bradavice ali ročaja; prostoročno izdelana; temno sivo do temno rjavo žgana glina. Vel. 11,4 x 9,5 cm; 10,9 x 6,5 cm; 8,3 x 7,4 cm; 6,9 x 6,0 cm; rek. pr. ustja. 15,7 cm; rek. pr. dna. 3,6 cm; ohr. ca. 70 %. LZ I-04/obm. 2; *t. 32: 1; sl. 12.3*.
2. Latvica; štirje odlomki; poševno ostenje z uvihanim ustjem, pod katerim je vodoravna gumbasta aplikacija; ravno dno; prostoročno izdelana; temno rjavo žgana glina z razpokano površino. Vel. 8,5 x 4,7 cm (LZ I-

2 CATALOGUE

2.1 Pottery

1. Bowl; four fragments; biconical walls with a low curved neck, a short everted rim and a slightly concave base; remains of a double knob or a handle below the neck; handmade; clay fired dark grey to dark brown. Size 11.4 x 9.5 cm; 10.9 x 6.5 cm; 8.3 x 7.4 cm; 6.9 x 6.0 cm; rec. rim diameter. 15.7 cm; rec. base diameter. 3.6 cm; preserv. ca 70 %. LZ I-04/area 2; *Pl. 32: 1; Fig. 12.3*.
2. Shallow bowl; four fragments; oblique walls with an incurved neck with a horizontal button-shaped appliqué beneath it; flat base; handmade; clay fired dark brown with a cracked surface. Size 8.5 x 4.7 cm (LZ

- 04/obm.1); 4,7 x 4,3 cm; 6,3 x 5,9 cm; 4,1 x 3,1 cm (LZ I-04/obm. 2); rek. pr. ustja. 13,7 cm; rek. pr. dna. 5,7 cm; ohr. ca. 25 %; *t. 32: 2.*
3. Skodela; odlomek; usločeno dno in del poševnega ostenja; prostoročno izdelana; temno sivo žgana glina z rjavimi do rdečkasto rjavimi lisami na površini. Vel. 8,2 x 6,7 cm; rek. pr. dna 5,0 cm; ohr. ca. 5 %. LZ I-04/obm. 5; *t. 32: 3.*
 4. Skodela; odlomek; bikonično ostenje z visokim usločenim vratom in kratkim izvihanim ustjem, ki ima na notranji strani tri fasete; prostoročno izdelana; temno rjavo do črno žgana glina z razpokano površino. Vel. 9,5 x 5,7 cm; rek. pr. ustja. 19,8 cm; ohr. ca. 10 %. LZ I-04/obm. 1; *t. 32: 4.*
 5. Lonec; odlomek ostenja in usločenega vratu z izvihanim ustjem; na ramah ostanek pritrdišča trakastega ročaja; prostoročno izdelan; temno sivo žgana glina s primesmi drobnega peska. Vel. 6,7 x 6,5 cm; ohr. ca. 4 %. LZ I-04/obm. 3; *t. 32: 5.*
 6. Globoka skodela/lonec; trije odlomki; trebušasto ostenje in navpično ustje; na največjem obodu trakast polkrožen ročaj; prostoročno izdelana; temno sivo žgana glina s temno do svetlo rjavo zunanjo površino; primesi drobnega peska. Vel. 9,1 x 6,7 cm (LZ I-04/obm. 2); 9,6 x 6,7 cm; 6,1 x 4,8 cm (LZ I-04/obm. 3); rek. pr. ustja 21,6 cm; ohr. ca. 15 %; *t. 32: 6.*
 7. Skleda; odlomek; ostenje z nizkim usločenim vratom in navpičnim ustjem; prostoročno izdelana; temno sivo do temno rjavo, trdo žgana glina; gladka površina. Vel. 6,7 x 6,4 cm; rek. pr. ustja ?; ohr. ca. 5 %. LZ II-04/N 118; *t. 32: 7.*
 8. Posoda; odlomek; polkrožen trakast ročaj; prostoročno izdelana; temno rjavo do rdečkasto rjavo žgana glina. Vel. 4,5 x 3,7 cm; ohr. ca. 1 %. Brez sledov abrazije. LZ II-04/N 050; *t. 32: 8.*
 9. Lonec; trije odlomki; poševno izvihano ustje; prostoročno izdelan; porozna, temno sivo do temno rjavo žgana glina z rdečkasto rjavo površino. Vel. 7,7 x 4,5 cm; 3,1 x 2,6 cm (LZ I-04/obm. 2); 6,5 x 4,1 cm (LZ I-04/obm. 3); ohr. ca. 2 %; *t. 33: 9.*
 10. Lonec; dva odlomka spodnjega dela ostenja z zaobljenim prehodom v dno; prostoročno izdelan; porozna, temno do rdeče rjavo žgana glina s primesmi peska in organskih pustil. Vel. 8,8 x 10,1 cm; 5,3 x 5,1 cm; rek. pr. dna 14,0 cm; ohr. ca. 5 %. LZ I-04/obm. 4; *t. 33: 10.*
 11. Lonec; dva pripadajoča odlomka spodnjega dela ostenja s prehodom v dno; prostoročno izdelan; poševno (ločno) glavničena površina; porozna, temno do rdeče rjavo žgana glina s primesmi peska in organskih pustil. Vel. 9,7 x 5,7 cm; 7,6 x 5,9 cm; rek. pr. dna 7,9 cm; ohr. ca. 5 %. LZ I-04/obm. 4; *t. 33: 11.*
 12. Lonec; 11 odlomkov; trebušasto ostenje s strmim vratom in ravnim ustjem; na največjem obodu aplicirano rebro z odtisi prstov; prostoročno izdelan; temno do svetlo rjavo žgana glina s primesmi peska. Vel. 11,0 x 9,4 cm; 7,1 x 5,0 cm; 6,8 x 4,8 cm; 3,5 x 3,4 cm; 11,4 x 7,5 cm; 8,0 x 5,2 cm; 6,6 x 4,8 cm; 7,2 x 5,7 cm; 7,6 x 6,6 cm; 5,4 x 4,5 cm; ohr. ca. 10 %. LZ I-04/obm. 2; *t. 33: 12.*
 13. Lonec; šest pripadajočih in pet dodatnih odlomkov; trebušasto ostenje s strmim vratom; na največjem I-04/area 1); 4,7 x 4,3 cm; 6,3 x 5,9 cm; 4,1 x 3,1 cm (LZ I-04/area 2); rek. rim diameter. 13,7 cm; rec. base diameter. 5,7 cm; preserv. ca 25 %; *Pl. 32: 2.*
 3. Cup; fragment; curved base and part of the walls; handmade; clay fired dark grey with brown to reddish patches on the surface. Size 8.2 x 6.7 cm; rec. base diameter 5.0 cm; preserv. ca 5 %. LZ I-04/area 5; *Pl. 32: 3.*
 4. Cup; fragment; biconical walls with a high curved neck and a short everted rim with three facets on its inner side; handmade; clay fired brown to black with cracked surface. Size 9.5 x 5.7 cm; rec. rim diameter. 19.8 cm; preserv. ca 10 %. LZ I-04/area 1; *Pl. 32: 4.*
 5. Pot; fragment; walls and a curved neck with an everted rim; remains of the attachment spot for a strap handle on the shoulders; handmade; clay fired dark grey with fine sand inclusions. Size 6.7 x 6.5 cm; preserv. ca 4 %. LZ I-04/area 3; *Pl. 32: 5.*
 6. Deep cup/pot; three fragments; globular walls and a horizontal rim; a semi-circular strap handle applied at maximum diameter; handmade; clay fired dark grey with dark to light brown outer surface; inclusions of fine sand. Size 9.1 x 6.7 cm (LZ I-04/area 2); 9.6 x 6.7 cm; 6.1 x 4.8 cm (LZ I-04/area 3); rec. rim diameter 21.6 cm; preserv. ca 15 %; *Pl. 32: 6.*
 7. Bowl; fragment; walls with a low curved neck and a horizontal rim; handmade; clay fired hard, dark grey to dark brown; smooth surface. Size 6.7 x 6.4 cm; rec. rim diameter ?; preserv. ca 5 %. LZ II-04/N 118. *Pl. 32: 7.*
 8. Vessel; fragment; semi-circular strap handle; handmade; clay fired dark brown to reddish brown. Size 4.5 x 3.7 cm; preserv. ca 1 %. No abrasion marks. LZ II-04/N 050; *Pl. 32: 8.*
 9. Pot; three fragments; obliquely everted rim; handmade; porous clay fired dark grey to dark brown with a reddish brown surface. Size 7.7 x 4.5 cm; 3.1 x 2.6 cm (LZ I-04/area 2); 6.5 x 4.1 cm (LZ I-04/area 3); preserv. ca 2 %; *Pl. 33: 9.*
 10. Pot; two fragments; lower part of the walls with a rounded transition to the base; handmade; porous clay fired dark to red-brown with inclusions of sand and organic temper. Size 8.8 x 10.1 cm; 5.3 x 5.1 cm; rec. base diameter 14.0 cm; preserv. ca 5 %. LZ I-04/area 4; *Pl. 33: 10.*
 11. Pot; two fragments; lower part of the walls with the transition into the base; handmade; obliquely executed (curved) combed surface; porous clay fired dark to red brown with inclusions of sand and organic temper. Size 9.7 x 5.7 cm; 7.6 x 5.9 cm; rec. base diameter 7.9 cm; preserv. ca 5 %. LZ I-04/area 4; *Pl. 33: 11.*
 12. Pot; eleven appertaining fragments; globular walls with a steep neck and a straight rim; a rib with finger impressions applied at maximum diameter; handmade; clay fired dark to light brown with inclusions of sand. Size 11.0 x 9.4 cm; 7.1 x 5.0 cm; 6.8 x 4.8 cm; 3.5 x 3.4 cm; 11.4 x 7.5 cm; 8.0 x 5.2 cm; 6.6 x 4.8 cm; 7.2 x 5.7 cm; 7.6 x 6.6 cm; 5.4 x 4.5 cm; preserv. ca 10 %. LZ I-04/area 2; *Pl. 33: 12.*
 13. Pot; six appertaining and five additional fragments; globular walls with a steep neck; a rib with finger impressions applied at maximum diameter; handmade;

- obodu aplicirano rebro z odtisi prstov; prostoročno izdelan; temno sivo žgana glina s primesmi peska; zunanja površina temno do svetlo rjava. Vel. 13,0 x 7,1 cm; 7,4 x 5,5 cm; 6,8 x 5,0 cm; 7,2 x 3,6 cm; 4,5 x 3,2 cm; 5,3 x 4,8 cm; 8,0 x 3,8 cm; 7,2 x 5,0 cm (LZ I-04/obm. 2); 6,2 x 5,3 cm; 4,0 x 2,5 cm; 6,7 x 4,2 cm (LZ I-04/obm. 3); ohr. ca. 8 %; *t.* 33: 13.
14. Lonec; dva pripadajoča in štirje dodatni odlomki; trebušasto ostenje s strmim vratom in ravnim ustjem; na največjem obodu aplicirano rebro z odtisi prstov; prostoročno izdelan; temno sivo žgana glina s primesmi peska; zunanja površina temno siva do svetlo rjava. Vel. 11,6 x 7,1 cm; 8,1 x 5,1 cm; 6,6 x 5,0 cm; 7,8 x 6,5 cm; 7,4 x 6,0 cm; 6,2 x 4,5 cm; ohr. ca. 8 %. LZ I-04/obm. 2; *t.* 33: 14.
 15. Lonec; odlomek; navpično ustje; prostoročno izdelan; temno sivo do temno rjavo žgana glina s primesmi peska. Vel. 3,3 x 2,9 cm; ohr. ca. 1 %. LZ I-04/obm. 2; *t.* 33: 15.
 16. Lonec; odlomek; ostenje; prostoročno izdelan; temno do svetlo rjavo žgana glina s primesmi peska. Vel. 5,5 x 4,1 cm; ohr. ca. 1 %. LZ I-04/obm. 1.
 17. Lonec; odlomek ostenja ali ram; prostoročno izdelan; prečiščena, temno rjavo žgana glina. Vel. 6,2 x 5,2 cm; ohr. ca. 3 %. LZ I-04/obm. 4.
 18. Lonec; odlomek; ravno dno; prostoročno izdelan; porozna, temno rjavo do temno sivo žgana glina z luknjičavo površino. Vel. 4,7 x 4,3 cm; ohr. ca. 1 %. LZ II-04/N 047.
 19. Posoda; odlomek; ostenje; prostoročno izdelana; temno sivo do temno rjavo žgana glina s svetlo rjavo zunanjo površino. Vel. 5,0 x 3,7 cm; ohr. ca. 1 %. LZ II-04/N 015.
 20. Posoda; odlomek; ostenje; prostoročno izdelana; temno rjavo žgana glina z rdečkasto rjavo zunanjo površino. Vel. 3,5 x 2,9 cm; ohr. ca. 1 %. LZ II-04/N 015.
 21. Posoda; odlomek; ostenje z ostankom bradavice ali ročaja; prostoročno izdelana; temno sivo do rjavo, izmenično žgana glina z gladko površino. Vel. 3,6 x 2,0 cm; ohr. ca. 1 %. LZ II-04/N 113.
 22. Posoda; odlomek; ostenje; prostoročno izdelana; temno sivo do temno rjavo žgana glina s primesmi sljude in drobnega peska. Vel. 5,1 x 3,8 cm; ohr. ca. 1 %. LZ II-04/N 116.
 23. Posoda; odlomek; ostenje; prostoročno izdelana; temno rjavo do rdečkasto rjavo žgana glina s primesmi grobega karbonatnega peska. Vel. 5,2 x 5,1 cm; ohr. ca. 1 %. LZ II-04/N 117.
- clay fired dark grey with inclusions of sand; outer surface dark to light brown. Size 13.0 x 7.1 cm; 7.4 x 5.5 cm; 6.8 x 5.0 cm; 7.2 x 3.6 cm; 4.5 x 3.2 cm; 5.3 x 4.8 cm; 8.0 x 3.8 cm; 7.2 x 5.0 cm (LZ I-04/area 2); 6.2 x 5.3 cm; 4.0 x 2.5 cm; 6.7 x 4.2 cm (LZ I-04/area 3); preserv. ca 8 %; *Pl.* 33: 13.
14. Pot; two appertaining and four additional fragments; globular walls with a steep neck and a straight rim; a rib with finger impressions applied at maximum diameter; handmade; clay fired dark grey with sand inclusions; outer surface dark grey to light brown. Size 11.6 x 7.1 cm; 8.1 x 5.1 cm; 6.6 x 5.0 cm; 7.8 x 6.5 cm; 7.4 x 6.0 cm; 6.2 x 4.5 cm; preserv. ca 8 %. LZ I-04/area 2; *Pl.* 33: 14.
 15. Pot; fragment; vertical rim; handmade; clay fired dark grey to dark brown with inclusions of sand. Size 3.3 x 2.9 cm; preserv. ca 1 %. LZ I-04/area 2; *Pl.* 33: 15.
 16. Pot; fragment; walls; handmade; clay fired dark to light brown with inclusions of sand. Size 5.5 x 4.1 cm; preserv. ca 1 %. LZ I-04/area 1.
 17. Pot; fragment; walls or a shoulder; handmade; refined clay fired dark brown. Size 6.2 x 5.2 cm; preserv. ca 3 %. LZ I-04/area 4.
 18. Pot; fragment; flat base; handmade; porous clay fired brown to dark grey with a highly porous surface. Size 4.7 x 4.3 cm; preserv. ca 1 %. LZ II-04/N 047.
 19. Vessel; fragment; walls; handmade; clay fired dark grey to dark brown with a light brown outer surface. Size 5.0 x 3.7 cm; preserv. ca 1 %. LZ II-04/N 015.
 20. Vessel; fragment; walls; handmade; clay fired dark brown with reddish-brown outer surface. Size 3.5 x 2.9 cm; preserv. ca 1 %. LZ II-04/N 015.
 21. Vessel; fragment; walls with the remains of a knob or a handle; handmade; clay fired dark grey to brown; alternately fired clay with a smooth surface. Size 3.6 x 2.0 cm; preserv. ca 1 %. LZ II-04/N 113.
 22. Vessel; fragment, walls, handmade; clay fired dark grey to dark brown with inclusions of mica and fine sand. Size 5.1 x 3.8 cm; preserv. ca 1 %. LZ II-04/N 116.
 23. Vessel; fragment; walls; handmade; clay fired dark brown to reddish-brown with inclusions of coarse carbonate sand. Size 5.2 x 5.1 cm; preserv. ca 1 %. LZ II-04/N 117.

2.2 Kamnita orodja

1. Fragment strgala na odbitku iz temno rjavega do črnega roženca (D 3,1; S 2,2; B 1,2). Na proksimalnem delu levega lateralnega roba na dorzalni strani so izdelane školjkovite retuše. LZ I-04/obm. 4.
2. Strgalo na fragmentiranem odbitku iz temno sivo rjavega roženca (D 4; S 4,3; B 1,6). Talon je fasetiran. Na levem lateralnem robu na dorzalni strani so izdelane stopnjevite školjkovite retuše. LZ I-04/obm. 4.
3. Sveder na fragmentu odbitka iz temno rjavega roženca (D 2,9; S 2,3; B 0,7). Na distalnem delu desnega

2.2 Stone tools

1. Scraper fragment on a flake of dark brown to black chert (L 3.1; W 2.2; Th 1.2). Conchoidal retouch is on the proximal part of the left lateral edge on the dorsal side. LZ I-04/area 4.
2. Scraper on a fragmented flake of dark grey-brown chert (L 4; W 4.3; Th 1.6). Striking platform is faceted. Scaliform conchoidal retouch is on the left lateral edge on the dorsal side. LZ I-04/area 4.
3. Borer on a flake fragment of dark brown chert (L 2.9; W 2.3; Th 0.7). Conchoidal retouch is on the distal part

- lateralnega roba na dorzalni strani in na distalnem delu levega in desnega lateralnega roba na ventralni strani so izdelane školjkovite retuše. LZ I-04/obm. 4.
4. Sveder na fragmentu odbitka iz sivoga do temno rjavega roženca (D 2,8; S 2,9; B 0,7). Na proksimalnem in srednjem delu desnega lateralnega roba na ventralni strani so izdelane retuše. LZ I-04/obm. 4.
 5. Odbitek iz rdečkasto sivo rjavega roženca (D 6,1; S 2,4; B 0,8). Talon je gladek. LZ I-04/obm. 4.
 6. Odbitek iz zelenkasto rjavega roženca (silificiranega tufa?) (D 6,5; S 2, B 1,8). Talon je gladek. LZ I-04/obm. 3.
 7. Odbitek iz zelenkasto sivoga roženca (silificiranega tufa?) (D 3,8; S 3,1, B 0,9). Talon je fasetiran. LZ I-04/obm. 3.
 8. Fragmentiran odbitek iz rdečkastega roženca (D 1,7; S 1,5; B 0,3). Talon je gladek. LZ I-04/obm. 2.
 9. Fragment retuširanega odbitka iz sivo-rjavo zelenkastega roženca (D 3,2; S 3,2; B 1,4). Na proksimalnem delu na ventralni strani se nahajajo retuše.
 10. Klinica iz temno rjavega roženca (D 2,3; S 0,7; B 0,5). Talon je zdrobljen.

3 OPREDELITEV NAJDB

Oblike posod izpričujejo na eni strani podobnosti z gradivom iz prostora med Spodnjo Avstrijo in južno Slovaško ter Transdanubijo in severno Bosno, na drugi strani pa smemo domnevati tudi o vplivih, ki so Ljubljansko kotlino dosegali iz zaledja severnega Jadrana med Padsko nižino in zahodnim Balkanom.

Globoka skodela z rahlo koničnim vratom in polkrožnim trakastim ročajem, ki se pripenja na ostenje tik pod največjim obodom (*t. 32: 6*), kaže navezanost na oblike srednje bronaste dobe. Skoraj identično oblikovana žara izvira iz biritualnega grobišča Castello di Bovolone pri Veroni, kjer se je pokopavalo v mlajšem delu stopnje *bronzo medio* (pred stopnjo Peschiera).¹ Podobne oblike so znane tudi iz grobov srednje podonavske kulture gomil na Slovaškem.² Na kraških in istrskih kaštelirjih ter v Furlaniji se sorodne globoke skodele pojavljajo v starejšem delu stopnje *bronzo recente*,³ dobro primerjavo pa vidimo tudi v večji skodeli z nekoliko bolj zaobljenim profilom (pr. ustja 26,4 cm) iz jame Bezdanjača pri Vrhovinah v Liki.⁴ Med več sorodnimi posodami s polkrožnimi trakastimi ročaji iz iste nekropole⁵ izstopa še lonec z rahlo usločenim vratom iz groba 34,⁶ ki ga je R. Drechsler-Bižić tako kot ostale našete posode datirala v drugi horizont pokopavanja oz. stopnji Bd D in Ha A1 po

¹ Salzani 1985, 30-32, sl. 23.

² Točik 1964, t. 34: 14; Dušek 1980, t. 10: 18.

³ Cardarelli 1983, 98, t. 19: 38; Moretti 1978a, sl. 4: 11; Gerdol, Stacul 1978, sl. 5: 1,2.

⁴ Drechsler-Bižić 1979-1980, t. 7: 1; 36: 5.

⁵ *Ib.*, t. 26: 9; 27: 1; 36: 1; 37: 3.

⁶ *Ib.*, t. 19: 9.

of the right lateral edge on the dorsal side as well as on the distal part of the left and right lateral edges on the ventral side. LZ I-04/area 4.

4. Borer on a flake fragment of grey to dark brown chert (L 2.8; W 2.9; Th 0.7). Retouch is on the proximal and the middle parts of the right lateral edge on the ventral side. LZ I-04/area 4.
5. Flake of reddish grey-brown chert (L 6.1; W 2.4; Th 0.8). Striking surface is smooth. LZ I-04/area 4.
6. Flake of greenish-brown chert (silicified tuff?) (L 6.5; W 2, Th 1.8). Striking surface is smooth. LZ I-04/area 3.
7. Flake of greenish-grey chert (silicified tuff?) (L 3.8; W 3.1, Th 0.9). Striking surface is faceted. LZ I-04/area 3.
8. Fragmented flake of reddish chert (L 1.7; W 1.5; Th 0.3). Striking surface is smooth. LZ I-04/area 2.
9. Fragment of a retouched flake of grey-brown greenish-chert (L 3.2; W 3.2; Th 1.4). Retouch is on the proximal part on the ventral side.
10. Bladelet of dark brown chert (L 2.3; W 0.7; Th 0.5). Striking surface is crushed.

3 DETERMINATION OF THE FINDS

The vessel forms show similarities with the material from the area extending from Lower Austria and southern Slovakia to Transdanubia and northern Bosnia. At the same time, they allow us to consider the influences that reached the Ljubljansko barje from the hinterland of the northern Adriatic between the Po Valley and the western Balkans.

A deep cup with a slightly conical neck and a semi-circular strap handle, attached to the walls just below maximum diameter (*Pl. 32: 6*), shows similarities to the Middle Bronze Age forms. An urn originating from the biritual Castello di Bovolone cemetery near Verona, where the dead were buried in the later part of the *bronzo medio* period (prior to the Peschiera phase), for example, is formally almost identical.¹ Furthermore, similar forms are known from the graves of the Middle Danubian Tumulus Culture in Slovakia.² Similar deep cups appear at the Castellieri of the Kras and Istria as well as Friuli in the early part of the *bronzo recente* period,³ while a good comparison can also be observed in a large cup with a slightly rounded profile (rim diameter 26.4 cm) from the cave of Bezdanjača near Vrhovine in Lika.⁴ More similar vessels with semi-circular strap handles were found at this necropolis.⁵ Among these, a pot with a slightly curved neck from grave 34 deserves a special

¹ Salzani 1985, 30-32, Fig. 23.

² Točik 1964, Pl. 34: 14; Dušek 1980, Pl. 10: 18.

³ Cardarelli 1983, 98, Pl. 19: 38; Moretti 1978a, Fig. 4: 11; Gerdol, Stacul 1978, Fig. 5: 1,2.

⁴ Drechsler-Bižić 1979-1980, Pl. 7: 1; 36: 5.

⁵ *Ib.*, Pl. 26: 9; 27: 1; 36: 1; 37: 3.

srednjeevropski kronologiji.⁷ Podobno profiliran lonec z ročajem in nekoliko višjim vratom je bil najden tudi v glavnem vhodnem rovu Jame pod Jamskim gradom v Predjami pri Postojni.⁸

Skodelo iz Ljubije lahko primerjamo tudi s posamičnimi žarami starejše faze virovitiške skupine (Bd D) in sočasnih najdišč v vzhodni Sloveniji, ki pa imajo bolj konične vratove. Gre za posodo iz groba 1 na Potrčevi cesti na Ptuj, za katero že Dular, Šavel, Tecco Hvala¹⁰ navajajo paralele na najdiščih v Moravčah pri Sesvetah,¹¹ Virovitici¹² in Sirovi Kataleni.¹³ Navedenim primerom lahko dodamo še novejšo grobno najdbo iz Lepoglave v Podravini¹⁴ ter podoben lonec iz naselbine pod Meljskim hribom pri Mariboru.¹⁵ Po klekasti profilaciji notranjega ostenja se skodeli iz Ljubije približujeta tudi plitvejša skleda z močno izvihanim ustjem iz naselbine na Brinjevi gori pri Zrečah, ki jo je D. Oman pripisal srednjebronastodobnim oblikam,¹⁶ in posoda groba 2 na nekropoli Sármelek-Repülötér pri Keszthelyu (Kom. Veszprém),¹⁷ datirana v starejši del kulture žarnih grobišč (Ha A).

Razmeroma ozka časovna opredelitev je mogoča tudi za skledo s klekastim profilom in odebeljenim ustjem, ki ima na notranji strani ravno faseto (*t. 32: 4*). Podobno profilirane skleda in skodele, ki nastopajo v izvedbah z ročaji ali brez njih, so na Moravskem znane iz stopnje Blučina-Kopčany oz. prehoda srednje v mlajšo bronasto dobo (Bd C2/Bd D),¹⁸ fasetiran okras pa pozna že srednje podonavsko kultura gomil.¹⁹ Na Bavarskem je fasetiranje ustij in ostenij posod eden od vodilnih elementov v času skupine Riegsee (Bd D),²⁰ na Slovaškem in Moravskem pa se pojavlja v horizontih Pred Čaka in Blučina-Kopčany.²¹ V srednjem Podonavju se uveljavi v stopnjah Čaka²² in Baierdorf (Bd D/Ha A1).²³

Na območju južne Transdanubije, vzhodne Slovenije in medrečja Save in Drave je fasetiranje notranje

mention,⁶ dated by R. Drechler-Bižić as all the other enumerated vessels to the second burial horizon or Bd D and Ha A1 according to the Central European chronology.⁷ A pot with a similar profile, a handle and a slightly higher neck was found also in the main entry passage of the Cave below Predjama Castle in Predjama near Postojna.⁸ The cup from the Ljubija can be compared also to individual urns of the early phase of the Virovitica group (Bd D) and of the contemporary sites in eastern Slovenia, which, however, have more conical necks. For the latter, the vessel foremost in mind was found in grave 1 from the Potrčeva Street in Ptuj,⁹ for which Dular, Šavel, Tecco Hvala¹⁰ already offer parallels on the sites at Moravče near Sesvete,¹¹ Virovitica,¹² and Sirova Katalena.¹³ The examples cited may be added a recent grave find from Lepoglava in the Podravina area¹⁴ and a similar pot from the settlement below Meljski hrib above Maribor.¹⁵ The carinated profile of the inner walls of the Ljubija cup closely resembles also a shallower bowl with a strongly everted rim from the settlement on Brinjeva gora near Zreče, ascribed by D. Oman to the Middle Bronze Age forms,¹⁶ as well as a vessel from grave 2 on the Sármelek-Repülötér necropolis near Keszthely (Kom. Veszprém),¹⁷ dated to the early part of the Urnfield Culture period (Ha A).

Such a relatively narrow chronological determination may also be assigned to the bowl with a carinated profile, thickened rim and a straight facet on the inner side (*Pl. 32: 4*). Bowls and cups with similar profiles, appearing in versions with or without handles, are known in Moravia in the Blučina-Kopčany phase, during the transition from the Middle to the Late Bronze Age (Bd C2/Bd D),¹⁸ while the faceted decoration is already known in the Danubian Tumulus Culture.¹⁹ Facets on rims and walls of vessels are one of the leading elements in Bavaria, during the period of the Riegsee group (Bd D),²⁰ while it appears in

⁷ *Ib.*, 37.

⁸ Korošec 1956, t. 34: 2.

⁹ Jevremov 1988-1989, 171, sl. 2: 1; Dular, Šavel, Tecco Hvala 2002, 177, sl. 22: 1.

¹⁰ Dular, Šavel, Tecco Hvala 2002, 179, sl. 34: 4,8; 35: 3,9; 36: 2; 38: 4,11.

¹¹ Sokol 1996, 32, sl. 12: 2.

¹² Vinski-Gasparini 1973, t. 7: 6; 8: 1,4; 11: 2,3,5.

¹³ *Ib.*, t. 14: 1; 16: 5; 17: 1,5.

¹⁴ Šimek 2003, 153-155, sl. 2.

¹⁵ Djurić *et al.* 2003, 181,182.

¹⁶ Oman 1981, 117, sl. 29: 1; Dular, Šavel, Tecco Hvala 2002, 177, sl. 22: 1.

¹⁷ Patek 1968, 148, t. 50: 3.

¹⁸ Řihovský 1982, 172, t. 39: 15; 44: 10; 46: 1, 2, 6; 46: 11,17.

¹⁹ *Ib.*, 21, t. 15: B5; Paulík 1963.

²⁰ Müller-Karpe 1959, 189, sl. 23: 35,37,38.

²¹ Řihovský 1982, 49,50.

²² Paulík 1963, 334.

²³ Lochner 1986, 274, t. 1: 5; 3: 1.

⁶ *Ib.*, Pl. 19: 9.

⁷ *Ib.*, 37.

⁸ Korošec 1956, Pl. 34: 2.

⁹ Jevremov 1988-1989, 171, Fig. 2: 1; Dular, Šavel, Tecco Hvala 2002, 177, Fig. 22: 1.

¹⁰ Dular, Šavel, Tecco Hvala 2002, 179, Fig. 34: 4,8; 35: 3,9; 36: 2; 38: 4,11.

¹¹ Sokol 1996, 32, Fig. 12: 2.

¹² Vinski-Gasparini 1973, Pl. 7: 6; 8: 1,4; 11: 2,3,5.

¹³ *Ib.*, Pl. 14: 1; 16: 5; 17: 1,5.

¹⁴ Šimek 2003, 153-155, Fig. 2.

¹⁵ Djurić *et al.* 2003, 181,182.

¹⁶ Oman 1981, 117, Fig. 29: 1; Dular, Šavel, Tecco Hvala 2002, 177, Fig. 22: 1.

¹⁷ Patek 1968, 148, Pl. 50: 3.

¹⁸ Řihovský 1982, 172, Pl. 39: 15; 44: 10; 46: 1, 2, 6; 46: 11,17.

¹⁹ *Ib.*, 21, t. 15: B5; Paulík 1963.

²⁰ Müller-Karpe 1959, 189, Fig. 23: 35,37,38.

strani ustja skled in skodel²⁴ v času trajanja virovitiške skupine (Bd C2/Bd D - Bd D/Ha A1) dokaj redko (npr. Doljni Lakoš²⁵ in Mala Pupelica v Podravini),²⁶ podobno pa velja tudi za vodoravno fasetiranje zunanjih ostenij posod.²⁷ V stopnji Ha A1 se fasetiranje uveljavlja kot ena prevladujočih tehnik okrasa, ki navadno nastopa v kombinaciji s poševnim kaneliranjem, aplikami in navpičnim metličanjem. Fasetiranje je tako ena glavnih značilnosti mlajše faze grobišč (Ha A1) Balatonmagyaród-Hídvégpuszta²⁸ in Vörs-Battyáni disznólegelő,²⁹ predstavlja pa tudi pogost okras ustij in zunanje površine skled in skodel iz poznobronastodobnega naselja Kalnik-Igrišče pri Varaždinu, ki z večjim delom sodi v stopnjo Ha A.³⁰

Posodi iz Ljubije so sorodne tudi skleds s klekom (*ciotola carenata*) s Krasa, Istre in drugih najdišč v zaledju severnega Jadrana, ki predstavljajo enega tipičnih elementov časa med vključno mlajšim delom srednje bronaste dobe (*bronzo medio recente*) in pozno bronasto dobo (*bronzo finale*; druga polovica 12.-10. stol. pr. n. št.).³¹ Primerki s podobno profilacijo se med Istro in Furlanijo pojavljajo predvsem v mlajši bronasti dobi (*bronzo recente*; 13. in del 12. stoletja pr. n. št.),³² vendar so le redko fasetirani.³³ Za nas so posebej pomembne fasetirane skleds iz bronastodobnih najdišč na Notranjskem (Predjama, Križna gora, Metulje na Blokah)³⁴ in v Pokolpu (Kostel),³⁵ ki imajo podobno kot primerek iz Ljubije odebeljeno notranjo stran ustja. Naštete posode iz Notranjske bi lahko

Slovakia and Moravia in the horizons Pre-Čaka and Blučina-Kopčany.²¹ In the middle Danube basin, however, it is common in the Čaka²² and Baierdorf phases (Bd D/Ha A1).²³

Faceting the inner rim sides of bowls and cups²⁴ occurs fairly rarely in the areas of southern Transdanubia, eastern Slovenia and the region between the Sava and the Drava Rivers (for example Doljni Lakoš²⁵ and Mala Pupelica in the Podravina area²⁶) for the duration of the Virovitica group (Bd C2/Bd D - Bd D/Ha A1). A similar observation can be made for the horizontal faceting of outer vessel walls.²⁷ Faceting is established in the Ha A1 phase as one of the predominant decorative techniques, usually appearing in combination with oblique fluting, appliqués and vertical combing. It is, therefore, one of the main characteristics of the later phase (Ha A1) of the Balatonmagyaród-Hídvégpuszta²⁸ and Vörs-Battyáni disznólegelő²⁹ cemeteries but represents also a frequent decoration of the rim and the outer surface of bowls and cups at the Late Bronze Age settlement of Kalnik-Igrišče near Varaždin that belongs largely to Ha A.³⁰

The two vessels from the Ljubija are related also to carinated bowls (*ciotola carenata*) from the Kras region, Istria and other sites in the hinterland of the northern Adriatic that represent one of the typical elements of the time between and including the later part of the Middle Bronze Age (*bronzo medio recente*) and the Late Bronze Age (*bronzo finale*; second half of the 12th-10th century BC).³¹ Examples with a similar profile appear between Istria and Friuli mostly during the Late Bronze Age (*bronzo recente*; 13th and part of the 12th centuries BC),³² but are rarely

²⁴ Neokrašene skleds in skodele s klekom so v temu času sicer znane iz vrste naselbin in grobišč na prostoru med južno Transdanubijo, vzhodno Slovenijo in severno Bosno; npr. Doljni Lakoš (Dular, Šavel, Tecco Hvala 2002, t. 2: 13; 5: 4; 8: 19; 9: 6; 12: 5; 25: 1-3; 30: 5; 31: 13,14; 42: 1-5; 49: 5; 57: 3,4, 59: 14), Rabelčja vas (Strmčnik-Gulič 1988-1989, t. 2: 3; 6: 15), Drljanovac (Majnarić-Pandžić 1988, sl. 3; ead. 1994, t. 2: 3), Gređani (Minichreiter 1984, sl. 3), Barice pri Gornji Orahovici (Čović 1958, t. 1: 1-3,5,9,10; 2: 1,2,6-8).

²⁵ Dular, Šavel, Tecco Hvala 2002, 177, sl. 11: O18; t. 4: 6; 42: 7.

²⁶ Majnarić-Pandžić 1988, 23, sl. 4: 2,3.

²⁷ Ložnjak 2003, 35,36, t. 1: 1.

²⁸ Horváth 1994, t. 13: 1,2; 14: 1,5.

²⁹ Dular, Šavel, Tecco Hvala 2002, sl. 31: 12.

³⁰ Vrdoljak 1994, 28-31, t. 15: 1; 22: 1, 2; 26: 3; 29:3.

³¹ Cardarelli 1983, 98, t. 19: 47-49, 20: 20A; 22: 51.

³² Npr. Pozzuolo del Friuli-Braida Roggia (Càssola Guida, Borgna 1994, 168, 171, sl. 37: 95; 45: 139), Castions di Strada (Càssola Guida 1983, 80, t. 14: 1), Most na Soči (Svoljšak 1988-1989, 369, t. 1: 13,14), Kovačeva jama pri Robiču (Bressan 1988-1989, t. 3: 5,6,8,9), Njivice (Moretta 1978a, 21, sl. 3: 2), Sermin (Svetličič 1997, 50, t. 28: 24).

³³ Sakara Sučević 2004, 54, sl. 7: 5.2c1, 5.2c.2; 385,386.

³⁴ Korošec 1956, t. 39: 1-4; Korošec 1988-1989, 334, t. 1: 12,13; 2: 1; Guštin 1979, t. 16: 2; Urleb 1974, t. 32: 9,11.

³⁵ Velušček 1996, t. 12: 8; 20: 5; 21: 3.

²¹ Řihovský 1982, 49,50.

²² Paulik 1963, 334.

²³ Lochner 1986, 274, Pl. 1: 5; 3: 1.

²⁴ Undecorated carinated bowls and cups are otherwise known in this time from numerous settlements and cemeteries in the area between the southern Transdanubia, eastern Slovenia and northern Bosnia; for example Doljni Lakoš (Dular, Šavel, Tecco Hvala 2002, Pl. 2: 13; 5: 4; 8: 19; 9: 6; 12: 5; 25: 1-3; 30: 5; 31: 13,14; 42: 1-5; 49: 5; 57: 3,4, 59: 14), Rabelčja vas (Strmčnik-Gulič 1988-1989, Pl. 2: 3; 6: 15), Drljanovac (Majnarić-Pandžić 1988, Fig. 3; ead. 1994, Pl. 2: 3), Gređani (Minichreiter 1984, Fig. 3), Barice near Gornja Orahovica (Čović 1958, Pl. 1: 1-3,5,9,10; 2: 1,2,6-8).

²⁵ Dular, Šavel, Tecco Hvala 2002, 177, Fig. 11: O18; Pl. 4: 6; 42: 7.

²⁶ Majnarić-Pandžić 1988, 23, Fig. 4: 2,3.

²⁷ Ložnjak 2003, 35-36, Pl. 1: 1.

²⁸ Horváth 1994, Pl. 13: 1,2; 14: 1,5.

²⁹ Dular, Šavel, Tecco Hvala 2002, Fig. 31: 12.

³⁰ Vrdoljak 1994, 28-31, Pl. 15: 1; 22: 1,2; 26: 3; 29: 3.

³¹ Cardarelli 1983, 98, Pl. 19: 47-49, 20: 20A; 22: 51.

³² For example Pozzuolo del Friuli-Braida Roggia (Càssola Guida, Borgna 1994, 168,171, Fig. 37: 95; 45: 139), Castions di Strada (Càssola Guida 1983, 80, Pl. 14: 1), Most

uvrstili v starejše naselitvene faze najdišč (Bd D-Ha A1), medtem ko se ta način okrasa na Štajerskem in Dolenjskem bolj uveljavi šele v mlajši KŽG in zgodnjem halštatu, kjer je omejen predvsem na notranje robove ustij loncev in pitosov ter zunanja ostenja in ustja latvic.³⁶ Na gradiščih severne in severozahodne Bosne se fasetirane skledе in skodele pojavljajo predvsem v plasteh stopenj Ha A in Ha B.³⁷

Odlomek omfalos dna z delom ostenja (*t.* 32: 3) najverjetneje pripada nizki skledi s presegačim ročajem. V Podonavju so običajne že v srednji bronasti dobi,³⁸ v okolici Blatnega jezera pa se pojavljajo v grobovih mlajše faze grobišča (Ha A1) Balatonmagyaród-Hídvégpuszta.³⁹ V vzhodni in osrednji Sloveniji doživijo skodelice s presegačimi ročaji višek priljubljenosti v mlajšem delu KŽG in na začetku železne dobe. Na grobiščih v Ljubljani⁴⁰ in Dobovi⁴¹ predstavljajo primerki z vbočenim dnem eno vodilnih oblik.

Nizki bikonični skledi z ostankom ročaja oz. dvojne bradavice tik pod največjim obodom (*t.* 32: 1; *sl.* 12.3) ne poznamo neposrednih primerjav. Še najbližje so ji navadno nekoliko večje nizke skledе z nizkim vratom iz žganih grobov na nekropoli Salka na južnem Slovaškem, ki je pripisana karpatski kulturi grobnih gomil (Bd C).⁴² Zelo podobna je tudi skodela iz naselja Šarovce (okr. Levice) na jugovzhodnem Slovaškem, ki jo je Paulík uvrstil v horizont Čaka (Bd D/Ha A1).⁴³ Ročaj tik pod največjim obodom posode imajo tudi globoke skodele s kaneliranim okrasom iz grobišča Baierdorf.⁴⁴

Z dvojno vodoravno bradavico in vrezanimi visečimi trikotniki okrašeno skledo zelo podobne profilacije, vendar brez ročaja, najdemo na bronastodobni naselbini v Vinkovcih skupaj s psevdo vrvičasto okrašenimi žarami in amforami.⁴⁵ Plast je bila pripisana starejšemu delu belegiške faze vatinske skupine oz. srednji bronasti dobi (Bd B2-C1), podobne skledе pa se v vzhodni Slavoniji pojavljajo še v stopnjah Bd D in Ha A1.⁴⁶ Preproste bikonične skledе z nizkim vratom

facetted.³³ Of a special interest here are the faceted bowls from the Bronze Age sites in Notranjska (Predjama, Križna gora, Metulje on Bloke)³⁴ and in the Kolpa basin (Kostel)³⁵ that have, similarly to the example from the Ljubija, a thickened inner side of the rim. The above-mentioned vessels from Notranjska could be attributed to the earlier settlement phases of the sites (Bd D-Ha A1), while this decorative technique only becomes commoner in Štajerska and Dolenjska in the later Urnfield Culture and Early Hallstatt periods and it is limited mostly to the inner rim edges of pots and pithoi as well as outer walls and rims of shallow bowls.³⁶ The hillforts of northern and north-western Bosnia reveal faceted bowls and cups predominantly in the layers of phases Ha A and Ha B.³⁷ A fragment of an omphalos base with part of the walls (*Pl.* 32: 3) most probably belongs to a low bowl with an updrawn handle. These are common in the Danube basin already during the Middle Bronze Age,³⁸ while they appear around Lake Balaton in the graves of a later phase of the Balatonmagyaród-Hídvégpuszta (Ha A1) cemetery.³⁹ Cups with updrawn handles reach the peak of their popularity in eastern and central Slovenia during the later part of the Urnfield Culture period and at the beginning of the Iron Age. At the cemeteries of Ljubljana⁴⁰ and Dobova,⁴¹ for example, the vessels with a concave base represent one of the leading forms.

Direct comparisons to the low biconical bowls with the remains of a handle or a double knob just below maximum diameter (*Pl.* 32: 1; *Fig.* 12.3) are not known. Closest are the usually slightly larger low bowls with a low neck from cremation graves at the Salka cemetery in southern Slovakia, ascribed to the Carpathian Tumulus Culture (Bd C).⁴² Very similar is also a cup from the Šarovce settlement (the Levice

na Soči (Svoljšak 1988-1989, 369, Pl. 1: 13,14), the cave of Kovačeva jama near Robič (Bressan 1988-1989, Pl. 3: 5,6,8,9), Njivice (Moretti 1978a, 21, Fig. 3: 2), Sermin (Svetličič 1997, 50, Pl. 28: 24).

³³ Sakara Sučević 2004, 54, Fig. 7; 5.2c1, 5.2c.2; 385,386.

³⁴ Korošec 1956, Pl. 39: 1-4; Korošec 1988-1989, 334, Pl. 1: 12,13; 2: 1; Guštin 1979, Pl. 16: 2; Urleb 1974, Pl. 32: 9,11.

³⁵ Velušček 1996, Pl. 12: 8; 20: 5; 21: 3.

³⁶ Dular 1993, 105; Velušček 1996, 65.

³⁷ For example Kekića glavica (Čović 1962, 56,57, Fig. 2: 1c,3a,3b,5a), Vis near Derventa and Zecovi near Prijedor (Čović 1965, 35,41, Pl. 1: 1,2; 3: 1-3,5,6).

³⁸ For example Torbrügge 1961, 35, Fig. 10: 8; Řihovský 1982, 170, Pl. 10: 2,8; 11: 2,3,7; 17: 6; Doneus 1994, Fig. 3: 11-13.

³⁹ Horváth 1994, Pl. 13: 1,2; 14: 1,5.

⁴⁰ Stare 1954, 97, Pl. 1: 1-5, 8; 5: 5; 24: 5; 27: 1; 28: 4; 42: 4; 48: 1; 67: 2; 69: 3; Puš 1982, Pl. 29: 1.

⁴¹ Stare 1975, Pl. 6: 13; 24: 11; 36: 4; 42: 1; 47: 4; 48: 8; 55: 1; 56: 2.

⁴² Točík 1964, 50, Fig. 5: 21; Pl. 19: 11; 27: 17; 30: 13.

³⁶ Dular 1993, 105; Velušček 1996, 65.

³⁷ Npr. Kekića glavica (Čović 1962, 56,57, sl. 2: 1c,3a,3b,5a), Vis pri Derventi in Zecovi pri Prijedoru (Čović 1965, 35, 41, t. 1: 1,2; 3: 1-3,5,6).

³⁸ Npr. Torbrügge 1961, 35, sl. 10: 8; Řihovský 1982, 170, t. 10: 2,8; 11: 2,3,7; 17: 6; Doneus 1994, sl. 3: 11-13.

³⁹ Horváth 1994, t. 13: 1, 2; 14: 1,5.

⁴⁰ Stare 1954, 97, t. 1: 1-5, 8; 5: 5; 24: 5; 27: 1; 28: 4; 42: 4; 48: 1; 67: 2; 69: 3; Puš 1982, t. 29: 1

⁴¹ Stare 1975, t. 6: 13; 24: 11; 36: 4; 42: 1; 47: 4; 48: 8; 55: 1; 56: 2.

⁴² Točík 1964, 50, sl. 5: 21; t. 19: 11; 27: 17; 30: 13.

⁴³ Paulík 1963, 303, sl. 30: 3.

⁴⁴ Lochner 1986, t. 6: 2,3,5; 7: 6.

⁴⁵ Dizdar 1996, 15, t. 2: 4.

⁴⁶ Ib., 15; Šimić 1987, t. 9: 9.



Sl. 12.3: Na območju 2 je bila najdena večina odlomkov manjše sklede (foto: Andrej Gaspari).

Fig. 12.3: Most of the fragments of a small bowl were found in area 2 (photo: Andrej Gaspari).

so znane tudi iz kaštelirjev na Krasu, v Furlaniji⁴⁷ in Istri, kjer so v izvedbi z notranjimi fasetami prisotne še v 10. stoletju pr. n. št. in naprej.⁴⁸

Zgornji del sklede z navpičnim ustjem in nizkim, rahlo usločenim vratom (*t. 32: 7*) prav tako pripada dolgotrajnim oblikam. Podobne sklede in skodele so znane z višinske naselbine pri Žlebiču⁴⁹ in najdišča Sághegy (Kom. Vas, Kr. Celldömölk),⁵⁰ pa tudi iz groba virovitiške skupine v Vočinu (Podravina), ki ji Ložnjakova navaja primerjavo na grobišču v Sotinu.⁵¹ Sorodne oblike pozna tudi kaštelirska kultura.⁵²

Trakast ročaj (*t. 32: 8*) najverjetneje pripada manjši skodeli tipa Sk 1 po Dularju, kakršna je bila najdena v plasteh bližnjega naselja Iška Loka.⁵³

Latvice (*t. 32: 2*) sodijo med kronološko manj oprijemljive oblike, saj se na ozemlju med severnim Jadranom in Podonavjem pojavljajo vse od začetka pozne bronaste dobe do halštatskega obdobja.⁵⁴ Ovalna aplikacija na največjem obodu posode iz Ljubije govori o navezanosti na srednjobronastodobne dekorativne tehnike.⁵⁵ Latvici z ovalno aplikacijo sta bili najdeni na bližnjih naselbinah pri Žlebiču⁵⁶ in Iški Loki,⁵⁷ soroden

district) in south-eastern Slovakia, attributed by Paulík to the Čaka horizon (Bd D/Ha A1).⁴³ As for the handle just below maximum vessel diameter, it can also be found on deep cups with fluted decoration from the eponymic Baierdorf cemetery.⁴⁴

A bowl decorated with a double horizontal knob and incised hanging triangles of a similar profile but no handle was found in the Bronze Age settlement at Vinkovci together with urns and amphoras with pseudo-cord decoration.⁴⁵ The layer was ascribed to the earlier part of the Belegiš phase of the Vatin group, that is the Middle Bronze Age (Bd B2-C1), while similar bowls appear in Slavonia also in phases Bd D and Ha A1.⁴⁶ Simple biconical bowls with a low neck are known also from the hillforts in Kras, Friuli⁴⁷ and Istria, where they are present with the variant with the interior facets also in the 10th century BC and onwards.⁴⁸

The upper part of the bowl with a vertical rim and a low, slightly curved neck (*Pl. 32: 7*) also belongs to persisting forms. Similar bowls and cups are known from a hill settlement near Žlebič⁴⁹ and the Sághegy site (Kom. Vas, Kr. Celldömölk)⁵⁰ as well as from a grave of the Virovitica group in Vočin (the Podravina area), to which Ložnjak cites a parallel at the cemetery at Sotin.⁵¹ Related forms are known also in the Castelieri Culture.⁵²

The strap handle (*Pl. 32: 8*) most probably belongs to a smaller cup of the Sk 1 type by Dular, such as was found in the layers of the near-by settlement of Iška Loka.⁵³

Shallow bowls (*Pl. 32: 2*) belong to chronologically less defined forms, since they appear in the area between the northern Adriatic and the Danube basin from the beginning of the Late Bronze Age to the Hallstatt period.⁵⁴ The oval appliqué at maximum vessel diameter from the Ljubija resembles Middle Bronze Age decorative techniques.⁵⁵ The two shallow bowls

⁴⁷ Lonza 1981, t. 24: 3; Gerdol, Stacul 1978, sl. 3: 5,6,10.

⁴⁸ Cardarelli 1983, 112, t. 32: 7.

⁴⁹ Puš 1988-1989, t. 2: 9.

⁵⁰ Patek 1968, 36,37, t. 15: 18.

⁵¹ Ložnjak 2003, 37, t. 3: 1.

⁵² Moretti 1978a, 48, sl. 3: 8; Moretti 1978b, 48, sl. 3: 9,11,13,15; Lonza 1981, t. 6: 3.

⁵³ Velušček 2005, t. 7: 3.

⁵⁴ Dular 1982, 75, 113, 127; Cardarelli 1983, 100, t. 21: 26,28,29,32,175; 22: 28A,33,25A,27,30,31; Càssola Guida, Borgna 1994, 162, sl. 30: 37-41; Sakara Sučević 2004, 57-63, sl. 8: tipi 6.1a-6.5; Lochner 1991, 301,302.

⁵⁵ Jankovits 1992, 338; Dular, Šavel, Tecco Hvala 2002, 159, sl. 11: O9.

⁵⁶ Puš 1988-1989, t. 3: 7.

⁵⁷ Velušček 2005, t. 5: 11.

⁴³ Paulík 1963, 303, Fig. 30: 3.

⁴⁴ Lochner 1986, Pl. 6: 2,3,5; 7: 6.

⁴⁵ Dizdar 1996, 15, Pl. 2: 4.

⁴⁶ *Ib.*, 15; Šimić 1987, Pl. 9: 9.

⁴⁷ Lonza 1981, Pl. 24: 3; Gerdol, Stacul 1978, Fig. 3: 5,6,10.

⁴⁸ Cardarelli 1983, 112, Pl. 32: 7.

⁴⁹ Puš 1988-1989, Pl. 2: 9.

⁵⁰ Patek 1968, 36,37, Pl. 15: 18.

⁵¹ Ložnjak 2003, 37, Pl. 3: 1.

⁵² Moretti 1978a, 48, Fig. 3: 8; Moretti 1978b, 48, Fig. 3: 9,11,13,15; Lonza 1981, Pl. 6: 3.

⁵³ Velušček 2005, Pl. 7: 3.

⁵⁴ Dular 1982, 75,113,127; Cardarelli 1983, 100, Pl. 21: 26,28,29,32,175; 22: 28A,33,25A,27,30,31; Càssola Guida, Borgna 1994, 162, Fig. 30: 37-41; Sakara Sučević 2004, 57-63, Fig. 8: types 6.1a-6.5; Lochner 1991, 301,302.

⁵⁵ Jankovits 1992, 338; Dular, Šavel, Tecco Hvala 2002, 159, Fig. 11: O9.

primerek pa poznamo tudi iz nekoliko mlajšega groba 35 v Gređanih pri Novi Gradiški v Slavoniji.⁵⁸

Večji del dna z okrasom navpičnega glavničenja verjetno pripada tipu loncev s cilindričnim ali stožčastim vratom, ki se v Spodnji Avstriji in zahodni Transdanubiji pojavljajo v času celotne KŽG.⁵⁹

Iz 22 odlomkov je bilo moč rekonstruirati tudi zgornje dele treh velikih loncev s trebušastim trupom (*t.* 33: 12-14), od katerih sta dva okrašena z vodoravnimi rebri z vtisi prstov. Razmeroma redke oblike, ki pogosto nastopajo v funkciji žare, se pojavljajo vse od srednje bronaste dobe naprej, podoben časovni razpon pa ima tudi omenjena tehnika krašenja.⁶⁰ Razčlenjena vodoravna rebra poznata tudi plana naselbina Iška Loka⁶¹ ter okvirno sočasno višinsko naselje pri Žlebiču.⁶²

4 SKLEP

Sodeč po enotni lončarski masi in dodelavi posod, kronološki homogenosti oblik ter ozko zamejenemu območju razprostranjenosti lahko razmeroma skromne najdbe iz Ljubije pripišemo časovno zaključenemu kompleksu. Glede na analogije z gradivom iz bližnjih naselbin Žlebič in Iška Loka ter bolj oddaljenih najdišč na severovzhodu in v zaledju severnega Jadrana se nagibamo k mnenju, da gre za ostanke kratkotrajne naselbine nekje iz časa med vključno mlajšim delom srednje bronaste dobe (Bd C2) in mlajšo bronasto dobo (Bd D-Ha A1).

Glavno območje razprostranjenosti prazgodovinskih najdb, ki natančno ustreza obsegu regulacije, pričča, da izvirajo najdbe iz kopenskega konteksta, ki je bil bodisi odplavljen ali pa je v vodo dospel ob izkopu nove struge. Ker je bilo 7 odlomkov prostoročno izdelanih posod, od tega fragmenti dna, zgornjega dela sklede (*t.* 32: 7), polkrožnega trakastega ročaja (*t.* 32: 8) in štirih ostenij najdenih tudi okoli 150 m dol vodno na območju kamenodobnega najdišča Zalog (II) sklepamo, da najdišče obsega precejšen del okljuka. sestava najdb (keramične posode, sileksi, redke živalske kosti) bi lahko kazala na doslej neznan naselbino, ni

with oval appliqués were found in the near-by settlements near Žlebič⁵⁶ and Iška Loka,⁵⁷ while a related example is known also from a somewhat later grave 35 at Gređani near Nova Gradiška in Slavonia.⁵⁸

The large piece of a base with vertical combed decoration probably belongs to a type of pots with a cylindrical or cone neck that appear in Lower Austria and western Transdanubia throughout the Urnfield Culture period.⁵⁹ The altogether twenty-two pot fragments allowed also a reconstruction of the upper parts of three large pots with globular bodies (*Pl.* 33: 12-14), two of which decorated with horizontal ribs with finger impressions. These relatively rare forms, often used as urns, appear from the Middle Bronze Age onwards, while the decorative technique used shows a similar time span.⁶⁰ The horizontal ribs with impressed decoration are known also from the plane settlement at Iška Loka⁶¹ and the roughly contemporary upland settlement near Žlebič.⁶²

4 CONCLUSION

The uniform clay fabric and vessel decoration, the chronologic homogeneity of the forms as well as the limited area of distribution all suggest that the relatively modest finds from the Ljubija belong to a chronologically closed complex. Furthermore, the analogies with the material from the near-by settlements of Žlebič and Iška Loka as well as more distant sites to the northeast and in the hinterland of the northern Adriatic suggest that these are the remains of a settlement of a short duration dating from and including the later part of the Middle (Bd C2) and the Late Bronze Age (Bd D-Ha A1).

The main area of distribution of the prehistoric finds, which exactly corresponds to the extent of the stream regulation, indicates that the finds originated from a dry-land context that was either washed away or submerged during the construction of a new bed. The find of seven fragments of handmade vessels, which include fragments of bases, upper part of a bowl (*Pl.* 32: 7), semi-circular strap handle (*Pl.* 32: 8) and four wall fragments, as far away as 150 m downstream, in the area of the Mesolithic Zalog (II) site, suggests that the site spreads across most of the sharp

⁵⁸ Dular, Šavel, Tecco Hvala 2002, 177, sl. 43: 3.

⁵⁹ Lochner 1986, t. 8: 7; ead. 1991, 298,299.

⁶⁰ Patek 1968, 91, t. 3: 12,13; Lochner 1991, 298; Svöljšak 1988-1989, t. 7: 4; Puš 1988-1989, t. 4: 2,3; Dular, Šavel, Tecco Hvala 2002, sl. 4: L2.

⁶¹ Velušček 2005, 75, t. 2: 1-4; 3: 7; 4: 1-6; 5: 8,12; 6: 1; 7: 1,7-9.

⁶² Puš 1988-1989, t. 9.

⁵⁶ Puš 1988-1989, Pl. 3: 7.

⁵⁷ Velušček 2005, Pl. 5: 11.

⁵⁸ Dular, Šavel, Tecco Hvala 2002, 177, Fig. 43: 3.

⁵⁹ Lochner 1986, Pl. 8: 7; ead. 1991, 298,299.

⁶⁰ Patek 1968, 91, Pl. 3: 12,13; Lochner 1991, 298; Svöljšak 1988-1989, Pl. 7: 4; Puš 1988-1989, Pl. 4: 2,3; Dular, Šavel, Tecco Hvala 2002, Fig. 4: L2.

⁶¹ Velušček 2005, 75, Pl. 2: 1-4; 3: 7; 4: 1-6; 5: 8,12; 6: 1; 7: 1,7-9.

⁶² Puš 1988-1989, Pl. 9.

pa izključena niti nekropola. Pri opredeljevanju značaja najdišča nam prisotnost odbitkov ne pove veliko, saj se kamniti artefakti kot del naselbinskega ali grobnega inventarja pojavljajo vse do starejše železne dobe. Iz mlajših obdobij prazgodovine omenimo silekse z nižinskih naselij Iška Loka,⁶³ Krtina pri Domžalah, Zagorica pri Biču, Log in Zemono pri Vipavi, Šiman pri Gotovljah⁶⁴ ter prdatke v žarnih grobovih iz Dobove⁶⁵ in dvorišča SAZU v Ljubljani.⁶⁶ Sodeč po opisih so odbitki iz grobišča v Ljubljani izdelani iz podobnega materiala kot tisti iz Ljubije, torej zelenega ali sivo zelenega tufa.

V času, ki mu pripadajo najdbe iz Ljubije, kolišča na Ljubljanskem barju ne živijo več, saj se ta tip poselitve z izjemo Šivčevega prekopa izteče v fazi pramenaste keramike oz. v stopnji Bd A2 (Lj. barje VII; Ig c, Notranje gorice d).⁶⁷ Poleg najdb s kolišč sodijo v zgodnjo bronasto dobo tudi razmeroma redke keramične najdbe iz Ljubljanice, odkrite predvsem vzdolž ledin Lipovec v bližini kompleksa kolišč pod Blatno Brezovico ter Bržič in Tri Lesnice v Kaminu pri Bevkah.⁶⁸

Srednji bronasti dobi pripada skupna najdba jezičastoročajnega meča tipa Sombor, plavutaste sekire, igle in keramičnega lonca, ki jo je Naravoslovnemu muzeju na Dunaju prodal vrhniški župan K. Jelovšek leta 1911. Najdba, ki najverjetneje izvira iz okolice Vrhnike oz. zahodnega dela Barja, je bila sprva opisana kot depo, nato kot grobna celota iz stopnje Bd C,⁶⁹ v novejšem času pa se ponovno favorizira mnenje, da gre za depojsko najdbo.⁷⁰ Na konec zgodnje bronaste dobe in v srednjo bronasto dobo sodijo posamične vodne in močvirske najdbe kovinskih predmetov,⁷¹ v temu času pa lahko iščemo tudi začetek enega najbolj evidentnih odlagališč dolgega trajanja, ki je obsegal okolico sotočja Ljubljanice in Bistre.⁷²

Oblike in okras keramičnega inventarja grobov iz Podsmreke pri Višnji gori, Kamnika, morda tudi vasi Krka⁷³ ter naselbinske najdbe iz gradišča na Grajskem

bend. The composition of finds (ceramic vessels, stone flakes, rare animal bones), on the other hand, might indicate an as yet unknown settlement though a cemetery is also not to be excluded. The presence of flakes on the site does not help much in defining its nature, since stone artefacts can appear as constituent parts of settlement or cemetery contents all to the Early Iron Age. To illustrate the latter, we should mention stone flakes at late prehistoric sites: at lowland sites at Iška Loka,⁶³ Krtina near Domžale, Zagorica near Bič, Log and Zemono near Vipava, Šiman near Gotovlje⁶⁴ and at cemeteries at Dobova⁶⁵ and the SAZU courtyard in Ljubljana,⁶⁶ where they appeared as goods in cremation graves. Based on the descriptions, the flakes from the cemetery in Ljubljana were made of a similar material as those from the Ljubija, that is green or grey-green chert.

During the time-span indicated by the Ljubija finds, the pile dwelling settlements at the Ljubljansko barje no longer exist, since the settlement type, with the exception of the site at Šivčev prekop, terminates in the Litzen ware phase, that is in Bd A2 (phases Lj. barje VII; Ig c, Notranje gorice d).⁶⁷ The Early Bronze Age is represented, beside the finds from the pile dwelling settlements, also by the relatively rare finds from the Ljubljanica, found predominantly along the fallows of Lipovec in the vicinity of the pile dwellings below Blatna Brezovica as well as Bržič and Tri Lesnice at Kamin near Bevke.⁶⁸

The Middle Bronze Age is represented by a group find consisting of a flange-hilted sword of the Sombor type, a winged axe, a pin and a ceramic pot, sold to the Natural History Museum in Vienna by K. Jelovšek, the mayor of Vrhnika in 1911. The find most probably originates from the surroundings of Vrhnika or the eastern part of the Ljubljansko barje. It was initially described as a hoard and later as a grave unit of the Bd C phase,⁶⁹ while recently the opinion again favours it being a hoard find.⁷⁰ There are individual underwater and moor finds of metal objects that are also ascribed to the period of the end of the Early and the Middle Bronze Age.⁷¹ This may also be the time where the onset of one of the most evident long-term

⁶³ Velušček 2005, t. 2: 9.

⁶⁴ Djurić *et al.* 2003, 167,168,175,176,256,257,276,277, 279,280.

⁶⁵ Stare 1975, t. 53: 8.

⁶⁶ Stare 1954, 105,106, t. 21: 5; 22: 6,9, 12; 24: 7; 25: 6; 26: 4; 27: 4,5; 34: 6,7,9,10; 38: 9; 41: 4,5; 42: 2; 50: 6,7; 65: 3; 66: 6-22; Puš 1971, 96, t. 10: 4; 16: 9; id. 1982, t. 4: 12; 11: 14; 12: 12; 16: 5; 19: 13; 22: 5; 23: 8,9,11; 47: 10.

⁶⁷ Parzinger 1984; Gabrovec 1988-1989, 116.

⁶⁸ Potočnik 1988-1989, t. 3: 25,26.

⁶⁹ Gabrovec 1966.

⁷⁰ Turk 2000, 129.

⁷¹ Šinkovec 1996.

⁷² Gaspari 2004, 41, sl. 6: 1,2,8; P. Pavlin, Srednjebronastodobni levoročni jezičastoročajni srpi in meč iz Ljubljanice. - *Arheološki vestnik* 57, v tisku.

⁷³ Dular, Šavel, Tecco Hvala 2002, 177-181, sl. 23,24.

⁶³ Velušček 2005, Pl. 2: 9.

⁶⁴ Djurić *et al.* 2003, 167,168,175,176,256,257,276,277, 279,280.

⁶⁵ Stare 1975, Pl. 53: 8.

⁶⁶ Stare 1954, 105,106, Pl. 21: 5; 22: 6,9, 12; 24: 7; 25: 6; 26: 4; 27: 4,5; 34: 6,7,9,10; 38: 9; 41: 4,5; 42: 2; 50: 6,7; 65: 3; 66: 6-22; Puš 1971, 96, Pl. 10: 4; 16: 9; id. 1982, Pl. 4: 12; 11: 14; 12: 12; 16: 5; 19: 13; 22: 5; 23: 8,9,11; 47: 10.

⁶⁷ Parzinger 1984; Gabrovec 1988-1989, 116.

⁶⁸ Potočnik 1988-1989, Pl. 3: 25,26.

⁶⁹ Gabrovec 1966.

⁷⁰ Turk 2000, 129.

⁷¹ Šinkovec 1996.

griču v Ljubljani,⁷⁴ planega naselja Iška Loka na južnem obrobju Barja⁷⁵ ter na Korinjskem hribu pri Velikem Korinju⁷⁶ kažejo, da je bila v času mlajše bronzaste dobe (Bd D-zgodnji Ha A) osrednja Slovenija v vplivnem območju kulturnih skupin iz Transdanubije ter medrečja Save in Drave. Stiki z virovitiško skupino in sočasnimi skupinami na severovzhodu so razvidni v primeru skupne najdbe lonca in sklede v strugi Ljubljanice pri Lipovcu pod Blatno Brezovico, ki ju lahko morda obravnavamo kot ostanek posebne oblike pokopa.⁷⁷ Zanj bi lahko govorila tudi v neposredni bližini odkrita bronasta igla z bikonično glavico in šrafiranim vzorcem na vratu.⁷⁸ Tovrstne igle se pojavljajo na prostoru med južno Češko in Bosno, večina od 13 znanih primerkov pa izvira iz Gradiščanskega in zahodne Madžarske. Datirane so med konec srednje bronzaste dobe (Bd C2) in starejši del kulture žarnih grobišč (Ha A1) s težiščem v stopnji Bd D, večina najdb iz znanih kontekstov pa govori, da so predvsem pridatek ženskih grobov.⁷⁹ Več odlomkov posod z značilnim okrasom omenjenih skupin (okrogle izbokline, obdane z žlebom, ter rebra s trikotnim presekom) izvira tudi iz okolice izliva Pekovega grabna v Kaminu (sl. 12.4: 4,5).

Okvirno v ta čas (Bd D-Ha A1) sodijo najstarejši žarni grobovi z dvorišča SAZU, pri katerih je B. Teržan opozorila na podobnosti z gradivom z zahodnega Balkana.⁸⁰ Na povezave ljubljanskega prostora z Liko in bližnjimi notranjskimi najdišči ter kaštelirsko kulturo kažejo tunelasti ročaji s konkavnimi robovi⁸¹ iz groba 278 na dvorišču SAZU⁸² in Ljubljanice v Kaminu na zahodnem delu Barja (sl. 12.4: 3),⁸³ vrsta skodel s presegajočimi ročaji iz istega podvodnega kompleksa,⁸⁴ morda pa tudi globoka skodela z ročajem (t. 32: 6) ter skleda s fasetiranim ustjem iz Ljubije (t. 32: 4). Na tem mestu omenimo še skledo z ročajem iz kolišča ob Šivčevem prekopu pri Preserju (sl. 12.4: 1),⁸⁵ ki ima primerjavo v posodah iz Dolnjega Lakoša, Rabelčje vasi in Brinjeve gore,⁸⁶ zelo podobne pa so znane tudi s Krasa, Posočja in vzhodnega dela Furlanije, kjer so značilne za stopnjo *bronzo recente*.⁸⁷ V nekoliko

places of deposition, spreading over the confluence of the Ljubljanica and the Bistra, may be sought.⁷²

The forms and decoration of the ceramic grave goods from Podsmreka near Višnja gora, Kamnik, possibly also the Krka village⁷³ as well as settlement finds from the hillfort on the Castle hill in Ljubljana,⁷⁴ the plane settlement of Iška Loka at the southern outskirts of the Ljubljansko barje⁷⁵ and on Korinjski hrib above Veliki Korinj⁷⁶ indicate that central Slovenia, during the Late Bronze Age (Bd D-early Ha A), was within the field of influence of cultural groups from Transdanubia as well as the Drava and the Sava confluence. Contacts with the Virovitica group and contemporary groups to the northeast are clearly visible through the group find of a pot and a bowl in the bed of the Ljubljanica near Lipovec below Blatna Brezovica, possibly interpreted as the remains of a very specific form of burial.⁷⁷ The interpretation is supported by a bronze pin with a biconical head and hatched decoration on the neck, found in the immediate vicinity.⁷⁸ These pins appear in the area between southern Bohemia and Bosnia with most of the thirteen known examples originating from the Burgenland area and western Hungary. They are dated between the end of the Middle Bronze Age (Bd C2) and the early part of the Urnfield Culture period (Ha A1) with the majority appearing during the Bd D phase. Most finds from known contexts indicate these to be found mostly in female graves.⁷⁹ Several fragments of vessels with typical decoration of the above-mentioned groups (round knobs surrounded by a flute, ribs with a triangular section) were also found in the surroundings of the Pekov Graben outflow at Kamin (Fig. 12.4: 4,5). Ascribed to the approximately same time frame are the earliest cremation graves from the SAZU courtyard, the similarities of which with the material from the western Balkans were indicated by B. Teržan.⁸⁰ The connections of the Ljubljana area with Lika and near-by sites of Notranjska as well as the Castellieri Culture are indicated by tunnel handles with concave edges⁸¹ from grave 278 at the SAZU courtyard⁸² and from the Ljubljanica at Kamin in the western part

⁷⁴ Podatek I. Šinkovec.

⁷⁵ Velušček 2005.

⁷⁶ Dular *et al.* 1995, 95, t. 2: 9-16.

⁷⁷ Potočnik 1988-1989, t. 4: 28,29; Dular, Šavel, Tecco Hvala 2002, 181.

⁷⁸ Gaspari 2004, sl. 7: 8.

⁷⁹ Helgert 1995, 226-229, sl. 9,10.

⁸⁰ Teržan 1990, 22; ead. 1995, 330.

⁸¹ Velušček 1996, 62.

⁸² Puš 1982, t. 7: 6.

⁸³ Petru *et al.* 1982, t. 11: 201+198.

⁸⁴ Npr. Petru *et al.* 1982, t. 11: 200.

⁸⁵ Korošec 1953, 260, sl. 9.

⁸⁶ Dular, Šavel, Tecco Hvala 2002, t. 7: 8; 64: 1; sl. 16: 1; 22: 1.

⁸⁷ Cardarelli 1983, t. 19: 19; prim. sklede z ročajem iz

⁷² Gaspari 2004, 41, Fig. 6: 1,2,8; P. Pavlin, Srednjebronzastodobni levoročni jezičastoročajni srpi in meč iz Ljubljane. - *Arheološki vestnik* 57, in print.

⁷³ Dular, Šavel, Tecco Hvala 2002, 177-181, Fig. 23,24.

⁷⁴ Pers. comm. by Irena Šinkovec.

⁷⁵ Velušček 2005.

⁷⁶ Dular *et al.* 1995, 95, Pl. 2: 9-16.

⁷⁷ Potočnik 1988-1989, Pl. 4: 28,29; Dular, Šavel, Tecco Hvala 2002, 181.

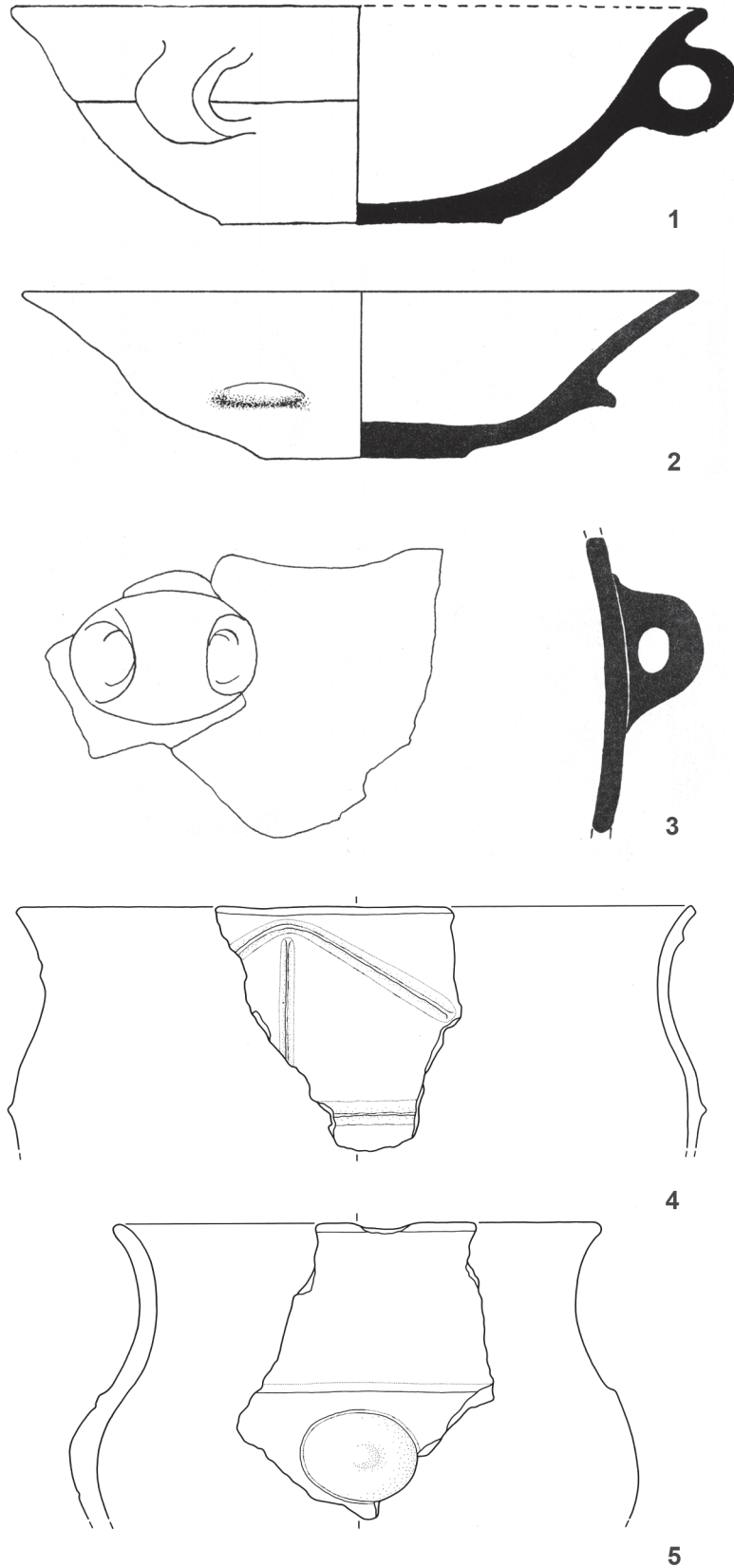
⁷⁸ Gaspari 2004, Fig. 7: 8.

⁷⁹ Helgert 1995, 226-229, Fig. 9,10.

⁸⁰ Teržan 1990, 22; ead. 1995, 330.

⁸¹ Velušček 1996, 62.

⁸² Puš 1982, Pl. 7: 6.



Sl. 12.4: 1 Šivčev prekop (po Korošec 1953, sl. 5), 2-5 Ljubljana v Kaminu (2-3 po Petru *et al.* 1982, t. 11: 203; 201+198). Vse keramika. M. = 1 : 3.

Fig. 12.4: 1 Šivčev prekop (from Korošec 1953, Fig. 5), 2-5 the Ljubljana at Kamin (2-3 from Petru *et al.* 1982, Pl. 11: 203; 201+198). All pottery. Scale = 1 : 3.

starejši čas kot posoda iz Šivčevega prekopa verjetno sodi enako profilirana skleda s trakastim držajem iz Ljubljanice v Kaminu (sl. 12.4: 2).⁸⁸

Omenjena najdišča med Vrhniko in Ljubljano kažejo, da je bila po koncu obstoja koliščarskega tipa naselbin z izjemo Šivčevega prekopa poselitev usmerjena na trdinski svet barskega obrobja,⁸⁹ medtem ko bi lahko na podlagi posamičnih najdb in odlagališč dolgega trajanja v strugi Ljubljanice ter okoliškem močvirju sklepali, da so osrednji deli Barja dobili značaj ritualne krajine. Tovrstne najdbe se začnejo posamično pojavljati ob koncu starejše bronaste dobe (Bd A2), izrazit porast pa običaj doživi z nastopom kulture žarnih grobišč,⁹⁰ kamor sodi tudi depo dveh plavutastih in ene tulaste sekire iz skalne razpoke blizu cerkve Sv. Janeza v Tomišlju na južnem obrobju Barja.⁹¹ Posebnost so posamične najdbe kovinskega orožja in orodja, najdene na območjih starejših kolišč,⁹² ki odpirajo vprašanja o ozadju izbire mest za odlaganje.

of the Ljubljansko barje (Fig. 12.4: 3),⁸³ a number of cups with updrawn handles from the same underwater complex,⁸⁴ and possibly also a deep cup with a handle (Pl. 32: 6) and a bowl with a faceted rim from the Ljubija (Pl. 32: 4). Here a bowl with two handles from the pile dwelling settlement at Šivčev prekop near Pre-serje may also be mentioned (Fig. 12.4: 1),⁸⁵ with an analogy in the vessels from Dolnji Lakoš, Rabelčja vas and Brinjeva gora,⁸⁶ with very similar vessels known from Kras, the Posočje area and eastern Friuli, where they are characteristic for the *bronzo recente* period.⁸⁷ Probably belonging to a slightly earlier time than the vessel from Šivčev prekop is an equally profiled bowl with a strap handle from the Ljubljanica at Kamin (Fig. 12.4: 2).⁸⁸

The above-mentioned sites between Vrhnika and Ljubljana indicate that settlement, after the end of the pile-dwellings, was transferred to dry areas of the outskirts of the Ljubljansko barje with the exception of Šivčev prekop.⁸⁹ Concurrently, individual finds as well as points of deposition of long duration in the bed of the Ljubljanica and the surrounding moory areas might suggest that the central parts of the Ljubljansko barje assumed a ritual character. These sorts of finds begin to appear individually at the end of the Early Bronze Age (Bd A2) while the phenomenon witnesses a significant increase with the advent of the Urnfield Culture.⁹⁰ Belonging to the latter is also a hoard of two winged and a socketed axe in a rock fissure near the church of St John at Tomišelj at the southern outskirts of the Ljubljansko barje.⁹¹ Particularly interesting are also individual finds of metal weapons and tools, found in the areas of former pile dwellings,⁹² which raise questions as to the reasons behind the choice of the points of deposition.

naselbin Pozzuolo del Friuli (Càssola Guida, Borgna 1994, sl. 37: 94) in Most na Soči (Svoljšak 1988-1989, t. 5: 4,6,8,10).

⁸⁸ Petru *et al.* 1982, 23, t. 11: 203.

⁸⁹ Velušček 2005.

⁹⁰ Šinkovec 1996; Gaspari 2002; id. 2004.

⁹¹ Čerče, Šinkovec 1995, 220,221, t. 50 B: 1-3.

⁹² Šinkovec 1995, 99,103, t. 28: 193; 29: 203; Velušček, Čufar 2003, 124.

⁸³ Petru *et al.* 1982, Pl. 11: 201+198.

⁸⁴ For example Petru *et al.* 1982, Pl. 11: 200.

⁸⁵ Korošec 1953, 260, Fig. 9.

⁸⁶ Dular, Šavel, Tecco Hvala 2002, Pl. 7: 8; 64: 1; Fig. 16: 1; 22: 1.

⁸⁷ Cardarelli 1983, Pl. 19: 19; cf. bowls with handles from the settlements Pozzuolo del Friuli (Càssola Guida, Borgna 1994, Fig. 37: 94) and Most na Soči (Svoljšak 1988-1989, Pl. 5: 4,6,8,10).

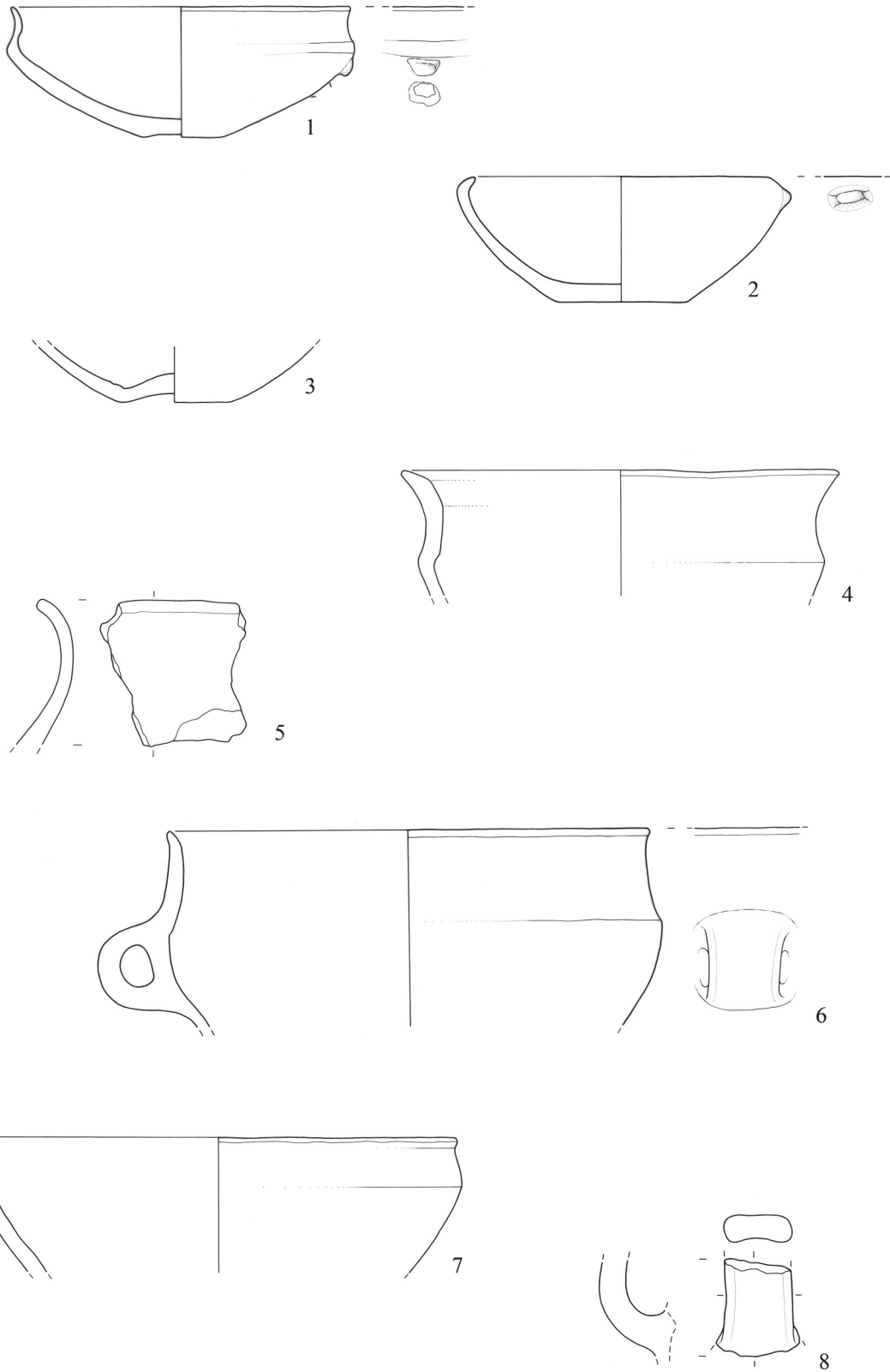
⁸⁸ Petru *et al.* 1982, 23, Pl. 11: 203.

⁸⁹ Velušček 2005.

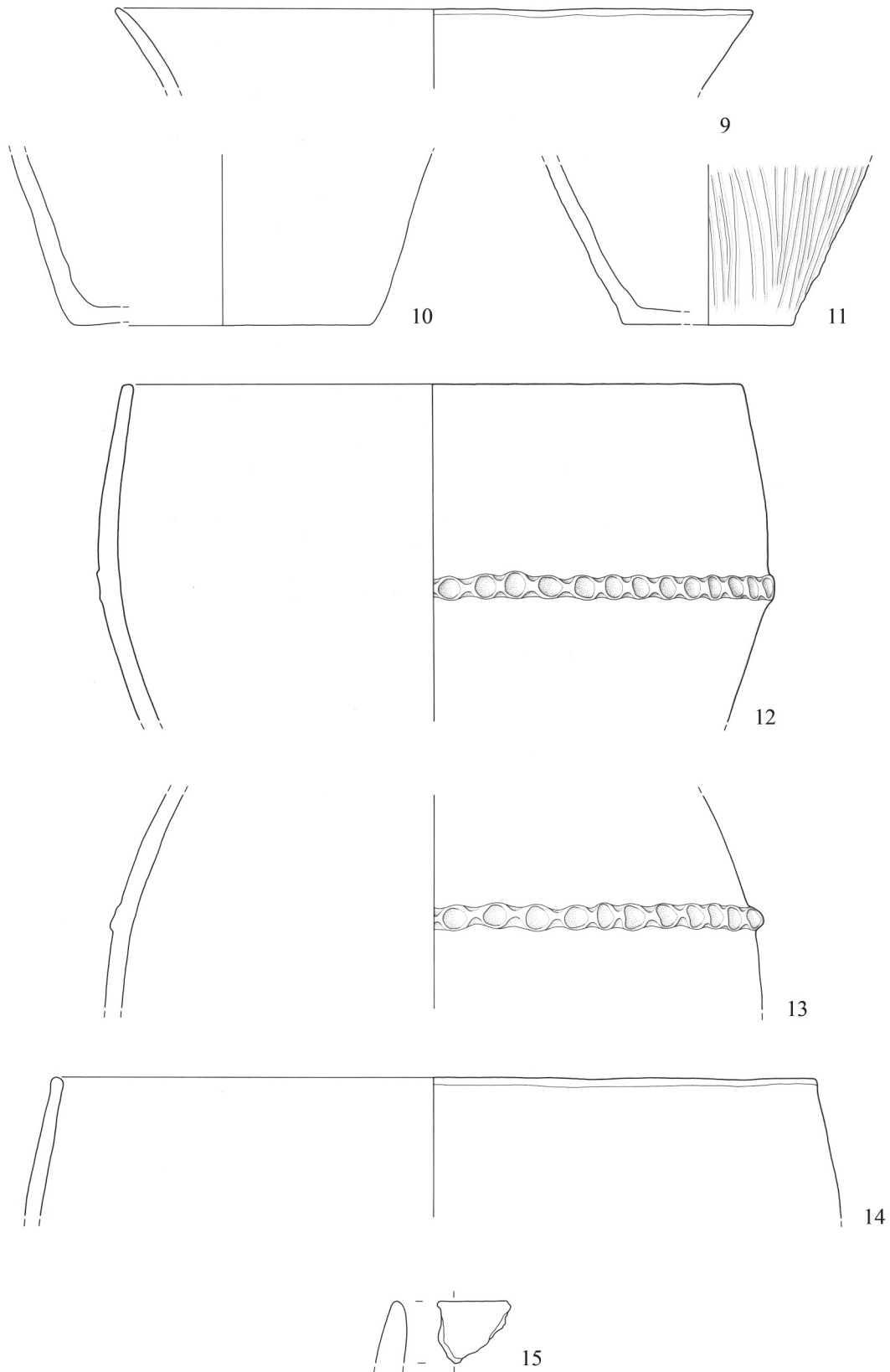
⁹⁰ Šinkovec 1996; Gaspari 2002; id. 2004.

⁹¹ Čerče, Šinkovec 1995, 220,221, Pl. 50 B: 1-3.

⁹² Šinkovec 1995, 99, 103, Pl. 28: 193; 29: 203; Velušček, Čufar 2003, 124.



T. 32: Zalog (I) pri Verdu. Keramika. M. = 1 : 3.
 Pl. 32: Zalog (I) near Verd. Pottery. Scale = 1 : 3.



T. 33: Zalog (I) pri Verdu. Keramika. M. = 1 : 3.
Pl. 33: Zalog (I) near Verd. Pottery. Scale = 1 : 3.

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