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Alatke od roga s nalazišta Jakovo – Kormadin iz zbirke Arheološkog muzeja u Zagrebu

Antler tools from the site of Jakovo-Kormadin from the collection of the Archaeological Museum in Zagreb

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Analiziran je materijal s nalazišta Jakovo – Kormadin, pohranjen u depou Arheološkog muzeja u Zagrebu. Nalazi o kojima je ovdje riječ potječu iz prvih, nesustavnih iskopavanja lokaliteta s početka 20. stoljeća, a u Muzej su pristizali tijekom više godina istraživanja (1902. – 1905.). Pregledom materijala ustanovljeno je 217 predmeta od roga koji su analizirani s tehno-tipološkog aspekta, a udio tih predmeta u sveukupnome materijalu (gotovo 40%) ukazuje na značajnu upotrebu ove sirovine za izradu artefakata. Potrebno je istaknuti kako su prisutni i nalazi sirovine, otpadaka od proizvodnje i poluproizvoda koji idu u prilog postojanju radioničkog mjesta na ovome nalazištu, na što su ukazali rezultati analize koštane industrije iz istraživanja lokaliteta 2008. godine.

Ključne riječi: *Jakovo – Kormadin, vinčanska kultura, neolitik, alatke od roga, tipologija, tehnike izrade*

This analysis includes material from the site of Jakovo-Kormadin which is kept at the Archaeological museum in Zagreb. The finds discussed here were discovered in the first, non-systematic excavations carried out at the site at the beginning of the 20th century, and were obtained by the Museum during several years of research (1902-1905). A review of the material revealed 217 finds made out of antler, which have been analyzed from a technological and typological aspect. The sheer amount of these finds in the material as a whole (almost 40%) points to significant use of this raw material for tool production. We should emphasize the presence of raw material, production waste, and half-products in the studied material, which speak in favor of the existence of a workshop at the site, as indicated by the results of bone industry analysis from the 2008 excavations of the site.

Key words: *Jakovo-Kormadin, the Vinča culture, Neolithic, antler tools, typology, production techniques*

UVOD

U zbirci Arheološkog muzeja u Zagrebu pohranjen je velik broj nalaza koštane industrije s Jakovo – Kormadina. U ovom radu izloženi su rezultati analize[1] predmeta od roga koji čine gotovo polovicu nalaza ove industrije. Provedena je tipološka analiza, pri čemu su predmeti prema namjeni radnog dijela razvrstani u veće grupe, a analizirane su i tehnike izrade. Velika količina predmeta od roga ukazuje na važnost ove sirovine za izradu alatki uz koje su ustanovljeni i poluproizvodi te nalazi sirovine, odnosno otpadaka od proizvodnje što pretpostavlja da su artefakti bili izrađivani na samome nalazištu.

Nalazište je poznato još s početka 20. stoljeća, kada su ondje izvršena prva, nesustavna iskopavanja koja su provodili tamošnji lokalni učitelj i muzejski povjerenik A. Poturičić i J. Brunšmid, tadašnji ravnatelj Arheološkog muzeja u Zagrebu. Jedini podaci o tim istraživanjima odnose se na zemljišne čestice na kojima su pronađeni pojedini predmeti i Brunšmidove skice i bilješke iz kojih nije moguće zaključiti ništa o stratigrafiji ni o kontekstu nalaza.[2] Ipak, Brunšmidove bilješke upućuju na činjenicu kako nalazište nakon neolitika nije bilo trajno naseljavano, zaključujući prema nalazima kasnijih razdoblja, uglavnom iz grobova čije je ukapanje djelomično poremetilo neolitički sloj.[3]

Tu su pretpostavku opravdala prva sustavna istraživanja lokaliteta sredinom 20. stoljeća, kada su tijekom zaštitnih iskopavanja (1956. – 1958.), osim nekropole iz 5. – 6. stoljeća, ustanovljena i 3 stambena horizonta koja pripadaju vinčanskoj kulturi, što je potvrđeno i istraživanjem lokaliteta 2008. godine.[4] U obje istraživačke kampanje otkriveni su nalazi vinčanske košta-

[1] Zahvaljujem dr. sc. Jacqueline Balen iz Arheološkog muzeja u Zagrebu, koja mi je povjerila materijal na obradu, i dr. sc. Seleni Vitezović iz Arheološkog instituta u Beogradu na stručnom savjetu pri analizi predmeta.

[2] Šeper 1952, 25-28.

[3] Šeper 1952, 30.

[4] Јовановић, Глишић 1960, 113; Булатовић, Капуран, Стругар 2010, 3.

INTRODUCTION

The collection of the Archaeological museum in Zagreb includes a large number of bone industry artifacts from the site of Jakovo-Kormadin. This paper brings the results of antler find analysis,[1] finds which make up almost half of the finds of this industry. A typological analysis was conducted, along with a study of production techniques, resulting in a division of the finds into larger groups based on the purpose of their working surface. The large number of antler finds stresses the importance of this raw material for tool production, as do the half-products, i.e. production waste, which also indicates that the artifacts were manufactured at the site.

The site has been known since the beginning of the 20th century, when the first non-systematic research was conducted there by local teacher and museum commissioner A. Poturičić, and the then director of the Archaeological museum in Zagreb J. Brunšmid. The only available data about their research refers to plots of land where individual finds were discovered, and includes Brunšmid's sketches and notes, which do not allow for conclusions about stratigraphy or context of the finds.[2] However, Brunšmid's notes, based on finds from later periods, point to the fact that the site was not permanently settled after the Neolithic. These finds mostly originated from graves that partially disturbed the Neolithic layer.[3]

That the site was not settled in later periods was supported by the first systematic research of the site in the mid-20th century when rescue excavations (1956-1958) yielded, apart from the 5th-6th century necropolis, three habitation phases of the Vinča culture, a situation confirmed by research conducted at the site in 2008.[4] Both research campaigns yielded finds of bone industry ascribed to the Vinča culture, and one pit discovered in the last excavations (2008) yielded a lot

[1] I would like to thank Jacqueline Balen, PhD, from the Archeological museum in Zagreb for allowing me to analyze the material, and Selena Vitezović, PhD, from the Institute of Archaeology in Belgrade for her expert advice about find analysis.

[2] Šeper 1952, 25-28.

[3] Šeper 1952, 30.

[4] Јовановић, Глишић 1960, 113; Булатовић, Капуран, Стругар 2010, 3.

ne industrije, a iz posljednjeg istraživanja (2008.) u jednoj od jama otkriven je i velik broj otpadaka od proizvodnje predmeta od roga, što upućuje na postojanje radioničkog mjesta na lokalitetu.[5]

Uzimajući u obzir činjenicu kako je jedina ustanovljena prapovijesna kultura na ovom nalazištu vinčanska, i uz usporedbu materijala koštane industrije iz navedenih sustavnih istraživanja i s ostalih nalazišta vinčanske kulture, analizirani predmeti pripisani su ovoj kulturi premda njihov kontekst nije poznat.

TEHNOLOŠKO-TIPOLOŠKA ANALIZA

Tipološko razvrstavanje predmeta okvirno se temelji na sistemu A. Bačkalova,[6] primijenjenom za klasifikaciju koštanog materijala s prostora Srbije iz razdoblja mezolitika i neolitika. Navedena klasifikacija dodatno je razrađena i nadopunjena tako što su predmeti razvrstani na temelju morfologije i namjene radnog vrha u nekoliko osnovnih grupa, podijeljenih na tipove, podtipove i varijante izdvojene na temelju varijacija u tehnici izrade i upotrijebljene sirovine.[7] Nalazi su prema spomenutim kriterijima razvrstani u pet grupa (tab. 1): na zašiljene predmete (I), predmete za glačanje (II), sječenje (III) i udaranje (IV) te predmete posebne namjene (V) i necjelovite predmete (VIII), dok neutilitarni i ukrasni predmeti izrađeni od roga nisu ustanovljeni unutar ove zbirke. U slučaju ovdje analiziranog materijala, osim prema tehnici izrade, varijacije unutar pojedinog tipa odnose se i na različite dijelove roga od kojih su izrađeni artefakti.

Za izradu alatki upotrebljavani su svi dijelovi roga – baza, stablo roga i parošci, pri čemu se određeni tip alatke izrađuje od segmenta čiji prirodni oblik najbolje odgovara funkciji predmeta. Primjerice, udarači su izrađivani isključivo od parožaka, dok se čekići, odno-

[5] Булатовић, Капуран, Стругар 2010, 10; Витезовић 2010, 57.

[6] Bačkalov 1979, 31 i dalje.

[7] Vitezović 2007, 61-64; 2011, 67-68, 274.

of waste from antler tool production, indicating that there was a workshop at the site.[5]

Considering the fact that the only established prehistoric culture at the site is the Vinča culture, and by comparing bone industry material from the mentioned excavations, the finds analyzed here have been ascribed to the same culture even though their context is unknown.

TECHNOLOGICAL AND TYPOLOGICAL ANALYSIS

The typological sorting was mostly done based on A. Bačkalov's system,[6] applied on the classification of bone material from Serbia dated to the Mesolithic and the Neolithic. The said classification was additionally expanded and adapted, and the finds were sorted, based on morphology and the purpose of the working surface, into several basic groups that include types, subtypes, and variants defined by production technique and the raw material used.[7] According to the aforementioned criteria, the finds were divided into five groups (Tab. 1): pointed tools (I), polishing tools (II), cutting tools (III), and striking tools (IV), as well as objects of special use (V) and incomplete objects (VIII). Non-utilitarian and decorative objects were not present in this collection. In the case of the material analyzed here, apart from production technique, variations within certain types refer to different parts of antlers used for tool production.

All parts of the antler were used for tool production – the base, beam, and tine, and certain types of tools were made on the part which best matches the function of the tool by its natural shape. For example, strikers were made exclusively from tines, while hammers, that is, larger tools, were mostly made from the beam because

[5] Булатовић, Капуран, Стругар 2010, 10; Витезовић 2010, 57.

[6] Bačkalov 1979, 31 and on.

[7] Vitezović 2007, 61-64; 2011, 67-68, 274.

GRUPA ZAŠILJENIH PREDMETA/POINTED TOOLS	5
Probojci/Points	12
Harpuni/Harpoons	4
UKUPNO/TOTAL	**21**
GRUPA PREDMETA ZA SJEČENJE/CUTTING TOOLS	
Dlijeta/Chisels	15
Klinovi/Wedges	10
Sjekire/Axes	29
UKUPNO/TOTAL	**54**
GRUPA PREDMETA ZA GLAČANJE/POLISHING TOOLS	
Spatule/Polishers	5
UKUPNO/TOTAL	**5**
GRUPA PREDMETA ZA UDARANJE/STRIKING TOOLS	
Udarač/Strikers	63
Čekić*/Hammers*	2
Čekići-sjekire*/Hammer-axes*	10
Pijuci/Picks	15
UKUPNO/TOTAL	**90**
GRUPA PREDMETA POSEBNE NAMJENE/OBJECTS OF SPECIAL USE	
Drške/Hafts	2
Radne površine/Working surfaces	1
UKUPNO/TOTAL	**3**
GRUPA NECJELOVITIH PREDMETA/INCOMPLETE OBJECTS	
Fragmentirane alatke/Fragmented tools	13
Poluproizvodi/Half-products	11
Sirovina-otpaci od proizvodnje/Raw material-production waste	20
UKUPNO/TOTAL	**44**
SVEUKUPNO/GRAND TOTAL	**217**

Tablica 1: Zastupljenost pojedinih grupa i pripadajućih tipova predmeta iz analizirane zbirke s Jakovo Kormadina / Table 1. The representation of certain groups and corresponding types of objects from the analyzed collection from Jakovo Kormadin

sno veće alatke za udaranje, uglavnom izrađuju od segmenta stabla roga s bazom, čiji je prirodan oblik idealan za radnu površinu ovoga tipa predmeta.

Izrada alatki počinje dijeljenjem roga na komade, primjenjujući jednu ili kombinaciju više tehnika koje uključuju cijepanje, sječenje i lomljenje, pogotovo kada je posrijedi obrada, odnosno dijeljenje većeg komada sirovine.[8] Rad na otpornijem materijalu, poput roga, mogao je biti olakšan tako što je rog ostavljen u vodi nekoliko dana, nakon čega postaje pogodniji za dijeljenje i daljnju obradu.[9]

Pri dijeljenju sirovine na manje segmente, prvo se odstranjuju parošci. Od stabla roga odvajaju se formiranjem žlijeba, što se može izvesti pomoću užeta i nekog abrazivnog sredstva,[10] usijecanjem žlijeba kremenom alatkom ili odbijanjem manjih komada korteksa direktnim udarcem sjekirom,[11] a potom se na mjestu spongioznog tkiva parožak odsječe kamenom sjekirom ili odlomi savijanjem.

Ipak, najčešće primijenjena tehnika odvajanja parožaka primijećena na analiziranome materijalu formiranje je žlijeba ljuštenjem tanjih traka materijala, koja se može smatrati karakterističnom za vinčansku kulturu, ili barem za nalazišta šire okolice Beograda.[12] Tehnike izrade inače predstavljaju vrlo učinkovit kriterij za razlikovanje pojedinih kultura i odnose među njima, pogotovo kad su posrijedi neolitičke koštane industrije, morfološki vrlo homogene, s često kronološki neosjetljivim tipovima alatki.[13] Na taj je način prisutnost spomenute vinčanske tehnike, na većem broju dobro očuvanih primjeraka različitih tipova alatki izrađenih od parožaka, bila važan kriterij za odredbu ove industrije kao vinčanske.

[8] Vitezović 2011, 269.

[9] Schibler 2013, 346.

[10] Schibler 2013, 346.

[11] Billamboz 1977, 100-101; Maigrot 2005, 122.

[12] Витезовић 2010, 54.

[13] Legrand, Sidéra 2007, 67.

its natural shape is ideal for the working surface of this type of tool.

Tool production starts by dividing the antler into pieces by applying one or a combination of several techniques including chopping, cutting, and breaking, especially when it comes to processing a larger piece of raw material.[8] Working with a more resistant material like antler could have been made easier by leaving the antler to soak in water for several days, after which it is easier to split and process.[9]

When the raw material is split into smaller segments, the tine is the first part that is removed. It is removed from the beam by forming gauges with the help of a rope and some abrasive compound,[10] cutting a gauge by using a stone tool, or by chopping off smaller pieces of cortex by direct hits with an axe,[11] after which the tine is cut off with a stone axe or broken off by bending at the point where spongy tissue appears.

However, the most frequently applied technique for separating tines when it comes to the studied material is the forming of gauges by peeling off thin strips of material, a technique characteristic of the Vinča culture, or at least for the sites in the wider Belgrade area.[12] Generally, production techniques are a very efficient criterion for differentiating between individual cultures and their inter-relations, especially when it comes to Neolithic bone industries, which are morphologically very homogenous and often display tool types that do not change over time.[13] Along these lines, the presence of the aforementioned Vinča technique on a large number of well-preserved finds of different types of tools was an important criterion for attributing this industry to the Vinča culture.

Apart from tines, tools could have been shaped from segments of antler beams obtained by longitudinal splitting[14] of raw material by applying an indirect hit using a wedge. Objects made out of antler cortex fragments were obtained by in-

[8] Vitezović 2011, 269.

[9] Schibler 2013, 346.

[10] Schibler 2013, 346.

[11] Billamboz 1977, 100-101; Maigrot 2005, 122.

[12] Витезовић 2010, 54.

[13] Legrand, Sidéra 2007, 67.

[14] Vitezović 2011, 296.

Osim od parožaka, alatke su mogle biti oblikovane i od segmenata stabla roga dobivenih uzdužnim cijepanjem[14] komada sirovine indirektnim udarcem klina na obrađivani komad. Predmeti izrađeni od fragmenata korteksa roga dobiveni su usijecanjem dvaju paralelnih žljebova, nakon čega se klinom (*groove-and-splinter-technique*) izdvoje pločice materijala koje se dalje obrađuju.[15] Pojedini su nalazi mogli biti izrađeni i od otpadaka proizvodnje ili popravka alatke, što je ustanovljeno za neke primjerke iz analizirane zbirke predmeta. U ovome slučaju riječ je o jednoj varijanti dlijeta malih dimenzija, izrađenih od korteksa jelenjeg roga. Drugi takav primjer odnosi se na jedan nalaz spatule izrađene od vrha paroška jelenjeg roga koji vjerojatno potječe od popravka alatke.

Tako dobiveni poluproizvodi daljnjom se obradom, odnosno formiranjem radne površine, oblikuju u željeni tip alatke. Distalni je kraj oblikovan kosim zasijecanjem ili ljuštenjem traka materijala kod alatki izrađenih od parožaka, odnosno tako što se koso odsječe veći komad stabla roga. U oba slučaja, kao i kod segmenata dobivenih uzdužnim cijepanjem, radna površina i rubovi alatke mogli su biti dodatno obrađeni sječenjem manjih komada materijala i struganjem.[16] Struganje se ponekad primjenjuje i kako bi se odstranile prirodne neravnine roga na površini predmeta ili kako bi se uklonila manja oštećenja.[17]

Izrada perforacija predstavlja završnu obradu predmeta. Perforacije, relativno pravilnog kružnog oblika, obično su izvedene zasijecanjem korteksa kremenom alatkom kako bi se došlo do spongioznog tkiva koje se potom izdubljuje.[18] Pri bazi jednog nalaza udarača vidljiv je početak izrade perforacije zasijecanjem korteksa (T. 2: P-16857.63; sl. 1), dok je na drugoj strani započeto i dubljenje, a identičan postupak prisutan je i na jednom nalazu pijuka koji potječe iz istraživanja Jakovo – Kormadina 2008. godine.[19]

[14] Vitezović 2011, 296.

[15] Billamboz 1977, 102.

[16] Beldiman 2005, 38-39.

[17] Billamboz 1977, 102-103.

[18] Beldiman 2005, 40.

[19] Витезовић 2010, 55, sl. 12 a, b.

cising two parallel gauges, after which a wedge (*groove-and-splinter-technique*) was used to separate plates of material, which were additionally processed.[15] Individual finds could have been made from production waste, or by fixing other tools, as was determined for some specimens from the analyzed collection. In this case, we are dealing with a chisel variant made out of red deer antler cortex, and a polisher made out of the tip of red deer tine which could possibly be a by-product of fixing another tool.

Half-products obtained in this way were shaped into desired tool types by further processing, i.e. by forming the working surface. The distal end was shaped by slanted incisions or by peeling off strips of material on tools made from tine, that is, by diagonal cutting from larger pieces of antler beams. In both cases, as well as with segments obtained by longitudinal splitting, the working surface and edges of tools could be additionally processed by cutting off small pieces of material and by scraping.[16] Scraping is sometimes applied to remove antler unevenness on the surface of the object, or to remove smaller defects.[17]

Perforations are the final part of processing an object. Perforations that have a relatively regular circular shape are usually made by cutting the cortex with a stone tool in order to reach the spongy tissue which is then hollowed out.[18] The base of one striker displays the beginning of making a perforation by cutting the cortex (Pl. 2: P-16857.63; Fig. 1), while its other side displays some hollowing. An identical process is also visible on a pick from the 2008 excavations conducted at Jakovo-Kormadin.[19]

[15] Billamboz 1977, 102.

[16] Beldiman 2005, 38-39.

[17] Billamboz 1977, 102-103.

[18] Beldiman 2005, 40.

[19] Витезовић 2010, 55, Fig. 12 a, b.

Slika / Figure 1: Detalj udarača sa započetom perforacijom / Detailed view of a striker with the beginning of a perforation P-16857.63 (snimio/ photo by I. Krajcar).

Grupa zašiljenih predmeta (I)

U grupu zašiljenih predmeta svrstane su alatke sa šiljastim radnim vrhom, čija je osnovna namjena bušenje, odnosno probijanje materijala.[20] Pojedini tipovi ove grupe, poput harpuna, služili su kao oružje za lov i ribolov.

Probojci (I 2). Probojci su alatke s jačim, masivnim šiljkom na distalnom dijelu, upotrebljavane za rad na otpornijim materijalima, poput drva ili roga.[21] Iz zbirke potječe dvanaest nalaza koji su određeni kao ovaj tip alatke. Svi su primjerci izrađeni od parožaka od kojih su tri od roga srndaća, a ostali od parožaka jelenjih rogova (T. 3: P-16857.8) većih dimenzija (dužine 18 do 24 cm). Na bazi bolje očuvanih primjeraka jasno je vidljiva primjena karakteristične vinčanske tehnike – odstranjivanje parožaka od ostatka roga uzdužnim ljuštenjem traka materijala. Kao tragovi upotrebe prisutna su manja oštećenja na radnom vrhu, ali i uglačanost, izraženija pri distalnom kraju alatke.

[20] Vitezović 2007, 65.

[21] Vitezović 2011, 284.

Pointed tools (I)

The group of pointed tools includes tools with a pointed working edge, which were primarily used for drilling, that is, puncturing material.[20] Specific types in this group, like harpoons, were used as hunting and fishing tools.

Points (I 2). Points are tools with a stronger, massive point at the distal end, used to work on more resilient materials like wood or antler.[21] The collection includes twelve finds which were shaped into this type of tool. All finds are made of tines, three of them from roe deer, and the rest from larger pieces (18 to 24 cm in length) of red deer tines (Pl. 3: P-16857.8). The base of better-preserved specimens clearly displays the application of typical Vinča technique – removing the tine from the rest of the antler by longitudinally peeling strips of material. Traces of use include small damage on the working edge, as well as smoothness which is more visible on the distal part of tools.

Harpoons (I 7). The collection includes four finds of this type which appear in two variants – conical and single-row harpoons. Single-row harpoons (Fig. 2) are made out of segments of antler beams. Triangular teeth are made on one side by cutting and scraping, and their purpose is to keep the harpoon in the body of the prey.[22] The entire surface of these finds is intensively polished, especially at the distal end of the tool, which, on one find, also displays densely spaced transverse wedges.

Conical harpoons are made of tines, and their pointed tip is additionally shaped by scraping and polishing, while a perforation is present on both sides so that the tool could be tied to a haft using rope.[23] The base of these objects can be serrated (Pl. 1: P-16877) or diagonally cut in order to form a protrusion that has the same function as the teeth on single-row harpoons.

[20] Vitezović 2007, 65.

[21] Vitezović 2011, 284.

[22] Bačkalov 1979, 35.

[23] Vitezović 2011, 294.

Harpuni (I 7). U zbirci su prisutna četiri nalaza ovog tipa koji se pojavljuju u dvije varijante – konusni i jednoredni harpuni. Jednoredni harpuni (sl. 2) izrađuju se od segmenta stabla roga. Na jednoj se strani zasijecanjem i struganjem oblikuju trokutasti zupci čija je svrha zadržati harpun u tijelu lovine.[22] Cijela je površina ovih predmeta intenzivno uglačana, najizraženije pri distalnom kraju alatke, gdje su na jednom primjerku uočene i gusto raspoređene poprečne linije.

Konusni harpuni izrađeni su od parožaka, a struganjem i glačanjem dodatno se oblikuje zašiljeni vrh, dok je perforacija izvedena s obje strane alatke služila kako bi se užetom mogli privezati za dršku.[23] Baza je kod ovih predmeta mogla biti nazubljena (T. 1: P-16877) ili koso odsječena kako bi se formirao jezičac, a ima istu funkciju kao i zupci jednorednih harpuna.

Oba su primjerka ove varijante iz zbirke gotovo identična onima pronađenima na Vinči.[24] Iako se ovaj tip nalaza najčešće određuje kao alatka za ribolov, konusni harpuni također su mogli biti upotrebljavani i za lov na veće, kopnene životinje.[25] Navedeni su primjerci zasad jedini nalazi ovog tipa alatke s lokaliteta Jakovo – Kormadin.

U ovu su grupu uvršteni i nalazi određeni samo kao zašiljeni predmeti, bez pobližeg svrstavanja u određeni tip. Riječ je o *ad hoc* predmetima, izrađenima od čitavih rogova srndaća, čiji su vrhovi parožaka obrađeni odstranjivanjem manjih komada materijala kako bi se dobila veća oštrina šiljka. Tragovi upotrebe na ovim predmetima prisutni su na distalnom kraju alatke u vidu uglačanosti i manjih oštećenja na samome radnom vrhu.

[22] Bačkalov 1979, 35.

[23] Vitezović 2011, 294.

[24] Срејовић, Јовановић 1958-59, 185; sl. 12: 1, 4.

[25] Bačkalov 1979, 29.

Slika / Figure 2: Jednoredni harpun / Single-row harpoon (P-16812.1) (snimio / photo by: I. Krajcar).

Both specimens of this variant from the collection are almost identical to those found at Vinča.[24] Although this type of find is most often defined as a fishing tool, conical harpoons could also have been used for hunting larger land animals.[25] The described specimens are the only finds of this type from Jakovo-Kormadin to date.

This group also includes finds defined only as pointed tools, and which could not be definitively ascribed to certain types. These are *ad hoc* objects made out of entire roe deer antler, on which the tines were processed by removing smaller pieces of material in order to get a more pointed tip. Traces of use in these finds are visible on the distal ends of tools in the sense of smoothing and smaller damage on the tip of the working point.

[24] Срејовић, Јовановић 1958-59, 185; Fig. 12: 1, 4.

[25] Bačkalov 1979, 29.

Slika/ Figure 3: Detalj radnog vrha dlijeta / Detailed view of the working point of chisel P-16858.38 (snimio / photo by I. Krajcar).

Slika/ Figure 4: Detalj klina / Detailed view of wedge P-16858.28 (snimio / photo by I. Krajcar).

Grupa predmeta za sječenje (II)

Zajednička je karakteristika predmeta ove grupe oštar radni rub na distalnom kraju koji služi rascjepljivanju ili sječenju sirovine. Grupi pripadaju alatke koje su se uglavnom koristile u obradi drva, ali i drugih materijala, poput kosti i roga.[26]

Dlijeta (II 1). Ovisno o tome pod kojim kutem se zadaje udarac, dlijeta su kao alatka-posrednik služila za rascjepljivanje ili ljuštenje tanjih traka materijala.[27] Zbirka broji petnaest nalaza ovog tipa, a razlikuju se tri varijante. Dlijeta izrađena od fragmenta korteksa roga (T. 1: P-16878.3) oblikom i dimenzijama podsjećaju na primjerke ovog tipa od glačanog kamena, a mogla su biti oblikovana iz pločica izdvojenih žlijebljenjem ili od manjih otpadaka proizvodnje. Baza je kod ovih primjeraka zaobljena, a kako na tom dijelu nisu primijećeni tragovi istrošenosti od udaranja, moguće je da su ovi predmeti bili uglavljeni u dršku.

[26] Vitezović 2011, 295-299.

[27] Vitezović 2011, 295.

Cutting tools (II)

The common characteristic of this group of tools is a sharp working edge on the distal part which was used for splitting or cutting raw material. The group includes tools which were primarily used to process wood, but also other materials like bone and antler.[26]

Chisels (II 1). Depending on the angle of striking, chisels were used as mediator-tools for splitting or peeling thin strips of material.[27] The collection includes fifteen finds of this type, which appear in three variants. Chisels made from antler cortex fragments (Pl. 1: P-16878.3) have dimensions and shape reminiscent of this type made out of polished stone, and could have been formed on plates obtained by gauging, or on smaller pieces of production waste. These finds have a rounded base, and, since no traces of wear from hitting are visible, it is possible that these objects were hafted.

[26] Vitezović 2011, 295-299.

[27] Vitezović 2011, 295.

Na jednome nalazu (T. 1: P-16858.38), izrađenom od paroška, distalni je kraj stanjen ljuštenjem traka materijala (sl. 3), dužine 2 – 3 cm, kako bi se formirala radna površina dlijeta, dok je na ostalim primjercima oštrica dobivena kosim zasijecanjem vrha paroška kako bi se dobio ravan radni rub. Za izradu ove varijante korišteni su parošci manjih dimenzija.

Varijanta izrađena od segmenta stabla roga dobivena je uzdužnim cijepanjem ili kosim zasijecanjem distalnog kraja manjeg stabla. Na distalnom dijelu nalazi se blago ovalna oštrica s jasnim tragovima obrade i upotrebe, dok je spongiozno tkivo pri radnoj površini izdubljeno, kao što je slučaj s jednim nalazom dlijeta koje je primarno vjerojatno služilo kao sjekira (T. 2: P-16867.10).

Klinovi (II 2). Svih deset nalaza ovog tipa izrađeno je od parožaka na čijem je distalnom kraju s obje strane ukoso odstranjen manji komad materijala kako bi se dobio oštar radni rub. Glavna je funkcija ovog tipa bila rascjepljivanje materijala, i to slično dlijetu, kao alatka-posrednik između komada sirovine koji se obrađuje i alata kojim se preko klina zadaje udarac.[28] Na jednome su nalazu (T. 1: P-16858.28) jasno vidljivi tragovi upotrebe u vidu naglašene uglačanosti distalnog kraja i gusto raspoređenih tankih linija na radnom rubu alatke (sl. 4), a jedan takav primjerak ustanovljen je prilikom istraživanja lokaliteta Jakovo – Kormadin 2008. godine.[29]

Sjekire (II 3). Sjekire su masivne alatke, većih dimenzija, izrađene od segmenta stabla roga najčešće tako što se na jednom dijelu stablo koso zasječe kako bi se dobila radna površina, dok se bliže bazi alatke formira perforacija za nasad drške.[30] Ovaj je tip prvenstveno upotrebljavan za obradu drva, no mogao je služiti i kao poljoprivredna alatka.[31] Nalazi sjekira poznati su i iz sustavnih istraživanja ovog nalazišta,[32] a u zbirci se nalazi dvadeset i devet predmeta ovog tipa. Ustanovljeno je više varijanti, ovisno o na-

[28] Vitezović 2011, 296.

[29] Витезовић 2010, 48.

[30] Vitezović 2007, 72.

[31] Vitezović 2011, 299.

[32] Perišić 1984, 46, T.24: 167; Витезовић 2010, 47-48.

One find (Pl. 1: P-16858.38) made on a tine has a distal end thinned by peeling off strips of material (Fig. 3), measuring 2-3 cm, which was done in order to form the working surface of the chisel. On other finds, the blade was made by diagonal cutting of the tine tip in order to obtain a straight working edge. Smaller tine pieces were used to make this variant.

The variant made of antler beam segments was obtained by longitudinal splitting or diagonal cutting of the distal end of smaller beams. The distal end has a slightly oval blade with clearly visible traces of processing and use, and the spongy tissue near the working surface was hollowed out, as is the case with one chisel that was probably primarily used as an axe (Pl. 2: P-16867.10).

Wedges (II 2). All ten finds of this type are made out of tines where smaller pieces of material were diagonally cut off at the distal end in order to obtain a sharp working edge. The main function of this type was to split material, similarly as chisels, as a mediator-tool between the raw material being processed and the tool used to strike the wedge.[28] One find (Pl. 1: P-16858.28) has clearly visible traces of use in the form of highlighted smoothing on the distal end and densely spaced thin lines on the working edge of the tool (Fig. 4), and one such find was unearthed in the 2008 excavations conducted at Jakovo-Kormadin.[29]

Axes (II 3). Axes are massive tools of larger dimensions made out of antler beam segments, most often by slanted cuts on one part of the beam made in order to obtain a working surface, and by forming a perforation for hafting closer to the base of the tool.[30] This type of tool was primarily used to process wood, but could also have been used as an agricultural tool.[31] Axes were found in systematic excavations at the site as well,[32] and this collection includes twenty-nine objects of this type. Several variants were defined based on the mode of production and the shape of the working surface, although the

[28] Vitezović 2011, 296.

[29] Витезовић 2010, 48.

[30] Vitezović 2007, 72.

[31] Vitezović 2011, 299.

[32] Perišić 1984, 46, T.24: 167; Витезовић 2010, 47-48.

Slika / Figure 5: Sjekira (P-16859.17) s dodatnom, započetom perforacijom / An axe (P-16859.17) with the beginning of an additional perforation (sninio/ photo by: I. Krajcar).

činu izrade i obliku radne površine, iako je oblik distalnog kraja djelomično mogao biti i rezultat upotrebe alatke.[33]

Jedna od varijanti izrađena je od uzdužno rascijepljenog stabla roga, s ravnom (T. 2: P-16881.1) ili zaobljenom oštricom na distalnom kraju, koja je kod nekih primjeraka veće širine i nepravilnijeg oblika (T. 4: P-16815.1). Spongiozno je tkivo kod ove varijante često u potpunosti izdubljeno pa su predmeti konkavnog presjeka.

Sjekire izrađene od koso zasječenog stabla roga imaju blago zaobljen (T. 4: P-16859.6) ili ovalan distalni kraj. Na bazi predmeta očuvani su tragovi odvajanja od ostatka roga, odnosno odstranjivanja paroška kod varijante s bazom od račvastog dijela stabla (T. 5: P-16859.18). Nalazi ove varijante, određeni kao motike, poznati su i s Vinče.[34]

Kod gotovo svih primjeraka perforacije se nalaze na proksimalnom dijelu alatke, promjera su 2,5 – 3 cm, izvedene kremenom alatkom. Samo na jednom nalazu veća rupa za nasad drške smještena je na središnjem dijelu alatke, kraj koje je započeta jedna manjeg promjera (sl. 5), a takve su dodatne perforacije bile izvedene kako bi se drška mogla bolje učvrstiti užetom.[35]

[33] Van Gijn 2007, 85: Eksperimenti su pokazali da obrada drva, osim što ostavlja izražene tragove uglačanosti, dodatno zaobljuje distalni kraj kod ovog tipa alatke.

[34] Bačkalov 1979, 29, T.XXXI: 8.

[35] Beldiman 2005, 40.

shape of the distal end could partially be the result of using the tool.[33]

One of the variants is made from a longitudinally split antler beam with a straight (Pl. 2: P-16881.1) or a rounded blade on the distal end, which is wider and more irregular in shape on some finds (Pl. 4: P-16815.1). The spongy tissue in this variant is often completely hollowed out so the finds have a concave cross-section.

Axes made out of diagonally cut antler beam have a slightly curved (Pl. 4: P-16859.6) or oval distal end. The bases of these finds display traces of separation from the rest of the antler, that is, traces of removing tines in the variant with a base made on the forked part of the beam (Pl. 5: P-16859.18). Finds of this variant, defined as hoes, were also found at Vinča.[34]

Almost all specimens have perforations, measuring 2.5-3 cm in diameter, made with stone tools on the proximal part of the tool. Only one find has a larger hole for hafting on the central part, with the beginning of a smaller hole next to it (Fig. 5). Such additional perforations could have been made to better secure the haft with rope.[35]

[33] van Gijn 2007, 85. Experiments have shown that wood processing, apart from leaving behind notable polishing marks, also additionally curves the distal end of this type of tool.

[34] Bačkalov 1979, 29, T. XXXI: 8.

[35] Beldiman 2005, 40.

Slika / Figure 6: Spatula / Polisher (P-16874.13) izrađena od vrha paroška jelenjeg roga/ made out of the tip of red deer antler (snimio / photo by: I. Krajcar).

Slika / Figure 7: Varijanta spatule / Polisher variant (P-16867.7) od uzdužno rascijepljenog stabla jelenjeg roga / on a longitudinally split beam of red deer antler (snimio / photo by: I. Krajcar).

Grupa predmeta za glačanje (III)

Ukupno pet predmeta određenih kao spatule pripada ovoj grupi koja je prema broju nalaza jedna je od manje zastupljenih unutar zbirke. Ovaj je tip predmeta uglavnom upotrebljavan za obradu organskih materijala, ali i gline, odnosno korišten je i u izradi keramičkih predmeta.[36]

Spatule (III 1 C). Jedan je nalaz ovog tipa izrađen od koso odsječenog vrha paroška (sl. 6), manjih je dimenzija (dužine 5,6 cm), izduženo ovalnog oblika. Vrh paroška, koji čini bazu alatke, dosta je istrošen, a prisutna su i oštećenja poput dubljih usjeka, pa je moguće da je vrh bio odstranjen radi popravka alatke te je potom poslužio kao spatula. Na radnom rubu uočena su sitna oštećenja, a spongiozno je tkivo na unutrašnjoj površini većim dijelom istrošeno, što upućuje na intenzivnu upotrebu ovog predmeta. Na gornjoj površini, bliže bazi alatke, sljuštena je jedna tanja traka materijala, možda kako bi se lakše rukovalo predmetom.

Druga je varijanta spatula izrađena od uzdužno rascijepljenog stabla roga (sl. 7), konkavnog je presjeka, s ovalnim ili ravnim radnim rubom na distalnom kraju. Proksimalni je kraj ravno odsječen, dodatno obra-

[36] Vitezović 2007, 73.

Polishing tools (III)

This group has a total of five finds defined as polishers, making it one of the groups with the least specimens in the studied collection. This type of object was mostly used to process organic material, but also clay, i.e. it was used in pottery production as well.[36]

Polishers *(III 1 C)*. One of the finds of this type is made on a diagonally cut tip of a tine (Fig. 6), is smaller in size (5.6 cm in length), and has an oval shape. The tip of the tine which is the base of the tool is quite worn, and there is damage in the sense of deeper cuts, so it is possible that the tip was removed in order to fix the tool and was subsequently used as a polisher. Small-scale damage is also present on the working edge, and the spongy tissue on the inner surface is mostly worn away, which points to the intensive use of this object. One thinner strip of material was peeled off on the upper surface, closer to the base of the tool, possibly to make handling the tool easier.

The second variant of polishers is made out of longitudinally split antler beams (Fig. 7), and has a concave shape with an oval or straight working edge on the distal end. The proximal end is cut off straight, and is additionally processed by scraping and polishing, which is also visible on the lateral edges of the tool. Apart from the dis-

[36] Vitezović 2007, 73.

đen struganjem i glačanjem, što je primijećeno i na lateralnim rubovima alatke. Osim distalnog kraja, radna površina kod ovog tipa predmeta uključuje veći dio unutrašnje površine alatke, gdje je spongiozno tkivo gotovo u potpunosti istrošeno od upotrebe. Tragovi upotrebe prisutni na radnoj površini i rubovima presjeka, u vidu uglačanosti i okomitih linija, ukazuju na obradu organskog materijala, i to vjerojatno kože.[37] Na jednom je primjerku vidljivo kako je baza predmeta oblikovana na mjestu nekadašnje perforacije pa je moguće da je alatka primarno služila kao sjekira, a nakon oštećenja prenamijenjena je u spatulu.

Slični su nalazi ovog tipa pronađeni i na Vinči, a za pojedine nalaze s izduženim i oštrijim distalnim krajem napominje se kako su mogli služiti i kao dlijeta,[38] što je slučaj i s jednim primjerkom iz zbirke.

tal end, the working surface of this type of object includes a larger portion of the inside surface of the tool, where the spongy tissue is almost completely worn from use. Traces of use are visible on the working surface and on the edges of the cross-section, appear as smoothing and perpendicular wedges, and point to organic material processing, probably leather.[37] The base of one specimen was formed in the place of a former perforation, so it is possible that the tool was primarily used as an axe and was turned into a polisher after it was damaged.

Similar finds of this type were found at Vinča, and it is suggested certain finds with an elongated and sharper distal end could have been used as chisels,[38] which is also the case with one find from the collection.

Grupa predmeta za udaranje (IV)

Predmeti ove grupe upotrebljavani su za obradu sirovine udarcem. U zbirci su, prema funkcionalnoj podjeli unutar ove grupe, ustanovljene manje (udarači) i jače (čekići) alatke za udaranje te pijuci i kombinirane alatke (čekići-sjekire), često s otvorom za uglavljivanje alatke od nekog drugog materijala.[39]

Udarači (IV 1). Udarači su najbrojniji tip ove grupe, a sva šezdeset i tri primjerka izrađena su od parožaka jelenjeg roga. Dimenzije variraju od 5 cm kod udarača izrađenih od vrhova parožaka (T. 1: P-16858.22) do 17 cm kod većih primjeraka (T. 1: P-16858.47). Na distalnom kraju alatke nalazi se manja kružna ili ovalna radna površina, ali radni vrh alatke može biti i dodatno obrađen, što je slučaj i s dijelom nalaza iz zbirke (T. 2: P-16857.63). Iako se možda radi o oštećenim predmetima ili o odstranjivanju materijala radi popravka alatke, distalni kraj mogao je biti i namjerno odsječen kako bi

Striking tools (IV)

Objects in this group were used to process raw material by striking. Based on a functional division within this group, the collection includes smaller (strikers) and stronger (hammers) striking tools, as well as picks and combined tools (hammer-axes), often with an opening for a haft made out of other materials.[39]

Strikers (IV 1). Strikers are the most numerous type in this group, and all sixty three finds are made out of red deer tines. Their dimensions vary from 5 cm in strikers made out of tine tips (Pl. 1: P-16858.22) to 17 cm in larger specimens (Pl. 1: P-16858.47). The distal end of these tools has a smaller circular or oval working surface, but the working tip of the tool can be additionally processed, as is the case with some finds from the collection (Pl. 2: P-16857.63). Although these are damaged finds or finds from which material was removed to fix the tool, the distal end could have been purposefully cut off to expose the spongy tissue.[40] Strikers processed in this way could have been used as some type of

[37] Van Gijn 2005, 56.

[38] Срејовић, Јовановић 1958-59, 185; sl. 6: 1, 2.

[39] Vitezović 2011, 308.

[37] van Gijn 2005, 56.

[38] Срејовић, Јовановић 1958-59, 185, Fig. 6: 1, 2.

[39] Vitezović 2011, 308.

[40] Vitezović 2011, 309.

spongiozno tkivo postalo izloženo.[40] Tako su obrađeni udarači mogli služiti kao neka vrsta tučka, za mljevenje pigmenta ili pripremu hrane, premda je ovaj tip predmeta upotrebljavan i za obradu otpornijih materijala, poput drva.[41]

Na distalnom kraju kod ovog tipa alatke vidljiva su sitna oštećenja i usjeci, a prisutna je i uglačanost koja se često proteže gotovo cijelom površinom predmeta. Osim uzdužnog ljuštenja traka materijala, druga najčešće primijenjena tehnika za odvajanje paroška od ostatka roga je cijepanje manjih, nepravilnih komada korteksa (T. 1: P-16857.59), a parožak je zatim odsječen ili prelomljen na mjestu spongioznog tkiva.

Čekići (IV 3). U ovu su grupu uvrštena dva fragmentirana primjerka, izrađena od stabla roga, slomljena na mjestu perforacije. Na očuvanome dijelu nalazi se radna površina čekića, no nije moguće zaključiti je li se i na dijelu koji nedostaje mogla nalaziti aktivna radna površina.

Unutar ovog tipa izdvojen je podtip kombiniranih alatki – čekića-sjekira, kojem pripada deset nalaza ove zbirke. Čekići-sjekire (T. 2: P-16860.3) izgledom podsjećaju na alatke ovog tipa od glačanog kamena, a sličnost nije samo u formi predmeta već i u načinu obrade materijala. Prirodne su neravnine roga uklonjene struganjem, a čitava je površina predmeta dodatno obrađena intenzivnim glačanjem do visokog sjaja. Izrađeni su od segmenta stabla bliže bazi roga, a na mjestu odstranjenog paroška izvedena je perforacija okomito na os alatke, promjera 2,5 – 3 cm, fino uglačane unutrašnjosti. Na jednom kraju alatke nalazi se ravna ili zaobljena radna površina čekića, konkavna i s dubljim usjecima od upotrebe (sl. 8). Stablo roga na suprotnom je kraju koso zasječeno, no kod pojedinih nalaza nije formirana oštrica kakva se nalazi kod sjekira, već je oblikovan usjek, a spongiozno je tkivo izdubljeno vjerojatno kako bi se uglavila manja kamena sjekira ili dlijeto. Slični nalazi ovog tipa poznati su i s Vinče.[42]

[40] Vitezović 2011, 309.

[41] Витезовић 2010, 49.

[42] Срејовић, Јовановић 1958-59, 186-187; sl. 14: 2.

pestle for grinding pigment or food preparation, but this type of tool was also used to process more resilient materials like wood.[41]

The distal end of this type of tool displays tiny damage and cuts as well as smoothness, which often spreads across the entire surface of the object. Apart from longitudinal peeling of strips of material, the second most frequently used technique for separating the tine from the rest of the antler is splitting off smaller irregular pieces of cortex (Pl. 1: P-16857.59), after which the tine gets cut or broken off where the spongy tissue appears.

Hammers (IV 3). This group includes two fragmented finds made out of antler beams, broken at the perforation. The preserved part includes the working surface of the hammer, but it is impossible to conclude if such an active working surface was present on the missing part of the tool.

A sub-type of combined tools was defined within this type - hammer-axes, which includes ten finds from this collection. Hammer-axes (Pl. 2: P-16860.3) visually resemble tools of this type made out of polished stone, and the similarities are not reflected only in form, but also in the way the material was processed. The natural imperfections were removed from the antler by scraping, and the entire surface of the find was additionally worked by intensive polishing until it obtained a glossy shine. These finds were made from segments of antler closer to the base, and the place where the tine was cut contains a perforation perpendicular to the axis of the tool, measuring 2.5-3 cm in diameter with a highly polished inner surface. One end of the hammer has a straight or curved working surface which became concave with deeper incisions from use (Fig. 8). The opposite side of the antler beam was diagonally cut, but some of the finds do not have a formed blade which can be seen on axes, and the cut forms a notch instead. The spongy tissue was then taken out, probably in order to insert a smaller stone axe or chisel. Similar finds of this type were defined at Vinča.[42]

[41] Витезовић 2010, 49.

[42] Срејовић, Јовановић 1958-59, 186-187, Fig. 14: 2.

Slika / Figure 8: Detalj radne površine čekića-sjekire / Detailed view of the working surface of hammer-axe P-16860.3 (snimio / photo by: I. Krajcar).

Tri nalaza izrađena su od većeg stabla roga s bazom (T. 3: P-16859.1, P-16859.15), blizu koje je smještena i perforacija za nasad drške. Na jednom kraju alatke kosim je zasijecanjem stabla oblikovana oštrica sjekire, dok je na suprotnom kraju prirodan oblik baze roga poslužio kao radna površina za čekić.[43] Tragovi obrade i upotrebe, na dijelu predmeta koji je korišten kao sjekira, isti su kao i kod primjeraka koji pripadaju tom tipu alatke. Na bazi predmeta, koja je služila kao čekić, uočeni su različiti tragovi upotrebe, poput sitnih oštećenja i usjeka, te mjestimična udubljenja od istrošenosti površine.[44] Jedan ovakav primjerak poznat je i s Banjice iako se ne napominje upotreba kao alatke za udaranje, već je određen samo kao sjekira.[45]

Pijuci (IV 4). Iako bi se pijuci prema obliku radnog vrha, koji čini jak šiljak, mogli svrstati u grupu zašiljenih predmeta, zbog načina na koji su upotrebljavani, smješteni su u ovu grupu.[46] Ovaj tip mogao se koristiti kao zemljoradnička ili rudarska alatka. Izrađuju se od većih, čeonih parožaka jelenjih rogova koji imaju prirodnu zakrivljenost (T. 5: P-16857.45), a koja služi kako bi se dobio veći zamah prilikom udarca.[47]

[43] Averbouh, Bodu 2002, 119.
[44] Averbouh, Bodu 2002, 121.
[45] Perišić 1984, 46, T.24: 169.
[46] Vitezović 2011, 314.
[47] Vitezović 2011, 314.

Three finds are made out of larger antler beams with a base (Pl. 3: P-16859.1, P-16859.15) which is close to the perforation made for hafting. The axe blade was formed on one end of the tool by diagonal cutting, and, on the opposite side, the natural shape of the base was used as the working surface of a hammer.[43] Traces of processing and use on the part of the find which was used as an axe are the same as those on the finds ascribed to that type of tool. The base of the object which was used as a hammer displays different traces of use like tiny damage and notches, as well as some indentations from surface wear.[44] One such find was recovered at Banjica, although there is no mention of it being used as a striking tool, but rather only as an axe.[45]

Picks (IV 4). Although the shape of the working point, a strong point, could be the basis for defining these finds as pointed tools, the way they were used made us define them as part of this group of objects.[46] This type could have been used as an agricultural or mining tool. Picks are made from larger, frontal tines of red deer antlers which have a natural curvature (Pl. 5: P-16857.45), which is used to obtain a stronger swing while striking.[47]

Traces of use include high polishing on the distal end of the tool, and the presence of wear on the working point which clearly exposes the spongy tissue. The collection includes fifteen picks, and finds of this type were recovered in the systematic excavation carried out at Jakovo-Kormadin and other Vinča culture sites – Banjica and Crkvina in Stubline.[48] The base of said finds displays clearly visible traces of techniques ascribed to the Vinča culture, which were used to remove them from the rest of the antler, and the same technique was noted on the well-preserved picks from this collection.

[43] Averbouh, Bodu 2002, 119.
[44] Averbouh, Bodu 2002, 121.
[45] Perišić 1984, 46, T. 24: 169.
[46] Vitezović 2011, 314.
[47] Vitezović 2011.
[48] Perišić 1984, 45, T. 20; Витезовић 2010, 50.

Slika / Figure 9: Drška / Haft P-16868.24 (snimio / photo by: I. Krajcar).

Od tragova upotrebe uočena je izrazita uglačanost distalnog kraja alatke, zatupljenost i istrošenost radnog vrha, na kojem je vidljivo spongiozno tkivo. Iz zbirke potječe petnaest nalaza pijuka, a predmeti ovog tipa poznati su iz sustavnih istraživanja lokaliteta Jakovo – Kormadin i drugih vinčanskih lokaliteta – Banjice i Crkvina u Stublinama.[48] Na bazi navedenih primjeraka jasno je vidljiva karakteristična vinčanska tehnika, kojom su odstranjeni od ostatka roga, a koja je ustanovljena i na bolje očuvanim nalazima pijuka ove zbirke.

Grupa predmeta posebne namjene (V)

Ovoj grupi pripadaju različiti pomoćni predmeti poput drški, radnih površina i recipijenata, odnosno upotrebni predmeti bez aktivnog radnog dijela.[49] U zbirci su ustanovljena dva predmeta određena kao drške i jedan nalaz koji možda predstavlja radnu površinu.

Drške (V 1). Dva su nalaza određena kao drške. Jedna od njih izrađena je od paroška, čija je cijela vanjska površina obrađena struganjem i glačanjem (T. 2: P-16858.46).

[48] Perišić 1984, 45, T. 20; Витезовић 2010, 50.

[49] Vitezović 2011, 316.

Objects of special use (V)

This group includes different auxiliary objects like hafts, working surfaces, and recipients, that is, objects without an active working part.[49] The collection includes two finds shaped into hafts and one which might be a working surface.

Hafts (V 1). Two finds were defined as hafts. One of them is made out of a tine which has been processed by scraping and polishing (Pl. 2: P-16858.46). The spongy tissue was completely removed from the inside of the tine (Fig. 9), probably with the help of some abrasive medium.[50] The hole, measuring 3.5 cm in diameter, is suitable for inserting a smaller stone tool or blade. Such a haft, used on its own or additionally inserted into a wooden haft, was used to absorb the shock of striking, thereby protecting the wooden haft from damage.[51]

The second haft was made out of the base of an antler, where the part closer to the beam was cut and the spongy tissue removed. The frontal tine was probably used as a haft (Fig. 10). It resembles a find from Vinča, made out of the same segment of antler, and which was interpreted as a weapon (mace or hammer).[52] However, in this case, there is no mention of a hole for inserting

[49] Vitezović 2011, 316.

[50] Vitezović 2011, 271.

[51] Schibler 2013, 348, 351, Fig. 20a.

[52] Срејовић, Јовановић 1958-59, 186-187, Fig. 13: 4.

Spongiozno je tkivo u potpunosti izdubljeno iz unutrašnjosti paroška (sl. 9), vjerojatno uz pomoć nekog abrazivnoga sredstava.[50] Otvor promjera 3,5 cm prigodan je za uglavljivanje manje kamene alatke ili sječiva. Takva drška, korištena samostalno ili dodatno uglavljena u drvenu dršku, služila je kako bi apsorbirala šok od udarca te tako štitila drvenu dršku od oštećenja.[51]

Drugi je primjerak izrađen od baze roga, a dio prema stablu ravno je odsječen te je spongiozno tkivo na tome dijelu odstranjeno, dok je čeoni parožak vjerojatno služio kao drška (sl. 10). Izgledom je vrlo sličan nalazu s Vinče, izrađenom od istog segmenta roga koji je interpretiran kao oružje (buzdovan ili malj),[52] no u ovome slučaju ne navodi se postojanje otvora za uglavljivanje alatke od nekoga drugog materijala. Osim kao drška, ovaj je predmet možda služio i kao čekić, na što ukazuje istrošenost površine baze roga.

Radne površine (V II). Jedan je predmet određen kao moguća radna površina (sl. 11). Riječ je o masivnijem komadu roga, s relativno ravnom, širom površinom na račvastom segmentu stabla s naglašenim tragovima upotrebe – nepravilno raspoređene sitne, kraće linije i veći, dublji usjeci, koji se često međusobno preklapaju. Ovakvi predmeti uglavnom nemaju tragove obrade, a služili su kao neka vrsta podmetača ili nakovnja na kojem su se mogle obrađivati različite sirovine.[53]

Slika / Figure 10: Detalj drške od jelenjeg paroška / Detailed view of a haft made out of red deer tine (P-16858.46) (snimio / photo by: I. Krajcar).

Grupa necjelovitih predmeta (VIII)

U ovu su grupu uvršteni nalazi poluproizvoda i otpadaka od proizvodnje te oštećeni predmeti koje nije moguće svrstati u neku drugu grupu.[54]

Zbog nedovoljne očuvanosti, dio nalaza nije bilo moguće pobliže odrediti. Uglavnom, riječ je o oštećenim predmetima, najčešće

[50] Vitezović 2011, 271.

[51] Schibler 2013, 348, 351, sl. 20a.

[52] Срејовић, Јовановић 1958-59, 186-187, sl. 13: 4.

[53] Maigrot 2005, 124-125, sl. 9: 2.; Vitezović 2007, 77.

[54] Vitezović 2011, 341.

tools made of some other material. Apart from as a haft, this find might have been used as a hammer, as indicated by wear seen on the surface of the antler base.

Working surfaces (V II). One find was determined as a possible working surface (Fig. 11). It is a massive piece of red deer antler with a relatively straight wider surface on the forked segment of the antler beam which also displays traces of use – irregularly placed shorter wedges and larger deeper notches which often overlap. Such segments do not display traces of processing, and were used as some sort of pad or anvil on which other raw materials were processed.[53]

Incomplete objects (VIII)

This group includes half-products and production waste which could not be otherwise defined.[54]

Some of the finds could not be more precisely defined due to poor preservation. These are mostly damaged objects, most often tines with missing working tips which were defined as fragmented tools. Their proximal ends clearly display traces of processing, even use on the

[53] Maigrot 2005, 124-125, Fig. 9: 2; Vitezović 2007, 77.

[54] Vitezović 2011, 341.

Slika / Figure 11: Radna površina / Working surface P-16868.20 (snimio / photo by: I. Krajcar).

parošcima čiji radni vrh nedostaje i koji su određeni kao fragmentirane alatke. Na njihovu proksimalnom kraju jasno su vidljivi tragovi obrade, pa čak i upotrebe pri distalnom dijelu, no nije bila moguća preciznija odredba tipa alatke iako se prema obliku i dimenzijama nekih parožaka može pretpostaviti da se radi o udaračima ili pijucima.

Nalazi s tragovima obrade predstavljaju sirovinu (sl. 12) za izradu alatki, odnosno otpatke od proizvodnje, iz kojih je izdvojen materijal za daljnju obradu. Osim toga, ustanovljeni su i nalazi koji predstavljaju poluproizvode – predmete prema čijoj se obradi i formi nazire buduća alatka. Najčešće su očuvani tragovi obrade poput formiranja žlijeba stanjivanjem korteksa roga, primijenjeni za odvajanje parožaka, ali i većih komada roga (T. 5: P-16881.6) ili grubog zasijecanja kamenom sjekirom, primjerice na nalazu P-16868.2, na kojem se nalazi i polovično formirana perforacija (T. 3: P-16868.2). Postupak izrade perforacije na već gotovom proizvodu uočen je i na jednom nalazu udarača (T. 1: P-16857.63).

Obje navedene skupine predmeta, osim što pružaju dragocjene podatke o tehnikama obrade sirovine i izrade alatki, također idu u prilog postojanju radioničkog mjesta na lokalitetu Jakovo – Kormadin.

distal parts, but it was impossible to precisely determine the type regardless of the fact that their shape and dimensions suggest that they were strikers or picks.

Finds with traces of processing are raw materials (Fig. 12) used to make tools, or production waste which was discarded when material for further processing was selected. Apart from that, we determined some half-products – finds which show processing and the form of which hints at the future tool shape. Most commonly preserved traces of processing include wedges formed by thinning down the antler cortex in order to separate tines and larger pieces of antler (Pl. 5: P-16881.6), or coarse cutting done by a stone axe, as on find P-16868.2 which also has a partially formed perforation (Pl. 3: P-16868.2). The process of making a perforation was also noted on one striker (Pl. 1: P-16857.63).

Both listed groups of objects provide valuable data on the techniques used to process raw material and make tools, and also speak in favor of Jakovo-Kormadin as a site that included a workshop.

Slika / Figure 12: Nalazi sirovine (otpaci od proizvodnje) za izradu alatki od roga / Raw material (production waste) for antler tool production (snimio / photo by: I. Krajcar).

RASPRAVA I ZAKLJUČNO

Rezultati analize predmeta od roga s lokaliteta Jakovo – Kormadin potvrdili su dosadašnja saznanja o koštanoj industriji ovog nalazišta i ukazuju na određene sličnosti s ostalim lokalitetima vinčanske kulture, u smislu izbora i načina pribavljanja sirovine, primijenjenih tehnika izrade i zastupljenosti pojedinih tipova predmeta.

Najveći broj alatki pripada grupi predmeta za udaranje, nakon kojih po brojnosti slijede predmeti za sječenje. Grupa zašiljenih predmeta relativno je slabo zastupljena, dok su spatule i predmeti posebne namjene prisutni u vrlo malom broju. Neutilitarni predmeti, kao ni nakit izrađen od roga nisu ustanovljeni. Iako se izostanak predmeta ove grupe djelomično može objasniti stanjem istraženosti nekog nalazišta, ona je također odraz tehnološkog ili kulturolo-

DISCUSSION AND CONCLUDING REMARKS

The results of the analysis done on antler finds from Jakovo-Kormadin confirm our knowledge about the bone industry of this site, and point to certain similarities with other sites of the Vinča culture regarding the selection and manner of obtaining raw material, the techniques applied in processing, and the presence of certain types of objects.

The largest number of tools is in the group of objects used for striking, followed by objects used for cutting. The group of pointed objects is relatively sparse, while polishers and objects of special use appear in very small numbers. The lack of this type of object can partially be explained by the state of research of a certain site, but it is also a reflection of technological and cultural choices,[55] although decorative objects made out of antler have been found at some sites of the

[55] Vitezović 2011, 275.

kog izbora[55] premda su ukrasni predmeti izrađeni od roga poznati s nekih vinčanskih nalazišta.[56] Manji broj spatula i predmeta sa zašiljenim radnim vrhom može se objasniti izborom sirovine, za čiju se izradu češće koriste rebra ili fragmenti dugih kostiju. Ovakva tipološka slika podudara se s uobičajenom upotrebom alatki od roga, odnosno najveći broj odnosi se na tipove koji pripadaju grupi predmeta za udaranje ili sječenje, najčešće korištenih za obradu otpornijih materijala, poput drva. Samo dio nalaza mogao je biti korišten u domaćinstvu, poput udarača s dodatno obrađenim distalnim krajem, primjerice, za pripremu hrane. Spomenute grupe predmeta (za sječenje i udaranje), osim za sječu drva i izradu građevinskih elemenata za izgradnju objekata, vjerojatno su korištene i kao poljoprivredne alatke, odnosno namijenjene su za obavljanje organiziranih aktivnosti koje su se odvijale podalje od naselja ili u njegovoj neposrednoj blizini.[57]

Alatke su u najvećem broju izrađene od odbačenih rogova jelena, dok se rjeđe pojavljuju primjerci koji potječu od ulovljene životinje. Pribavljanje sirovine sakupljanjem odbačenih rogova zahtijeva određeni stupanj organizacije i znanja, odnosno vremena i mjesta na kojem oni mogu biti sakupljeni.[58] Za razliku od jelenjih rogova, rog srndaća se rijetko koristi za izradu alatki i u tome se slučaju radi o *ad hoc* alatkama, s minimalnom obradom. Od ukupno 217 nalaza artefakata od roga, njih je samo deset izrađeno od roga srndaća. Riječ je o tri probojca i pet nalaza određenih samo kao zašiljeni predmeti.

Predmeti izrađeni od roga srndaća nalaze se na jednom kraju proizvodnog kontinuuma[59] i predstavljaju oportunističke proizvode, jednostavne izrade i kraćeg vijeka upotrebe, dok su na suprotnome kraju pažljivo izrađene alatke od roga. Nalazi takve izrade

[55] Vitezović 2011, 275.

[56] Vitezović 2013a, 12, 14.

[57] Maigrot 2005, 122-123, 125.

[58] Maigrot 2005, 122.

[59] Choyke 1997, 66.

Vinča culture.[56] The smaller number of polishers and objects with a pointed working tip can be explained by raw material selection, where ribs or fragments of longer bones are more often used. Such a typological image coincides with the usual use of antler tools, that is, the largest number refers to those types which fall into the group of striking and cutting tools most often used for processing more resilient materials like wood. Only a part of the finds could have been used in households, like the striker with an additionally processed distal end, which could have been used in food preparation. The mentioned group of finds (used for cutting and striking), apart from cutting wood and making architectural elements for building, were probably also used as agricultural tools used for organized activities away from the settlement or in its close vicinity.[57]

Most tools were made out of shed red deer antlers. Finds which were made out of hunted game rarely appear. Obtaining raw material by collecting shed antlers requires a certain degree of organization and knowledge, meaning time and the knowledge of places where such antlers could be collected.[58] Unlike red deer antler, roe deer antlers are seldom used to make tools and if they are, they are used for *ad hoc* tools with minimal processing. Out of the total 217 finds of antler artifacts, only ten were made out of roe deer antler – three points and five finds which were defined only as pointed objects.

Finds made out of roe deer antler are at the one end of the production continuum[59] and are opportunistic products with simple processing which get used for a short period of time. Red deer antler tools are on the opposite end of the production continuum. Such finds represent the production tradition characteristic of a certain period or site in a certain area, and are always made from the same skeletal remains or species, reflecting the importance of the economic activity they were used for.[60]

[56] Vitezović 2013a, 12, 14.

[57] Maigrot 2005, 122-123, 125.

[58] Maigrot 2005, 122.

[59] Choyke 1997, 66.

[60] Choyke 1997, 65-66.

predstavljaju proizvodnu tradiciju, karakterističnu za određeno vrijeme ili nalazišta na nekome prostoru, za čiju se izradu biraju uvijek isti skeletni elementi ili vrste, te se na taj način odražava i ekonomska važnost djelatnosti za koju su bili upotrebljavani.[60]

Na sličnu situaciju nailazimo i na Divostinu, na kojem je, kao i na lokalitetu Jakovo – Kormadin, ustanovljen visok udio alatki od jelenjeg roga,[61] dok se rijetko pojavljuju predmeti od roga srndaća. Mali broj predmeta izrađenih od roga srndaća vjerojatno je posljedica njihove lošije kvalitete kao sirovine i manjih dimenzija, što ih ne čini prikladnima za izradu alatki.[62]

Velik broj alatki od roga jelena ukazuje na važnost roga kao sirovine za izradu artefakata, a činjenica da je materijal prikupljen u toliko velikom broju u vrijeme kada nalazi koštane industrije nisu predstavljali zanimljive artefakte, pa nisu ni sustavno sakupljani, govori u prilog bogatstvu koštane industrije na ovome nalazištu, što se može iščitati na više mjesta iz izvještaja A. Poturičića koji spominje velike količine alatki od kostiju i roga.[63]

Ipak, na nalazištima vinčanske kulture predmeti od roga zastupljeni su u različitim omjerima u odnosu na ostale koštane sirovine.[64] Takva situacija djelomično može biti posljedica stanja istraženosti, ali može biti i objašnjena razlikom u ekonomiji između pojedinih nalazišta, od kojih su neka vjerojatno bila specijalizirana za pribavljanje sirovine i izradu alatki od roga, kao i za poslove vezane uz upotrebu takvih alatki.[65] Visok udio roga, osim na Divostinu, ustanovljen je i na Jakovo – Kormadinu.

Osim toga, tijekom istraživanja lokaliteta 2008. godine pronađeno je više otpadaka od proizvodnje artefakata od roga, koji su pružili vrijedne podatke o tehnikama izra-

A similar situation can be seen at Divostin where, just like at Jakovo-Kormadin, a large number of antler tools were found.[61] The small number of roe deer objects is probably a consequence of the fact that they, as a raw material, are of poor quality and are generally smaller, making them less suitable for tool making.[62]

The large number of red deer antler tools points to the importance of antler as a raw material for producing artifacts, and the fact that the material was collected in such large quantities at a time when finds of bone industry were not considered interesting and were, hence, not systematically collected, speaks in favor of the rich bone industry at this site, which was also attested to by A. Poturičić in his reports, where he often mentions large quantities of bone and antler tools.[63]

However, at sites ascribed to the Vinča culture, antler tools are present in different ratios in comparison with other bone raw materials.[64] This can partially be explained as a result of the state of research, but can also be explained through the difference in economy between specific sites, some of which probably specialized in collecting raw material and producing antler tools, as well as in activities connected to the use of those tools.[65] A large percentage of antler tools, apart from the finds at Divostin, was also noted at Jakovo-Kormadin.

Additionally, the 2008 excavations of the site yielded more waste from antler artifact production, which provided valuable data on production techniques and, more importantly, pointed to the existence of a workshop for making antler tools at the site,[66] which is also supported by finds of raw material and half-products from the here analyzed collection from Jakovo-Kormadin. In this regard, we should also mention the interesting note from the correspondence between commissioner A. Poturičić and the then Museum director in which the author makes an as-

[60] Choyke 1997, 65-66.

[61] Витезовић 2013, 111, 121.

[62] Vitezović 2013b, 69.

[63] Šeper 1952, 29; Brunšmid 1902, 234-238.

[64] Vitezović 2013b, 67, sl. 7.6.

[65] Vitezović 2013b, 68-69.

[61] Витезовић 2013, 111, 121.

[62] Vitezović 2013b, 69.

[63] Brunšmid 1902, 234-238; Šeper 1952, 29.

[64] Vitezović 2013b, 67, Fig. 7. 6.

[65] Vitezović 2013b, 68-69.

[66] Витезовић 2010, 57.

de, i još važnije, ukazali na postojanje radionice za izradu predmeta od roga na ovome nalazištu,[66] što ujedno podupiru i nalazi sirovine i poluproizvoda iz analizirane zbirke predmeta s lokaliteta Jakovo – Kormadin. U tom je pogledu zanimljiva i crtica iz korespondencije muzejskog povjerenika A. Poturičića s ravnateljstvom Muzeja, u kojoj zbog brojnosti pronađenih alatki od kosti i roga, iznosi pretpostavku o postojanju radioničkog mjesta na ovome nalazištu.[67]

Brojnost tipova alatki i njihovih varijanti govori o dobrom poznavanju svojstva sirovine od koje su izrađene, a tehnološka ujednačenost kod izrade predmeta ukazuje da su artefakte izrađivali visokospecijalizirani pojedinci. Sve to pruža sliku o Jakovo – Kormadinu kao o nalazištu s bogatom i razvijenom koštanom industrijom, a unatoč tomu što kontekst nalaza nedostaje, njihova dobra očuvanost, brojnost i raznolikost svakako doprinose boljem razumijevanju koštane industrije, ne samo na ovome nalazištu već i u okvirima vinčanske kulture općenito.

[66] Витезовић 2010, 57.

[67] Brunšmid 1902, 235; "*U Hauchovom vinogradu…izrovano je za jedna kola crijepova od starih lonaca, jelenjih i drugih rogova i silesija kostiju, i nađene su alatljike od kamena, kremena i kostiju, a jedan čovjek pripovijeda, da od toga nalazišta malko dalje prema jugu u zemlji imade vrlo mnogo kostiju, te izgleda, da su ovdje baš stanovali neki majstori, koji su od kostiju i drugog materijala oruđe pravili.*"

sumption about the existence of a workshop at the site because of the numerous finds of bone and antler tools.[67]

The number of types and their respected variants reflects knowledge about the properties of the raw material used for tool production, while the technological uniformity points to the fact that artifacts were made by highly specialized individuals. Everything listed creates an image of Jakovo-Kormadin as a site with a rich and developed bone industry and, despite the fact that the context is unknown, the fact that they are well-preserved and appear in large number and different types certainly contributes to a better understanding of bone industry not only at this site, but also in terms of the Vinča culture in general.

[67] Brunšmid 1902, 235; *"Hauch's vineyard…yielded a wagon of old pot fragments, red deer and other antlers and a bunch of bones, and we also found tools made of stone, flint and bones, and a man tells us that, a bit further from this site towards the south, the ground contains many bones, and it seems that this exact spot was where some artisans lived who made tools out of bone and other materials."*

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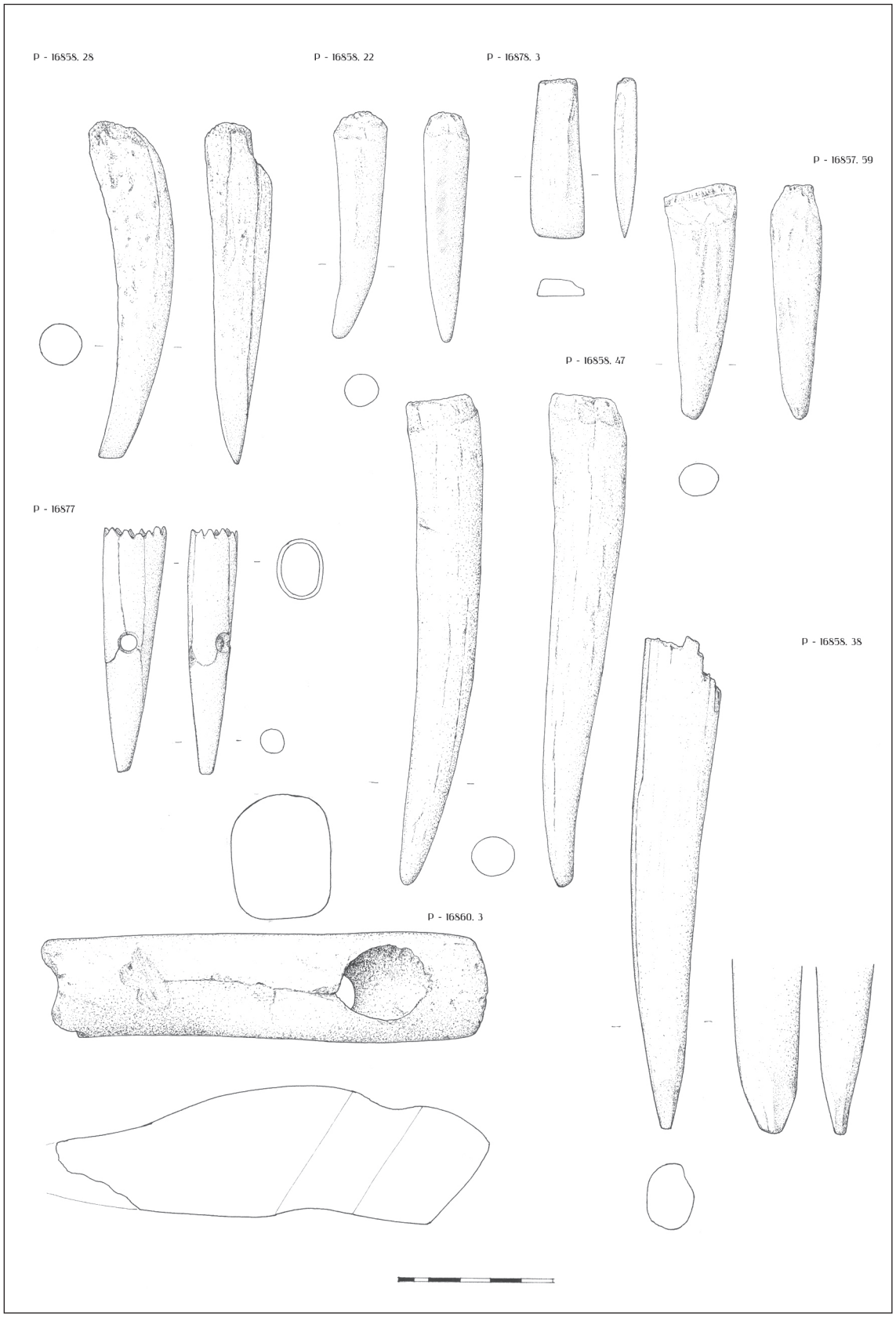

Tabla I: harpun (P-16877); dlijeta (P-16858.38, P-16878.3); klin (P-16858.28); udarači (P-16857.59, P-16858.22, P-16858.47); čekić-sjekira (P-16860.3). / Plate I: harpoon (P-16877); chisels (P-16858.38, P-16878.3); wedge (P-16858.28); strikers (P-16857.59, P-16858.22, P-16858.47); hammer-axe (P-16860.3). Autorica / Author: Miljenka Galić, računalna obrada / computer processing: Jelena Boras.

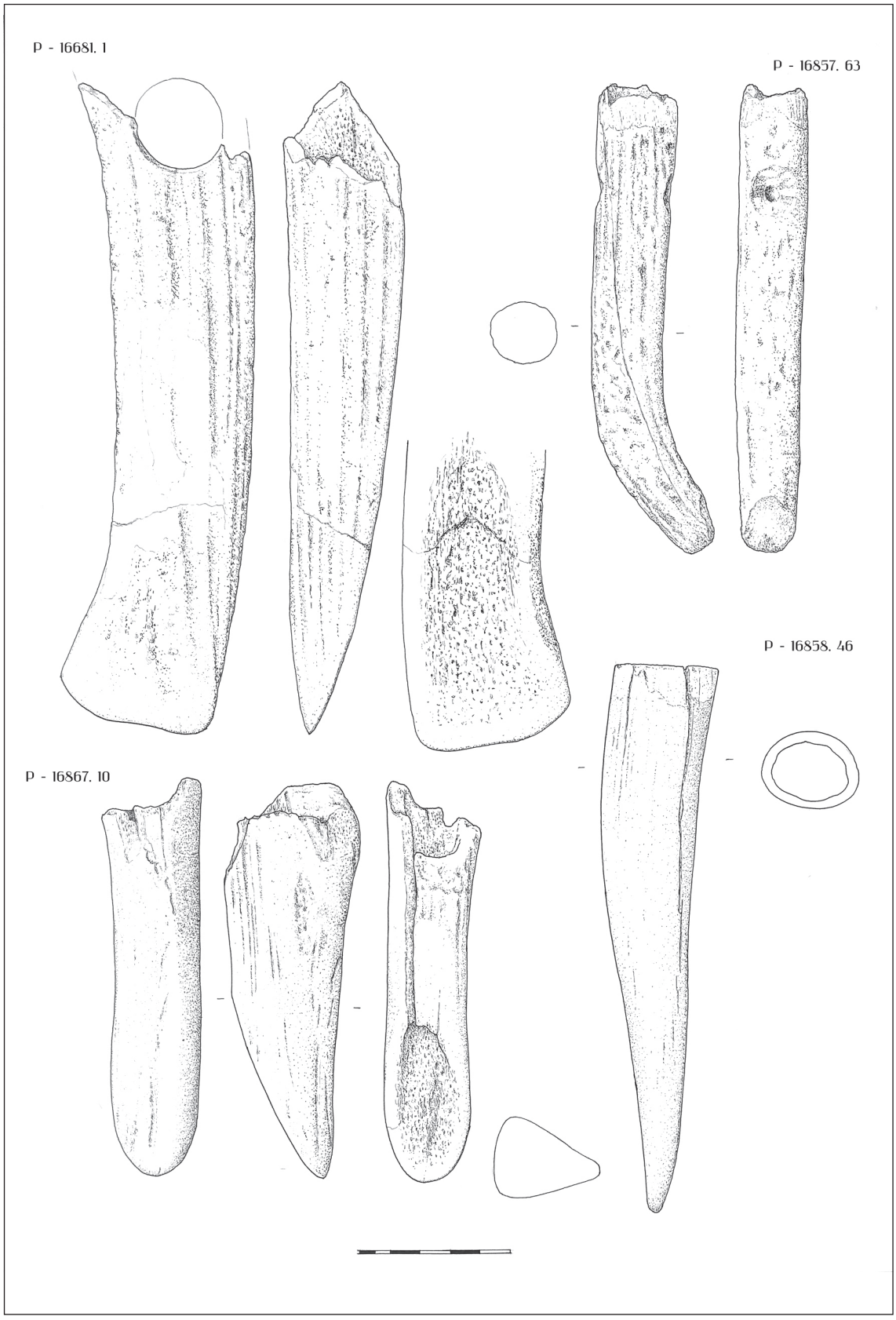

Tabla II: dlijeto (P-16867.10); sjekira (P-16881.1); udarač (P-16857.63); drška (P-16858.46). / Plate II: chisel (P-16867.10); axe (P-16881.1); striker (P-16857.63); haft (P-16858.46). Autorica / Author: Miljenka Galić, računalna obrada / computer processing: Jelena Boras.

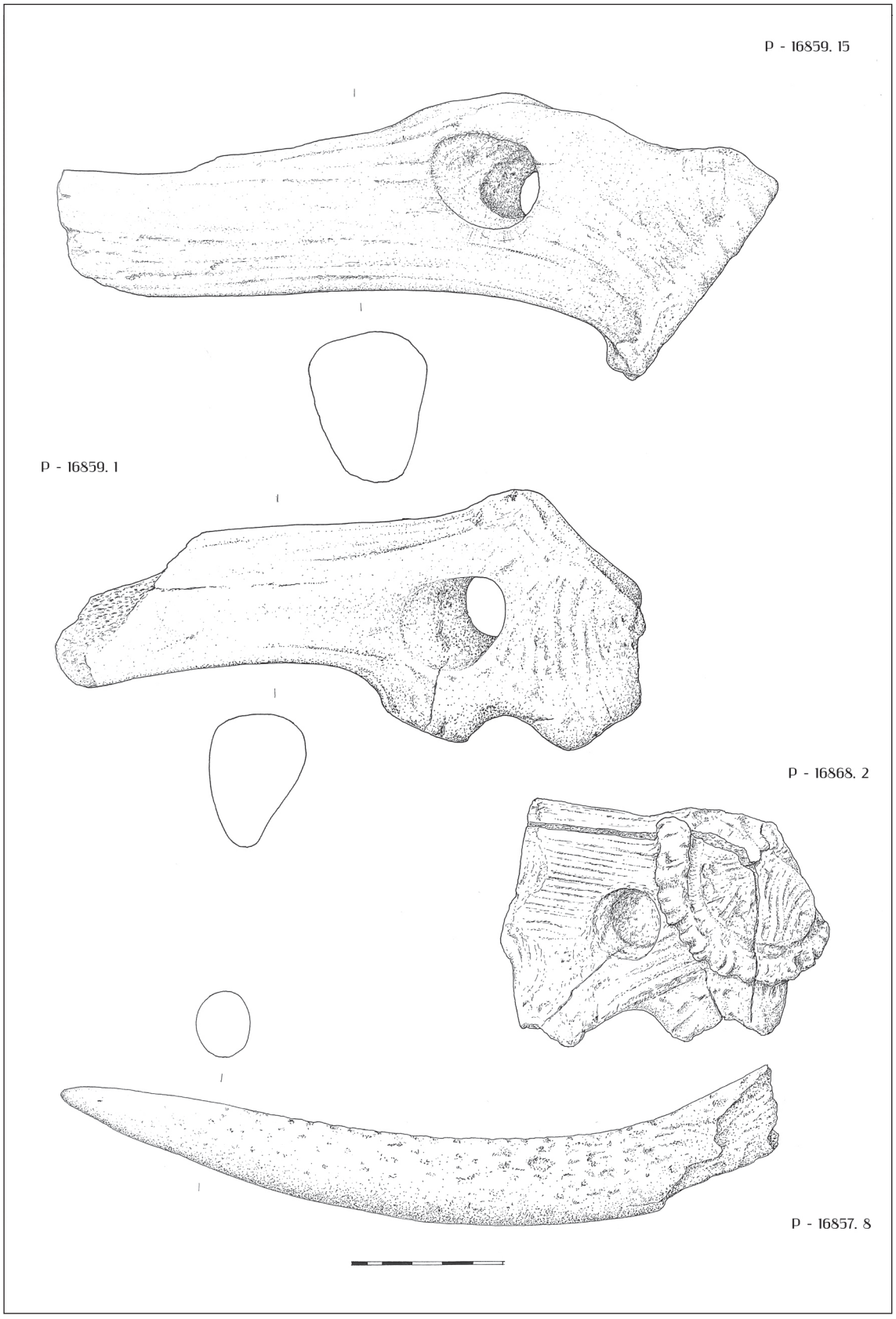

Tabla III: probojac (P-16857.8); čekići-sjekire (P-16859.1, P-16859.15); poluproizvod (P-16868.2). / Plate III: point (P-16857.8); hammer-axes (P-16859.1, P-16859.15); half-product (P-16868.2). Autorica / Author: Miljenka Galić, računalna obrada / computer processing: Jelena Boras.

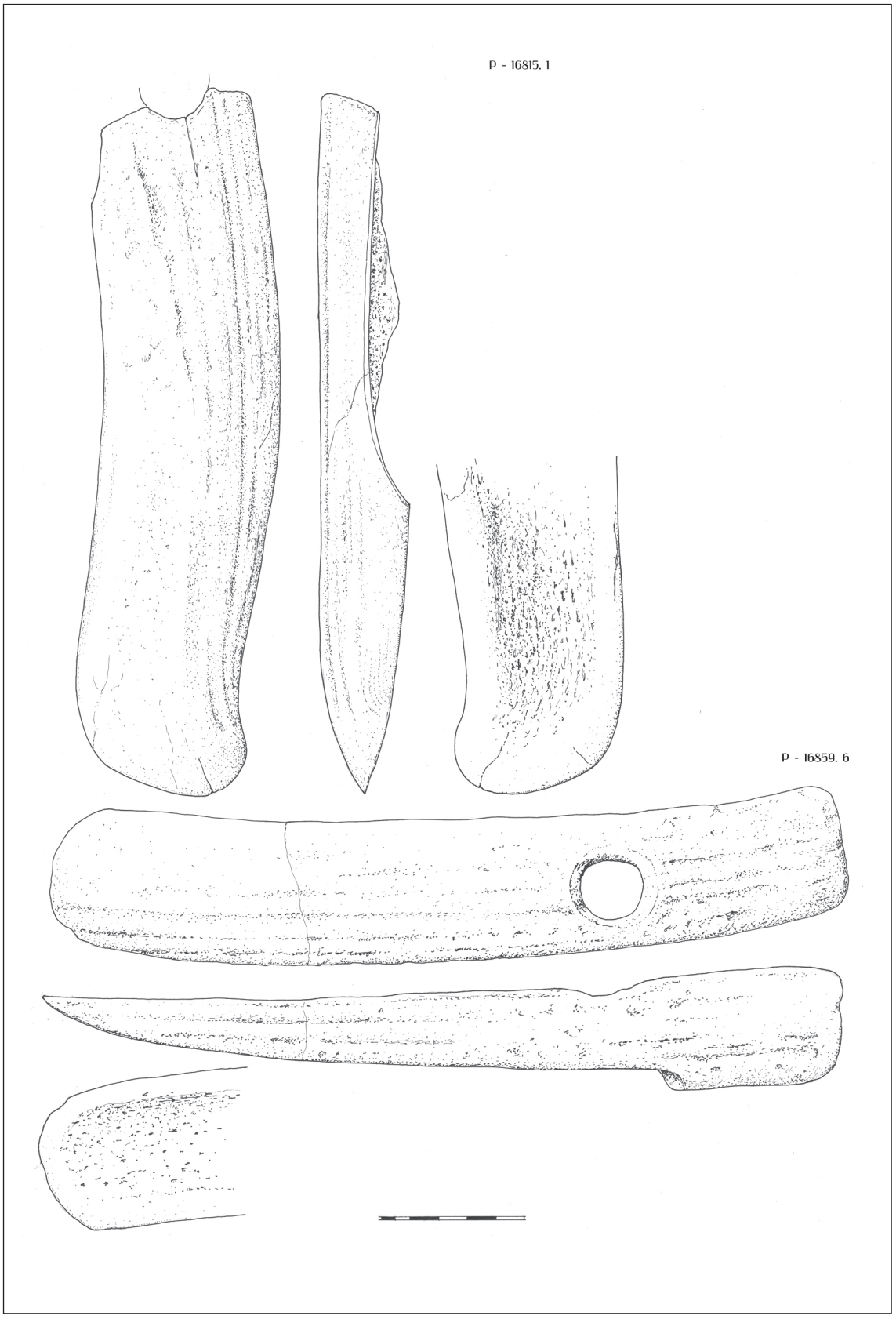

Tabla IV: sjekire (P-16815.1, P-16859.6). / Plate IV: axes (P-16815.1, P-16859.6). Autorica / Author: Miljenka Galić, računalna obrada / computer processing: Jelena Boras.

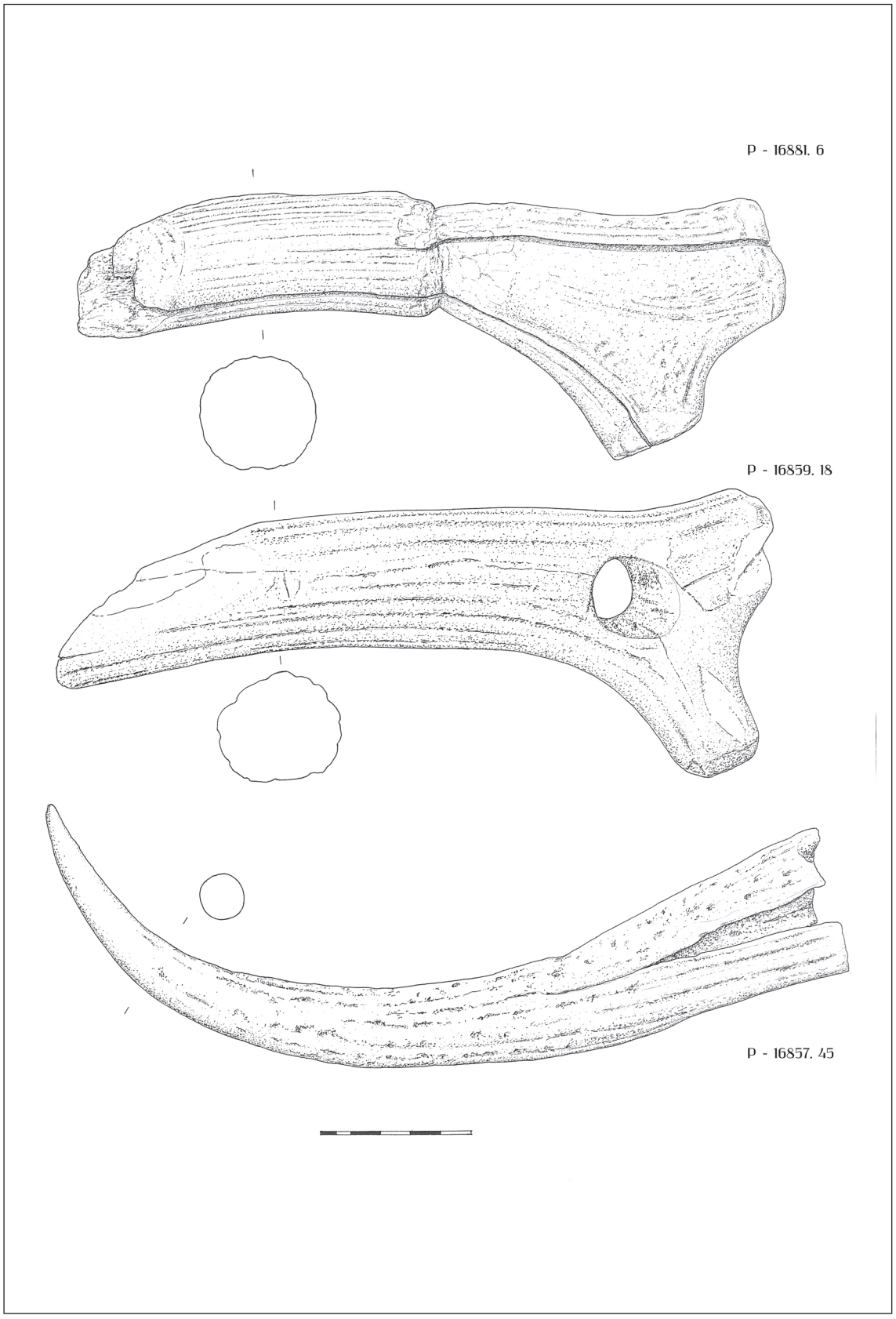

Tabla V: sjekira (P-16859.18); pijuk (P-16857.45); sirovina / poluproizvod (P-16881.6). / Plate V: axe (P-16859.18); pick (P-16857.45); raw material/half-product (P-16881.6). Autorica / Author: Miljenka Galić, računalna obrada / computer processing: Jelena Boras.