VINČANSKA KOŠTANA INDUSTRIJA S NALAZIŠTA JAKOVO-KORMADIN

BONE INDUSTRY FROM THE VINČA CULTURE SITE OF JAKOVO-KORMADIN

Vedrana Krištofić
Meštrovićeva 26
HR-51000 Rijeka
vedrana.kristofic@gmail.com

UDK: 903.21-035.56(497.11)"634"
Izvorni znanstveni rad / Original scientific paper

Tijekom nesustavnih istraživanja nalazišta Jakovo-Kormadin početkom 20. stoljeća otkrivena je velika količina nalaza vinčanske koštane industrije. Materijal predstavljen u ovome radu nalazi se u Arheološkome muzeju u Zagrebu i broji 566 predmeta izrađenih od različitih koštanih sirovina.

Provedena je tehno-tipološka analiza materijala. Posebno su razmotreni načini nabave koštanih sirovina, kao i njihov izbor za izradu pojedinih skupina predmeta. Upotreba artefakata ukazala je na raznovrsne djelatnosti koje su se odvijale unutar naselja ili u njegovoj blizini. Prema svim podacima, nalazi koštane industrije s lokaliteta Jakovo-Kormadin dobro se uklapaju u okvire vinčanske kulture i upotpunjuju dosadašanja saznanja o ovome segmentu ekonomije neolitičkih zajednica.

A large number of finds of bone industry ascribed to the Vinča Culture were discovered in the non-systematic excavations carried out at the Jakovo-Kormadin site at the beginning of the 20th century. The material presented in this paper is kept at the Archaeological Museum in Zagreb, and includes 566 finds made from various osseous raw materials.

The material was analysed technologically and typologically. Special attention was given to the modes of raw-material acquisition, as well as to the choice of material used in the production of specific groups of finds. The artefact usage indicates various activities that could have taken place within the settlement or its immediate vicinity. Based on all available data, finds of bone industry from Jakovo-Kormadin fit into the well-known framework of the Vinča Culture, and add to current knowledge on this segment of the economy within Neolithic communities.

Ključne riječi:
koštana industrija, vinčanska kultura, Jakovo-Kormadin, tehno-tipologija, raspolaganje sirovinama, upotreba alatki

Key words:
bone industry, Vinča Culture, Jakovo-Kormadin, technology, typology, raw-material management, tool usage

Uvod

Početkom 20. stoljeća provedena su prva nesustavna iskopavanja na nalazištu Jakovo-Kormadin.[1] Tijekom istraživanja prikupljena je velika količina nalaza neolitičke koštane industrije koji se danas čuvaju u zbirci Arheološkog muzeja u Zagrebu. No sačuvane skice i bilješke, koje su jedini podaci o tim istraživanjima, ne sadrže relevantne podatke o stratigrafiji niti o kontekstu nalaza.[2]

Lokalitet je istraživan i sredinom prošloga stoljeća, kada su na nalazištu otkrivena tri stambena horizonta vinčanske kulture.[3] Istraživanjem 2008. godine potvrđena je takva situacija[4] te je ustanovljeno kako je vinčanska kultura jedina prapovijesna kultura na ovome nalazištu.

Unatoč nedostatku konteksta, analizirani su predmeti pripisani vinčanskoj kulturi. Materijal iz zbirke tipološki je uspoređen s nalazima koštane industrije iz navedenih sustavnih istraživanja i s onima s ostalih nalazišta vinčanske kulture[5] te pokazuje visok stupanj sličnosti. Također, na većem su broju artefakata uočene tehnike obrade koštanih sirovina koje se mogu smatrati karakterističnima za vinčansku kulturu.[6] Zastupljenost različitih koštanih sirovina i načini njihova raspolaganja te upotreba alatki pokazali su da se koštana industrija Jakovo-Kormadin dobro uklapa u okvire vinčanske kulture iako pokazuje i neke posebnosti.

Ovaj rad pruža osnovne informacije o zbirci u pogledu tehno-tipologije, izbora i nabave koštanih sirovina te moguće upotrebe koštanih artefakata, što je i cilj ovoga rada. Ovdje prikazani rezultati analize mogu poslužiti za daljnji, detaljniji pristup materijalu.

Tipologija

Analizirani su predmeti tipološki razvrstani prema obliku i funkciji radnog dijela na osnovne tipove podijeljene u veće grupe predmeta. Osim primarnih tipova, izdvojeni su i podtipovi i varijante, ovisno o primijenjenim tehnikama izrade, upotrijebljenoj sirovini ili izboru skeletnog elementa.[7] Nalazi ove zbirke podijeljeni su u sedam osnovnih grupa (tab. 1; sl. 8), od kojih jedino nisu ustanovljeni nalazi koji pripadaju grupi neutilitarnih predmeta.

Introduction

The first non-systematic excavations of the Jakovo-Kormadin site were carried out at the beginning of the 20th century,[1] and yielded a large number of finds of Neolithic bone industry, which are currently kept at the Archaeological Museum in Zagreb. However, the preserved sketches and notes provide the only available information about the excavations, and do not contain relevant data about site stratigraphy or the context of the finds.[2]

The site was also excavated in the middle of the past century, when three habitational phases of the Vinča Culture were recorded.[3] In the 2008 excavations, the situation previously recorded was confirmed,[4] and the Vinča Culture was established as the only prehistoric culture present on the site.

Despite the lack of context, the finds analysed were ascribed to the Vinča Culture. The material from the collection was typologically compared with finds of bone industry recovered during the aforementioned systematic excavations, as well as to those from other sites of the Vinča Culture,[5] revealing a high degree of similarity. Additionally, a larger number of artefacts display processing techniques that can be considered characteristic of the Vinča Culture.[6] The presence of various osseous raw materials and the ways in which they were managed, as well as tool use, revealed that the bone industry of Jakovo-Kormadin fits into the framework of the Vinča Culture, although it also displays some particularities.

The main objective of this paper is to offer basic information about the collection analysed regarding techno-typology, selection and exploitation of osseous raw materials and the use of artefacts. The results of the analysis presented here can serve for further, more detailed analysis of the material.

Typology

The finds analysed were, on the basis of the shape and function of the working edge, typologically sorted into basic types that were further divided into larger groups of finds. Apart from the basic types, it was possible to discern subtypes and variants, depending on the production techniques applied, the choice of raw material, or the choice of skeletal elements.[7] The finds from this collection were divided into seven basic groups (Tab. 1; Fig. 8), noting that only non-utilitarian finds were not established.

1 Brunšmid 1902, 234–238; Šeper 1952, 25–28.
2 Šeper 1952, 25–30.
3 Јовановић, Глишић 1960, 113.
4 Булатовић, Капуран, Стругар 2010, 3.
5 Срејовић, Јовановић 1958–59; Bačkalov 1979; Perišić 1984; Russell 1990; Витезовић 2010; Vitezović 2011b; Витезовић 2013a; Vitezović 2013d.
6 Витезовић 2010, 54; Vitezović 2016, 76.
7 Bačkalov 1979, 31 i dalje; Vitezović 2007, 61–64; 2011a, 67–68, 274; 2016, 84–85.

1 Brunšmid 1902, 234–238; Šeper 1952, 25–28.
2 Šeper 1952, 25–30.
3 Јовановић, Глишић 1960, 113.
4 Булатовић, Капуран, Стругар 2010, 3.
5 Срејовић, Јовановић 1958–59; Bačkalov 1979; Perišić 1984; Russell 1990; Витезовић 2010; Vitezović 2011b; Витезовић 2013a; Vitezović 2013d.
6 Витезовић 2010, 54; Vitezović 2016, 76.
7 Bačkalov 1979, 31 ff; Vitezović 2007, 61–64; 2011a, 67–68, 274; 2016, 84–85.

SLIKA 1. Koštana šila izrađena od dugih kostiju i rebara (P-16807, P-16813; snimio I. Krajcar).

FIGURE 1. Bone awls made out of long bones and ribs (P-16807, P-16813; photo by I. Krajcar).

Zašiljeni predmeti (I). Zajednička je karakteristika ove grupe predmeta, koja uključuje oruđe i oružje, šiljasti radni vrh čija je osnovna namjena bušenje, odnosno probijanje materijala.[8] Ovo je najbrojnija grupa predmeta u analiziranoj zbirci u kojoj su zastupljeni svi tipovi koje obuhvaća (sl. 8). Nalazi rogova srndaća s minimalnom obradom na distalnom kraju također su uvršteni u ovu grupu predmeta, bez pobližeg svrstavanja u određeni tip.[9]

Šila (I 1) su najbrojniji tip alatki u zbirci i dijele se na više podtipova i varijanti (sl. 1). Ustanovljena su dva, brojčano podjednako zastupljena podtipa – šila izrađena od dugih (I 1A) i šila od plosnatih kostiju (I 1B).

Varijanta šila I 1A1u najvećem je broju izrađena od rascijepljenih metapodijalnih kostiju malih preživača, na čijoj je bazi očuvana distalna ili proksimalna epifiza (T. 1: 1, 9–10). Samo su tri nalaza izrađena od nerascijepljenih metapodijalnih kostiju (T. 1: 6), s očuvanom distalnom epifizom na bazi, i isto toliko od ulne manjeg sisavca. Druga varijanta šila od dugih kostiju (I 1A2) izrađena je od manjih segmenata dijafize, čija je baza uglavnom ravno odsječena i uglačana (T. 1: 5, 7–8).

Pointed tools (I). A common characteristic of this group of finds, which includes both tools and weapons, is a pointed working edge that was primarily used for drilling, that is, puncturing material.[8] This is the most numerous group of finds in the collection analysed, and includes all of the types ascribed to it (Fig. 8). Finds of roe-deer antlers with minimal processing at the distal end were also included in this group of finds, without additional ascription to specific type.[9]

Awls (I 1) are the most numerous find in the collection, and can be divided into several subtypes and variants (Fig. 1). Two numerically similar subtypes were defined: awls made out of long bones (I 1A), and awls made out of flat bones (I 1B).

Awls of the I 1A1 variant were mostly made from the split metapodial bones of small ruminants that have a preserved distal or proximal epiphysis at the base (Pl. 1: 1, 9–10). Only three finds were made from non-split metapodial bones (Pl. 1: 6) with a preserved distal epiphysis on the base, as were three finds made from the ulnas of smaller mammals. The second variant of awls made out of long bones (I 1A2) was actually made out of smaller segments of diaphyses, mostly with a straight cut and polished base (Pl. 1: 5, 7–8).

8 Vitezović 2007, 65.
9 Krištofić 2017, 36.

8 Vitezović 2007, 65.
9 Krištofić 2017, 36.

Šila od plosnatih kostiju (T. 1: 2–4) izrađuju se od rebara malih preživača. U zbirci je prisutna varijanta jednostranih šila (I 1B1). S obzirom na to da je dio materijala, koji pripada ovoj varijanti, djelomično fragmentiran, postoji mogućnost da su neki od tih nalaza mogli biti i dvostrana šila (I 1B2). No ta varijanta inače nije česta pojava, što je vjerojatno posljedica tehnički zahtjevnije izrade predmeta.[10] Manji dio nalaza podtipa I 1B izrađen je od nerascijepljenih rebara (T. 1: 4) na čijem je distalnom kraju šiljak oblikovan kosim zasijecanjem i struganjem.

Probojci (II 2) su alatke s jačim, masivnim šiljkom na distalnom dijelu, korištene za rad na otpornijim materijalima poput drva ili roga.[11] U zbirci su alatke ovog tipa izrađene od kostiju (T. 2: 1–6) te od parožaka jelenjih rogova (T. 6: 2) i od roga srndaća.[12] Slično kao i kod šila, za izradu su probojaca korištene duge kosti (uglavnom metapodijalne; T. 2: 4–6) ili samo njihovi fragmenti (T. 2: 2–3), čija veličina odgovara onoj goveda ili jelena. Probojci od plosnatih kostiju izrađeni su od nerascijepljenih rebara velikih preživača (T. 2: 1), kakvi su poznati i s ostalih nalazišta vinčanske kulture.[13]

Igle (I 3) su predmeti s vrlo oštrim i tankim, fino izrađenim šiljkom na distalnom kraju.[14] Primjerci iz zbirke poluprstenastog su presjeka, potpuno uglačane površine i širine do 5 mm (T. 1: 11). Ovakve su igle češće služile za tkanje i pletenje iako su mogle biti upotrebljavane i za šivanje tako da se vlakno provlači kroz već napravljenu perforaciju na materijalu.[15]

Nalazi svrdla iz zbirke (I 4) izrađeni su od metapodijalnih kostiju. Oba su primjerka vjerojatno prenamijenjena u svrdla nakon što je radni vrh istrošen, a prvobitno su služila kao šilo, odnosno probojac u slučaju većeg primjerka (T. 2: 7). Upotreba ovog tipa alatke ostavlja na distalnom kraju duboke linije i ureze koji su kružno raspoređeni oko šiljka, kakvi su ustanovljeni i na nalazima iz zbirke.[16]

Nalazi su oružja malobrojni, a uključuju udice, projektile i harpune. Udice (I 5) su oblikovane iz segmenta dijafize dugih kostiju. Središnji je dio valjkast s proširenjem na proksimalnom dijelu, a na zakrivljenom distalnom kraju oblikuje se šiljak (sl. 2). Udice su slabo zastupljene i na ostalim neolitičkim lokalitetima, što dovodi u pitanje njihovu namjenu. Moguće je da ovi predmeti nisu imali ulogu oružja, već su služili kao kuke za sušenje ribe.[17]

Nalazi projektila (I 6) izrađeni su od segmenata dijafize dugih kostiju većih sisavaca. Ovi predmeti valjkastog oblika, s jakim šiljkom na distalnom dijelu, služili su kao vrh koplja ili strijela.[18] S obzirom na to da su nalazi ove zbirke djelomično očuvani, nije moguće ustanoviti kojem podtipu pripadaju.

Awls made out of flat bones (Pl. 1: 2–4) were made from the ribs of small ruminants. The collection yielded a variant of one-sided awls (I 1B1). Given that some of the material ascribed to this variant is fragmented, it is possible that some of the finds could have been double-sided awls (I 1B2). However, that variant is not common, probably as the result of technically more complex production processes.[10] A smaller portion of the finds of subtype I 1B were made out of non-split ribs (Pl. 1: 4) with a point on the distal part that was shaped by slanted cutting and scraping.

Points (II 2) include tools with a stronger, massive point at the distal end, and were used to work on more resilient materials like wood or antler.[11] In the collection, this type of tool was made out of bones (Pl. 2: 1–6), but also out of red-deer tines (Pl. 6: 2) and roe-deer antlers.[12] As with the awls, the points were produced from long bones (mostly metapodial; Pl. 2: 4–6), or fragments of them (Pl. 2: 2–3), which match those of cattle or deer in size. Points made out of flat bones were made from the non-split ribs of large ruminants (Pl. 2: 1), the likes of which have also been discovered on other sites of the Vinča Culture.[13]

Needles (I 3) are finds with a very sharp, thin, finely-made point at the distal end.[14] The finds from the collection have a semi-circular cross-section and a completely polished surface, and measure up to 5 mm in width (Pl. 1: 11). This kind of needle was most often used for weaving and knitting, although it could have been used for sewing by driving the thread through a previously perforated hole in the material.[15]

Finds of borers (I 4) from the collection were made out of metapodial bones. Both of the finds were probably transformed into borers after their working edge was spent, and were originally used as awls, i.e. as a point in the case of the larger find (Pl. 2: 7). The usage of this tool type leaves deep lines and cuts at the distal end that are circularly distributed around the point, just like those established on the finds from this collection.[16]

Weapons are not very frequent, and include fishhooks, projectiles and harpoons. Fishhooks (I 5) were made out of segments of the diaphysis of long bones. Their central parts are cylindrical, are wider at the proximal end, and are shaped into a point at the curved distal end (Fig. 2). Fishhooks are poorly represented at other Neolithic sites as well, making their purpose questionable. It is possible that these objects did not play the role of weapons, but were used as hooks for drying fish.[17]

10 Vitezović 2007, 107.
11 Vitezović 2011a, 284.
12 Krištofić 2017, 35.
13 Perišić 1984, 35–36, T. 8: 64–66.
14 Vitezović 2011a, 288.
15 Vitezović 2007, 67; 2011a, 289.
16 Vitezović 2011a, 289.
17 Vitezović 2011a, 290.

10 Vitezović 2007, 107.
11 Vitezović 2011a, 284.
12 Krištofić 2017, 35.
13 Perišić 1984, 35–36, T. 8: 64–66.
14 Vitezović 2011a, 288.
15 Vitezović 2007, 67; 2011a, 289.
16 Vitezović 2011a, 289.
17 Vitezović 2011a, 290.

SLIKA 2. Nalazi koštanih udica iz zbirke (P-16808, P-16809, P-16810; snimio I. Krajcar).

FIGURE 2. Finds of bone fishhooks from the collection (P-16808, P-16809, P-16810; photo by I. Krajcar).

SLIKA 3. Jednoredni harpun (P-16812.2; snimio I. Krajcar).

FIGURE 3. Single-row harpoon (P-16812.2; photo by I. Krajcar).

U zbirci su prisutne dvije varijante harpuna (I 7) – konusni (T. 2: 8) i jednoredni harpuni (sl. 3), korišteni za ribolov ili lov na veće, kopnene životinje.[19] Kod obje su varijante formirani zupci ili jezičak, čija je svrha zadržati harpun u tijelu lovine.[20]

Predmeti za sječenje (II). Ova grupa obuhvaća dlijeta, klinove i sjekire izrađene od različitih dijelova jelenjih rogova i dugih kostiju. Oštar radni rub na distalnom kraju ovih predmeta služi za obradu otpornijih materijala (drvo, rog i kost), odnosno za rascjepljivanje ili sječenje sirovine.[21]

Dlijeta (II 1) i klinovi (II 2) izrađivani su od jelenjeg roga, kao i od dugih kostiju većih sisavaca. Kod dlijeta, izrađenih od jelenjeg roga, razlikuju se tri varijante: dlijeta izrađena od fragmenta korteksa roga, parožaka (T. 3: 4) i od stabla roga (T. 3: 1).[22] Dlijeta izrađena od fragmenta korteksa roga (T. 3: 3), i njima slični primjerci izrađeni od kosti (T. 3: 2), oblikom i dimenzijama podsjećaju na primjerke ovog tipa od glačanog kamena. Svi su nalazi klinova od roga izrađeni od parožaka (T. 3: 6).[23]

Ostali su primjerci dlijeta i klinova (T. 3: 5) izrađeni od uzdužno rascijepljenih metapodijalnih kostiju ili od segmenata dijafize. Gusto raspoređene tanke linije i uglačanost od upotrebe prekrivaju površinu blizu radnog ruba kod oba tipa predmeta, dok su kod dlijeta tragovi upotrebe prisutni i na rubovima presjeka.

Projectile points (I 6) were made out of segments of the diaphysis of long bones of larger mammals. These finds have a cylindrical shape with a strong point at the distal end, and were used as the heads of spears or arrows.[18] Given that the finds from this collection are partially preserved, it is not possible to ascribe them to a specific subtype.

The collection includes two variants of harpoons (I 7)– conical (Pl. 2: 8), and single-row harpoons (Fig. 3), used for fishing or hunting larger land animals.[19] Both variants have latches or points that were made in order to keep the harpoon in the body of the prey.[20]

Cutting tools (II). This group includes chisels, wedges and axes made out of various parts of red-deer antlers and long bones. The sharp working edge on the distal end of these finds was used to process more resilient materials (wood, antler and bone), that is, to split or cut raw materials.[21]

Chisels (II 1) and wedges (II 2) were made out of red-deer antlers, as well as out of the long bones of larger animals. Three variants were established for chisels made of red-deer antler: chisels made from antler cortex fragments, tines (Pl. 3: 4) and antler beam (Pl. 3: 1).[22] Chisels made from antler cortex fragments (Pl. 3: 3), and similar finds made of bone (Pl. 3: 2), resemble polished stone tools in shape and size. All finds of wedges were made from tines (Pl. 3: 6).[23]

18 Schibler *et al*. 2010, 250; Vitezović 2011a, 293.
19 Bačkalov 1979, 29; Krištofić 2017, 36.
20 Bačkalov 1979, 35.
21 Vitezović 2011a, 295–299.
22 Krištofić 2017, 37–38.
23 Krištofić 2017, 38.

18 Schibler *et al*. 2010, 250; Vitezović 2011a, 293.
19 Bačkalov 1979, 29; Krištofić 2017, 36.
20 Bačkalov 1979, 35.
21 Vitezović 2011a, 295–299.
22 Krištofić 2017, 37–38.
23 Krištofić 2017, 38.

Sjekire (II 3) su masivne alatke većih dimenzija. Primjerci iz zbirke izrađeni su isključivo od segmenata stabla jelenjeg roga (sl. 4). Bliže bazi alatke formirana je perforacija za nasad drške, promjera 2,5 – 3 cm, dok je na suprotnom kraju kosim zasijecanjem formirana radna površina. Ustanovljeno je više varijanti (T. 4: 1–2; sl. 4), ovisno o načinu izrade i segmentu stabla roga od kojeg su izrađene.[24]

The remaining finds of chisels and wedges (Pl. 3: 5) were made out of longitudinally split metapodial bones, or out of segments of diaphyses. The surface near the working edge, on both types of finds, displays densely-distributed thin lines and polishing from use, while chisels display additional traces of use on the edges of the cross-sections.

Axes (II 3) are massive larger tools. The finds from the collection were exclusively made out of segments of red-deer antler beams (Fig. 4). A perforation for hafting, measuring 2.5 – 3 cm in diameter, was placed closer to the base of the tool, while the opposite end includes a working surface shaped by slanted cuts. Several variants were defined (Pl. 4: 1–2; Fig. 4), depending on the mode of production and the segment of antler beam that was used.[24]

SLIKA 4. Varijanta sjekira (P-16859.6, P-16859.10, P-16859.13) koje su mogle služiti i kao motike (snimio I. Krajcar).

FIGURE 4. The variant of axes (P-16859.6, P-16859.10, P-16859.13) that could have been used as hoes (photo by I. Krajcar).

Predmeti za glačanje (III). Predmeti ove grupe zastupljeni su u vrlo malom broju (sl. 8), a služili su za obradu različitih organskih materijala glačanjem, poliranjem i struganjem.[25]

Samo jedan, djelomično očuvan nalaz spatule (III 1) izrađen je od rascijepljenog segmenta rebra (III 1B). Ostali primjerci većih su dimenzija, izrađeni od uzdužno rascijepljenog stabla roga (III 1C), a jedan je nalaz izrađen od koso odsječenog vrha paroška.[26]

U zbirci su ustanovljena četiri nalaza strugala (III 2) – jedno strugalo od cijelog rebra (III 2A) i tri primjerka koji pripadaju podtipu od zuba svinje (III 2B). Strugalo od rebra samo je djelomično očuvano (T. 4: 3). Radni je rub ovalan, unutrašnja površina reducirana te je spongiozno tkivo izloženo i većim dijelom istrošeno.

Polishing tools (III). The finds of this group are few in number (Fig. 8) and were used to process various organic materials by polishing, glazing and scraping.[25]

Only one polisher (III 1), partially preserved, was made out of a split rib segment (III 1B). The other finds are larger, made out of longitudinally split antler beams (III 1C), while one find was made out of a tine tip that was cut slantwise.[26]

A total of four scrapers (III 2) were recorded in the collection – one scraper made out of a whole rib (III 2A), and three finds that belong to the subtype made out of pig teeth (III 2B). The scraper made from a rib is only partially preserved (Pl. 4: 3) and has an oval working edge, and the inner surface is reduced to the point

24 Krištofić 2017, 39.
25 Vitezović 2007, 73–74.
26 Krištofić 2017, 40, sl. 6.
27 Maigrot 2003, 124–125.

24 Krištofić 2017, 39.
25 Vitezović 2007, 73–74.
26 Krištofić 2017, 40, Fig. 6.
27 Maigrot 2003, 124–125.

Dva su nalaza strugala od zuba svinje polumjesečastog oblika. Jedan je primjerak oblika izduženog trokuta, zaobljenih rubova, što je možda rezultat intenzivne i dugotrajne upotrebe (T. 4: 4). Kako su pokazali eksperimenti, guste, isprepletene linije od upotrebe, prisutne na radnoj površini i kod nalaza iz zbirke, rezultat su obrade otpornijih biljnih materijala.[27] Oba podtipa strugala karakteristična su za razdoblje starijeg i srednjeg neolitika i u vinčanskoj se kulturi javljaju vrlo rijetko,[28] što objašnjava njihovu slabu zastupljenost u zbirci.

Predmeti za udaranje (IV). Predmeti svrstani u ovu grupu korišteni su za obradu sirovine udarcima.[29] Svi su nalazi ove grupe izrađeni od jelenjih rogova.

where spongy tissue is exposed and mostly spent. Two of the scrapers made of pig teeth have a crescent shape. One is in the shape of an elongated triangle with rounded edges that might be the result of intensive and long-term use (Pl. 4: 4). As shown by experiments, the thick, intertwined lines from use, also present on the finds in this collection, are the result of processing more resilient plant materials.[27] Both subtypes of scraper are characteristic finds of the Early and Middle Neolithic, and appear in the Vinča Culture very rarely,[28] which explains their poor representation in this collection.

Striking tools (IV). The finds ascribed to this group were used to process raw material by striking.[29] All of the finds in this group were made out of red-deer antlers.

SLIKA 5. Udarači (P-16858.6, P-16858.22, P-16858.39) izrađeni od vrha parožaka jelenjih rogova (snimio I. Krajcar).

FIGURE 5. Strikers (P-16858.6, P-16858.22, P-16858.39) made from the tips of red-deer tines (photo by I. Krajcar).

Udarači (IV 1) su najbrojniji tip ove skupine predmeta (sl. 5), a korišteni su kod obrade otpornijih materijala, poput drva.[30] Svi su nalazi izrađeni od parožaka jelenjeg roga, na čijem se distalnom kraju nalazi manja kružna ili ovalna radna površina (T. 5: 1). Radni vrh alatke može biti i dodatno obrađen (T. 5: 2) kako bi spongiozno tkivo postalo izloženo te su takvi primjerci mogli služiti za mljevenje pigmenata ili pripremu hrane.[31]

Osim dva fragmentirana primjerka, na kojima je očuvana radna površina čekića (IV 3), veći broj predmeta pripada podtipu kombiniranih alatki – čekić-sjekira. Na jednome kraju alatke nalazi se ravna ili zaobljena radna površina čekića (T. 5: 3), koja može biti i prirodna baza roga kod jedne od varijanti (T. 6: 1; sl. 6). Na suprotnom kraju predmeta formirana je oštrica kakva se nalazi kod sjekira ili je oblikovan otvor za uglavljivanje alatke od nekog drugog materijala (manja kamena sjekira/dlijeto).

Strikers (IV 1) are the most numerous type of find in this group (Fig. 5), and were used to process more resilient material, such as wood.[30] All of the finds were made from red-deer tines, and have a smaller circular or oval working surface at the distal end (Pl. 5: 1). The working tip of the tool could also have been additionally processed (Pl. 5: 2) in order to expose the spongy tissue, and such finds could have been used to grind pigment or in food preparation.[31]

Apart from the two fragmented finds that have the preserved working surfaces of a hammer (IV 3), a large number of finds can be ascribed to the subtype of combined tools – hammer-axes. In such tools, one part has the straight or rounded working surface of a hammer (Pl. 5: 3), which could, in one variant, also be the natural base of the antler (Pl. 6: 1, Fig. 6). The opposite end of the find has a blade the like of which can be seen on axes, or a perforation for inserting a tool made from some other material (a smaller stone axe/chisel).

28 Vitezović 2011a, 303–304.
29 Vitezović 2011a, 308.
30 Vitezović 2007, 75.

28 Vitezović 2011a, 303–304.
29 Vitezović 2011a, 308.
30 Vitezović 2007, 75.

SLIKA 6. Čekić-sjekira (P-16815.2) izrađen od baze i stabla roga jelena (snimio I. Krajcar).

FIGURE 6. Hammer-axe (P-16815.2) made out of red-deer antler base and beam (photo by I. Krajcar).

Pijuci (IV 4) su mogli biti korišteni kao zemljoradnička ili rudarska alatka. Izrađuju se od većih, čeonih parožaka jelenjih rogova, koji imaju prirodnu zakrivljenost (T. 6: 3), a koja služi kako bi se dobio veći zamah prilikom udarca.[32]

*Predmeti posebne namjen*e (V). U ovu su grupu uključeni pomoćni upotrebni predmeti bez aktivnoga radnog dijela.[33] Dva su nalaza određena kao drške (V 1), izrađene od jelenjeg roga.[34] Takvi su predmeti mogli biti korišteni samostalno ili dodatno uglavljeni u drvenu dršku kako bi apsorbirali šok od udarca.[35] Jedan neobrađeni, masivni komad jelenjeg roga, s tragovima upotrebe, određen je kao moguća radna površina (V 2). Ovakav je predmet služio kao neka vrsta podmetača ili nakovnja na kojem su se mogle obrađivati različite sirovine.[36]

Nalazi izrađeni od kosti obuhvaćaju recipijente (V 3) i koštane štapiće (V 5) te pomoćne alatke korištene za obradu tekstila. Jedan fragmentirani nalaz vjerojatno predstavlja dršku spatule-žlice, čije obje površine pokazuju izrazitu istrošenost od upotrebe. Takav je predmet mogao biti u intenzivnom kontaktu s biljnim materijalima ili kožom, a mogao je služiti i za nanošenje pigmenata.[37] Drugi nalaz predstavlja koštanu žlicu. Drška je pravokutnog oblika, ovalnog presjeka, a na prijelazu drške u recipijent nalaze se trokutasta izbočenja (sl. 7). Recipijent je konkavan s tragovima struganja na unutrašnjoj strani. Za ovaj tip predmeta navode se različite funkcije.[38] No zbog oblika recipijenta, koji

Picks (IV 4) could have been used as agricultural or mining tools. They were made out of larger frontal tines of red-deer antlers with a natural curvature (Pl. 6: 3), which were used in order to achieve a stronger swing while striking.[32]

Objects of special use (V). This group includes auxiliary utilitarian finds without an active working part.[33] Two finds were defined as hafts (V 1) made out of red-deer antler.[34] Such objects could have been used individually, or could have been additionally inserted into a wooden haft to absorb the shock of striking.[35] One massive, unprocessed piece of red-deer antler with traces of use was defined as a possible working surface (V 2). This kind of object was used as some kind of base or anvil that could have been used to process various raw materials.[36]

The finds made out of bone include recipients (V 3), bone rods (V 5) and auxiliary tools used to process textiles. One fragmented find can probably be defined as the haft of a polisher-spoon, and it has extensive traces of wear from use on both surfaces. Such an object could have been in direct contact with plant material or leather, and could also have been used for applying pigments.[37] The other find was defined as a bone spoon. The haft is rectangular with an oval cross-section, and the transition from the haft to the recipient has triangular protrusions (Fig. 7). The recipient is concave and displays traces of scraping on the inner surface. The function of this type of find is variously defined.[38]

31 Витезовић 2010, 49; Vitezović 2011a, 309.
32 Vitezović 2011a, 314.
33 Vitezović 2011a, 316.
34 Krištofić 2017, 44–45.
35 Schibler 2013, 348, 351, sl. 20: a.
36 Maigrot 2005, 124–125, sl. 9: 2; Vitezović 2007, 77.
37 Vitezović 2011a, 325.

31 Витезовић 2010, 49; Vitezović 2011a, 309.
32 Vitezović 2011a , 314.
33 Vitezović 2011a, 316.
34 Krištofić 2017, 44–45.
35 Schibler 2013, 348, 351, Fig. 20: a.
36 Maigrot 2005, 124–125, Fig. 9: 2; Vitezović 2007, 77.
37 Vitezović 2011a, 325.

SLIKA 7. Koštana žlica (P-16814; snimio I. Krajcar).

FIGURE 7. A bone spoon (P-16814; photo by I. Krajcar).

podsjeća na onaj prave žlice, nalaz iz zbirke mogao je služiti za pripremu ili konzumaciju hrane. Prema izboru sirovine i oblicima, dosad poznati primjerci ovoga tipa u vinčanskoj kulturi dosta se razlikuju.[39] Stoga, teško je tražiti preciznije analogije, što dodatno otežava i moguću interpretaciju funkcije predmeta.

Gusto raspoređene, fine linije, koje prekrivaju cijelu površinu koštanih štapića i drugih pomoćnih alatki, ukazuju na intenzivan kontakt s biljnim materijalima.[40] Oba tipa predmeta mogla su služiti kao neka vrsta vretena ili kalema u obradi tekstila.[41]

Ukrasni predmeti (VI). Ovoj grupi pripadaju različiti predmeti dekorativne funkcije.[42]

U zbirci su ustanovljena dva nalaza privjeska (VI 1) izrađena od kljove divlje svinje i fragmenta duge kosti. Privjesak od kosti (T. 7: 1) uglačan je do visokog sjaja s pravilnom kružnom perforacijom, izvedenom okomito na os privjeska. Ovaj je nalaz zanimljiv po tome što predstavlja imitaciju zuba divlje životinje koji dimenzijama i oblikom podsjeća na očnjak medvjeda. Drugi je primjerak izrađen od zuba divlje svinje, relativno pravokutnog oblika, s izvedenom perforacijom na jednom kraju predmeta (T. 7: 2).

Dva nalaza, izrađena od ljušture mekušaca, uvjetno su određeni kao perle (VI 2) iako su mogli biti i dio nekog drugoga ukrasnog predmeta, poput narukvice. Prema tragovima istrošenosti na ovim predmetima, može se zaključiti da su duže vrijeme bili u upotrebi pa su vjerojatno i više puta prepravljani, što dodatno otežava njihovu precizniju odredbu.

However, due to the shape of the recipient, which is similar to those of regular spoons, the find from this collection could have been used in food preparation or consumption. On the basis of the choice of raw material and their shapes, the finds of this type in the Vinča Culture differ greatly,[39] making it difficult to look for more precise analogies and provide possible interpretations of the function of these finds.

The densely-distributed fine lines covering the entire surfaces of bone rods and other auxiliary tools point to intensive contact with plant materials.[40] Both types of finds could have been used as some kind of spindle or spool in textile processing.[41]

Decorative objects (VI). This group includes various finds that have a decorative function.[42]

The collection contains two pendants (VI 1) made out of boar tusk and long bone fragment. The bone pendant (Pl. 7: 1) is highly polished, and has a circular perforation perpendicular to the axis of the pendant. This find is interesting, because it is an imitation of a wild animal tooth, and its dimensions and shape are similar to a bear's canine tooth. The second find was made out of a wild-boar tooth, is relatively rectangular in shape, and has a perforation at one end (Pl. 7: 2).

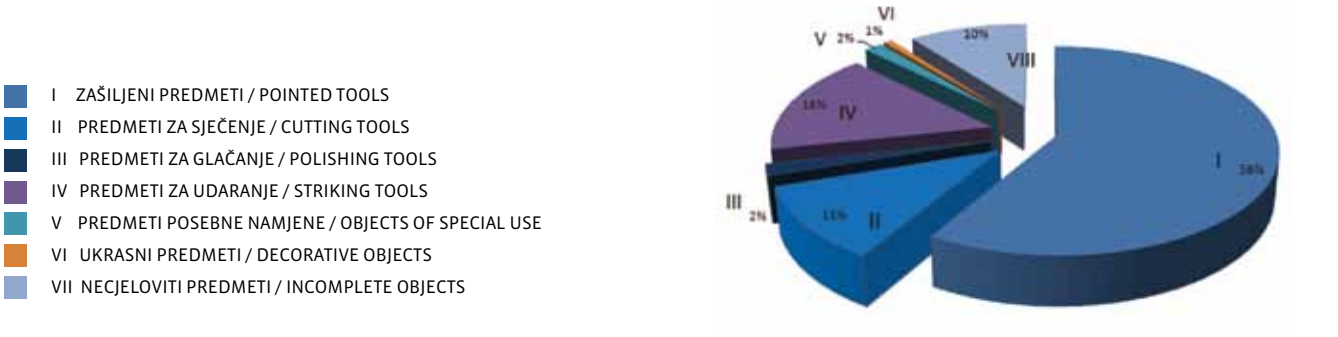
Two finds made out of mollusc shells were provisionally defined as beads (VI 2), although they could have been a part of some other decorative object, such as a bracelet. On the basis of the traces of use wear on these finds, it can be concluded that they were used for a long time and were, because of that, probably repaired several times, making a more precise determination even more difficult.

38 Vitezović 2007, 78; 2011a, 320–321.
39 Vitezović 2013d, 220–221.
40 Vitezović 2007, 79; 2011a, 327.
41 Vitezović 2011a, 327, 331.
42 Vitezović 2011a, 333.

38 Vitezović 2007, 78; 2011a, 320–321.
39 Vitezović 2013d, 220–221.
40 Vitezović 2007, 79; 2011a, 327.
41 Vitezović 2011a, 327, 331.
42 Vitezović 2011a, 333.

Necjeloviti predmeti (VIII). Grupa obuhvaća nalaze poluproizvoda i sirovine, odnosno otpadaka od proizvodnje. Također, ovdje su uvršteni i oštećeni predmeti – fragmentirane alatke. Riječ je o artefaktima, najčešće izrađenima od parožaka koje, zbog nedovoljne očuvanosti, nije bilo moguće svrstati u neku drugu grupu. Na nalazima sirovine i poluproizvoda (T. 7: 3–4), uglavnom onih od jelenjeg roga, očuvani su tragovi obrade sirovine pa je tako moguće rekonstruirati načine izrade artefakata.

Incomplete objects (VIII). This group includes half-products and raw materials, i.e. production waste. The group also includes damaged finds – fragmented tools. These artefacts were most often made out of tines, and could not be placed in the other groups due to an insufficient degree of preservation. The finds of raw materials and half-products (Pl. 7: 3–4), mostly those made out of red-deer antler, display traces of raw-material processing, making it possible to reconstruct the ways in which the artefacts were produced.



SLIKA 8. Prikaz zastupljenosti osnovnih grupa predmeta u analiziranoj zbirci (izradila V. Krištofić).

FIGURE 8. The percentages of basic groups of finds from the collection analysed (made by V. Krištofić).

ZAŠILJENI PREDMETI / POINTED TOOLS	5
Šila/Awls	204
Probojci/Points	95
Igle/Needles	15
Svrdla/Borers	2
Udice/Hooks	3
Projektili / Projectile points	3
Harpuni/Harpoons	4
UKUPNO/TOTAL	331
PREDMETI ZA SJEČENJE / CUTTING TOOLS	
Dlijeta/Chisels	22
Klinovi/Wedges	13
Sjekire/Axes	29
UKUPNO/TOTAL	64
PREDMETI ZA GLAČANJE / POLISHING TOOLS	
Spatule/Polishers	6
Strugala/Scrapers	4
UKUPNO/TOTAL	10
PREDMETI ZA UDARANJE / STRIKING TOOLS	
Udarači/Strikers	63
Čekići/Hammers	2
Čekići-sjekire/Hammer-axes	10
Pijuci/Picks	15
UKUPNO/TOTAL	90
PREDMETI POSEBNE NAMJENE / OBJECTS OF SPECIAL USE	2
Drške/Hafts	2
Radne površine/Working surfaces	1
Recipijenti/Recipients	2
Koštani štapići/Bone rods	2
UKUPNO/TOTAL	9
UKRASNI PREDMETI / DECORATIVE OBJECTS	
Privjesci/Pendants	2
Perle/Pearls	2
UKUPNO/TOTAL	4
NECJELOVITI PREDMETI / INCOMPLETE OBJECTS	
Fragmentirane alatke / Fragmented tools	13
Poluproizvodi / Half-products	11
Sirovina-otpaci od proizvodnje / Raw material-production waste	34
UKUPNO/TOTAL	58
SVEUKUPNO / GRAND TOTAL	566

TABLICA 1. Pregled zastupljenih tipova nalaza u zbirci, raspoređenih u osnovne grupe predmeta (izradila V. Krištofić).

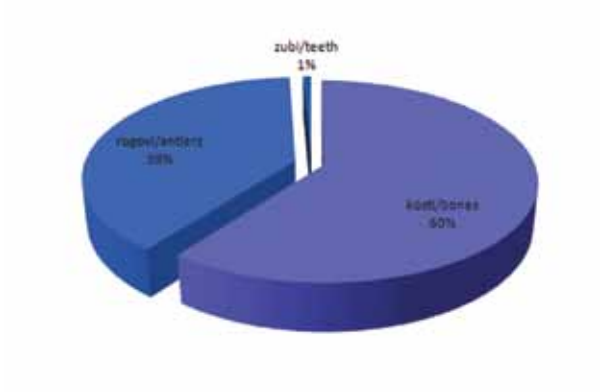
TABLE 1. An overview of the types established in the collection, distributed into the basic groups of finds (made by V. Krištofić).

Koštane sirovine – nabava i izbor

Za izradu artefakata na nalazištu Jakovo-Kormadin korištene su različite koštane sirovine koje uključuju kosti sisavaca, rogove jelena i srndaća, zube svinje i ljušture mekušaca (sl. 9).[43] Najveći je broj predmeta izrađen od dugih kostiju i rebara, dok se rog koristi u nešto manjoj mjeri iako je često upotrebljavana sirovina. Najmanje su zastupljeni zubi životinja, u ovome slučaju svinje, te ljušture mekušaca upotrebljavane za izradu nakita.

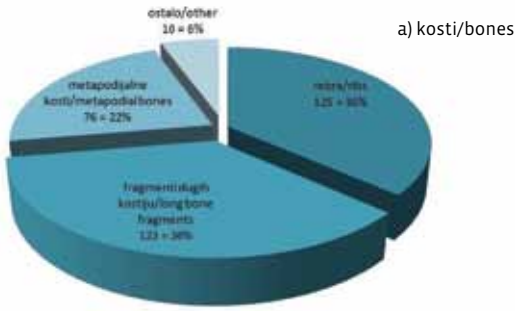
Osseous raw materials – selection and acquisition

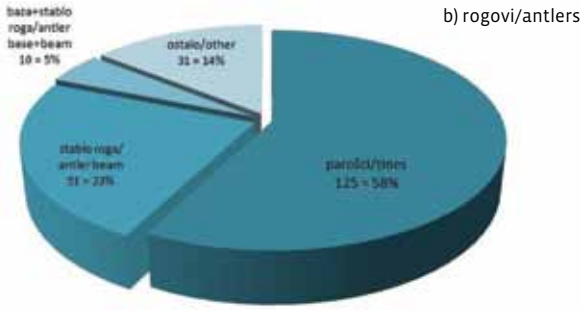
Various osseous raw materials were used for the production of the artefacts from Jakovo-Kormadin, including the bones of mammals, red- and roe-deer antlers, wild-boar teeth and mollusc shells (Fig. 9).[43] The largest portion of finds were made out of long bones and ribs, while antlers were used somewhat less, regardless of antler's being a frequently-used raw material. Animal teeth, in this case those of a pig, as well as mollusc shells used to make jewellery, are the least-represented raw materials.



SLIKA 9. Zastupljenost koštanih sirovina u analiziranoj zbirci (izradila V. Krištofić).

FIGURE 9. The percentages of osseous raw materials in the collection analysed (made by V. Krištofić).





SLIKA 10. Prikaz zastupljenosti elemenata dviju najčešće korištenih sirovina za izradu artefakata: a) kost, b) rog (izradila V. Krištofić).

FIGURE 10. The percentages of elements of the two most commonly-used raw materials: a) bone, b) antler (made by V. Krištofić).

Od kostiju su u najvećem broju zastupljene metapodijalne kosti i rebra (sl. 10: a), dok su se duge kosti, poput ulne, radijusa ili tibije, rijetko koristile. Iako manji dio možda potječe i od divljih životinja (pragovedo, jelen), moguće je pretpostaviti da su glavni izvor ove sirovine predstavljale domaće životinje uzgajane za prehranu, poput ovikaprida i domaćega goveda (tab. 2). Kost je, prema tomu, bila lako dostupna sirovina, pogotovo u slučaju kad je riječ o fragmentima dijafize dugih kostiju – kuhinjskim otpacima, dobivenim lomljenjem kako bi se došlo do koštane srži.[44] Rebra su, kao i metapodijalne kosti, vjerojatno bila pažljivo izdvajana u procesu komadanja ubijene životinje i na neki način skladištena za daljnju upotrebu.[45]

Bones include mostly metapodial bones and ribs (Fig. 10: a), while other bones like the ulna, the radius or the tibia were seldom used. Although a small portion might have come from wild animals (aurochs, red deer), it is possible to assume that the main source of this raw material was domestic animals grown for food, such as ovicaprids and cattle (Tab. 2). Bone was, therefore, an easily available raw material. This is especially true with respect to the fragments of long bones – kitchen waste, obtained by breaking in order to reach the bone marrow.[44] Ribs were, just like metapodial bones, probably carefully selected in the butchering process, and were somehow stored for future use.[45]

43 Samo su dva artefakta izrađena od školjaka: ljušture mekušaca stoga nisu prikazane u grafikonu s obzirom na to da su među koštanim sirovinama zastupljene s manje od 1 %.

44 Vitezović 2013c, 67.

45 Vitezović 2013c, 67; 2016, 66.

43 Only two artefacts are made out of shells; therefore, mollusc shells are not presented in the chart, due to the fact that they comprise less than 1 % of the entire assemblage.

44 Vitezović 2013c, 67.

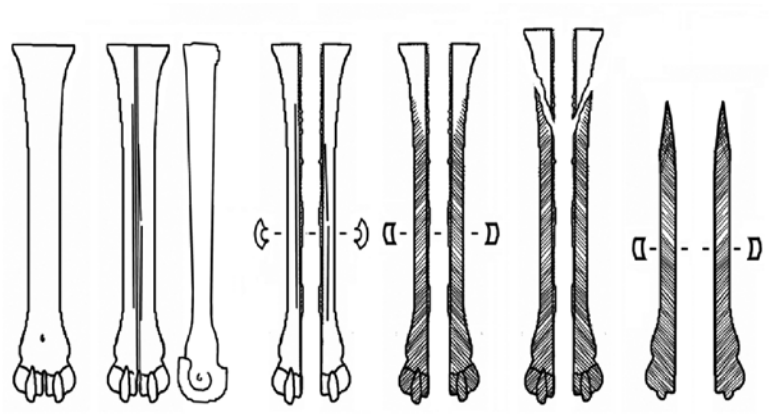
45 Vitezović 2013c, 67; 2016: 66.

Kao što je često slučaj na mnogim neolitičkim nalazištima, metapodijalne kosti i rebra ovikaprida najčešći su odabir za izradu zašiljenih predmeta, posebice šila. Upravo se na primjeru ovog tipa predmeta najbolje reflektira ujednačenost, ne samo u izboru sirovine već i u primjeni tehnika izrade i konačnoj formi predmeta.

Osim morfoloških odlika i adekvatnih dimenzija, razlog odabira ovih skeletnih elemenata njihove su tehnološke prednosti.[46] Metapodijalne kosti mogu se lako uzdužno rascijepiti na dva jednaka dijela, od kojih se daljnjom obradom mogu dobiti četiri alatke.[47] Šila od metapodijalnih kostiju vrlo su ujednačene forme, tanka i poluprstenastog presjeka (T. 1: 10–11), što je postignuto primjenom metode koja uključuje sječenje i potom abraziju (sl. 11), a koja je često korištena u vinčanskoj kulturi.[48] Slično tomu, od jednog segmenta rebra cijepanjem su dobivene dvije koštane pločice iz kojih su struganjem i glačanjem oblikovana šila.

As is often the case at numerous Neolithic sites, ovicaprid metapodial bones and ribs are the most common choice for the production of pointed tools, especially awls. It is precisely the example of this type that best reflects the uniformity of not only the raw-material selection, but also the application of production techniques and the final form of the object.

Apart from the morphological features and suitable dimensions, the reasons for selecting these skeletal elements lie in their technological advantages.[46] Metapodial bones can easily be split longitudinally into two equal parts that can then be processed into four tools.[47] Awls made out of metapodial bones display a uniform shape, are thin and have a semi-circular cross-section (Pl. 1: 10–11), all of which is achieved by applying a method that includes cutting and abrasion (Fig. 11), a method often used in the Vinča Culture.[48] Similarly, one rib segment was split into two bone plates that were scraped and polished into awls.



SLIKA 11. Metoda izrade šila od metapodijalnih kostiju primjenom sječenja i abrazije (Sidéra 2005, 86).

FIGURE 11. Method of producing awls from metapodial bones by cutting and abrasion (Sidéra 2005, 86).

Jedan od razloga izbora ove sirovine za izradu alatki svakako je i njezina dostupnost budući da potječe od životinja uzgajanih za prehranu. No analize faune pokazale su da je na vinčanskim nalazištima prevladavao uzgoj goveda.[49] Prema tomu, odabir metapodijalnih kostiju ovikaprida i rebara, koja možda potječu i od drugih životinja slične veličine, kulturološki je uvjetovan i predstavlja tradiciju u izboru skeletnih elemenata i životinjskih vrsta za izradu šila, čime je naglašena važnost aktivnosti za koje su bila korištena.[50]

One of the reasons for choosing this raw material is certainly its availability, as it comes from animals that were grown for food. However, faunal analyses have revealed that mostly cattle were bred on sites ascribed to the Vinča Culture.[49] Therefore, the selection of ovicaprid metapodial bones and ribs, which might also come from other animals of similar size, is culturally conditioned and represents a tradition in the choice of skeletal elements and species for awl production, highlighting the importance of the activity the tools were used for.[50]

46 Vitezović 2011a, 343–344.
47 Vitezović 2016, 65.
48 Sidéra 2005, 85–87; Vitezović 2016, 76.
49 Vitezović 2013c, 70.
50 Choyke 1998, 233.

46 Vitezović 2011a, 343–344.
47 Vitezović 2016, 65.
48 Sidéra 2005, 85–87; Vitezović 2016, 76.
49 Vitezović 2013c, 70.
50 Choyke 1998, 233.

Rog je, u odnosu na kost, zastupljen u nešto manjem postotku, ali njegov udio u sveukupnome materijalu (gotovo 40 %) ukazuje na značajnu upotrebu ove sirovine za izradu artefakata (sl. 9). Rog jelena, koji je češće korištena sirovina od roga srndaća,[51] mogao je biti pribavljen lovom i sakupljanjem odbačenih rogova. Među nalazima iz zbirke, na kojima je očuvana baza roga, rijetki su primjerci koji potječu od ulovljene životinje; alatke su u najvećem broju izrađene od odbačenih jelenjih rogova. Premda za nabavu ove sirovine lov nije bio nužan, sakupljanje odbačenih rogova također je morala biti dobro planirana aktivnost koja uključuje poznavanje vremena i mjesta na kojem su mogli biti sakupljeni.[52]

Određeni dijelovi roga – baza, stablo roga i parošci, odabirani su za izradu artefakata na takav način da njihov prirodni oblik najbolje odgovara funkciji predmeta, najčešće korištenih za udaranje i sječenje (sl. 10: b). Takav odabir pokazuje dobro poznavanje mehaničkih svojstava roga, poput fleksibilnosti zbog koje je manje nego kost podložan lomljenju, što ga čini pogodnim za poslove koji zahtijevaju upotrebu sile.[53] Zbog visokog udjela organskih tvari, rog bolje apsorbira šokove od udarca[54] pa je korišten u izradi drški i masivnijih alatki, čija je upotreba vezana uz obavljanje teških poslova i obradu otpornijih materijala (tab. 2).

Zubi divlje svinje, osim za izradu alatki (strugala), korišteni su i kao nakit. Ova je sirovina pribavljana izvan naselja, lovom ili nekom vrstom razmjene s manjih udaljenosti, moguće i kao gotov proizvod.[55]

Za izradu ukrasnih predmeta na lokalitetu Jakovo-Kormadin upotrebljavane su sve sirovine osim roga iako su takvi primjerci poznati s drugih vinčanskih nalazišta.[56] Nalazi od ljuštura mekušaca iz zbirke, uvjetno određeni kao perle, mogli su biti i dio nekog drugoga ukrasnog predmeta, poput narukvice. Na vinčanskim nalazištima za izradu narukvica korištene su školjke *Glycymeris* i *Spondylus*, no s obzirom na male dimenzije nalaza i fragmentiranost, nije moguće zaključiti o kojoj je vrsti riječ.[57] Sirovina je mogla biti pribavljena lokalno (fosilne školjke) ili razmjenom iz udaljenijih područja, a u tom je slučaju vrlo vjerojatno da su takvi predmeti nabavljeni kao gotovi proizvodi.[58]

Upotreba kosti za izradu nakita nije neuobičajena, no nalaz privjeska iz ove zbirke oblikom i dimenzijama imitira očnjak medvjeda, možda izrađen u nedostatku originalne sirovine. Površina svih ukrasnih predmeta iz zbirke naglašeno je uglačana, čime je istaknuta njihova zajednička karakteristika – bijela boja. Bijela je boja vjerojatno bila estetski privlačna iako nije isključeno mogu-

Antlers, in relation to bones, are somewhat less well represented, but their share in the total material (almost 40 %) points to significant use of this raw material in tool production (Fig. 9). Red-deer antler, a raw material used more frequently than roe-deer antler,[51] could have been acquired by hunting or by gathering shed antlers. The finds from this collection that have a preserved antler base show that antlers obtained from hunted animals are rare; tools were made mostly out of shed red-deer antlers. Although hunting was not necessary for the acquisition of this raw material, the gathering of shed antlers also had to be a well-planned activity that required knowledge of the time and place where they could be found.[52]

Certain parts of antlers – base, beam and tines – were selected for the production of tools in such a way that their natural shape best matched the function of the objects that were most commonly used for striking and cutting (Fig. 10: b). This selection reveals a great understanding of the mechanical properties of antler, such as flexibility, which makes it less susceptible to breaking than bone, which makes it suitable for work that requires the use of force.[53] Due to the high percentage of organic matter, antler can easily absorb striking shock,[54] so it was used to make hafts and massive tools the use of which is connected to performing heavy-duty tasks and processing more resilient materials (Tab. 2).

Wild-boar teeth were, apart from tool production (scrapers), also used as jewellery. This raw material was obtained outside the settlement, through hunting or some other kind of short-distance trade, possibly even as a finished product.[55]

At Jakovo-Kormadin, decorative objects were produced from all kinds of raw materials apart from antlers, although such finds were recovered at other sites of the Vinča Culture.[56] Finds of mollusc shells from the collection, provisionally defined as beads, could also have been parts of other decorative objects, such as bracelets. On sites of the Vinča Culture, bracelets were made out of *Glycymeris* and *Spondylus* shells. However, due to the small size and fragmentation, it is impossible to determine the species.[57] The raw material could have been obtained locally (fossilized shells), or through trade with more distant areas, in which case such finds were probably obtained as finished products.[58]

The use of bones for jewellery production is not unusual, but the pendant from this collection imitates a bear's canine tooth in shape and size, and was possibly made due to the lack of the

51 Krištofić 2017, 48–49.
52 Maigrot 2005, 122.
53 Vitezović 2016, 47–48.
54 Vitezović 2016, 48.
55 Vitezović 2011a, 348.
56 Russell 1990, 534; Vitezović 2013b, 12.
57 Dimitrijević, Tripković 2006, 238.
58 Dimitrijević, Tripković 2006, 239; Vitezović 2011a, 273.

51 Krištofić 2017, 48–49.
52 Maigrot 2005, 122.
53 Vitezović 2016, 47–48.
54 Vitezović 2016, 48.
55 Vitezović 2011a, 348.
56 Russell 1990, 534; Vitezović 2013b, 12.
57 Dimitrijević, Tripković 2006, 238.
58 Dimitrijević, Tripković 2006, 239; Vitezović 2011a, 273.

će simboličko značenje koje je pridavano ovoj boji, ali i porijeklu sirovine, kada je riječ o zubima lovljenih životinja i ljušturama mekušaca.[59]

original raw material. The surface of all decorative objects from this collection is significantly polished, thereby highlighting their common characteristic – the colour white. White was probably aesthetically attractive, although the option that the colour and the raw material had symbolic meaning cannot be excluded, especially with regard to mollusc shells and the teeth of animals that had to be hunted.[59]

KOŠTANE SIROVINE / OSSEOUS RAW MATERIALS	
KOST/BONE	ROG/ANTLER
duge kosti, rebra, fragmenti dugih kostiju / long bones, ribs, long bone fragments	rog: baza, stablo roga, parošci, fragmenti korteksa roga / antler: base, beam, tines, fragments of antler cortex
govedo, ovikapridi / cattle, ovicaprids	jelen, srndać / red deer, roe deer
domesticirane životinje korištene za prehranu / domesticated animals used for food	odbačeni rogovi – sakupljanje, lov / shed antlers – collecting, hunting
zašiljeni predmeti: šila, probojci, igle / pointed tools: awls, points, needles	alatke za sječenje i udaranje: sjekire, čekići, dlijeta / cutting and striking tools: axes, hammers, chisels
obrada biljnih materijala i kože, priprema hrane / plant fibres and hide processing, food preparation	obrada i eksploatacija drva, obrada roga, poljoprivreda / wood processing and exploitation, antler processing, agriculture
aktivnosti koje se odvijaju unutar naselja / activities taking place within the settlement	organizirane aktivnosti koje se odvijaju podalje od naselja ili u neposrednoj blizini / activities taking place away from the settlement or in its close vicinity

TABLICA 2. Usporedba dviju najčešće zastupljenih koštanih sirovina na nalazištu Jakovo-Kormadin (izradila V. Krištofić).

TABLE 2. Comparison of the two most commonly-used osseous raw materials at the site of Jakovo-Kormadin (made by V. Krištofić).

Tehnike izrade

Izrada artefakata počinje dijeljenjem sirovine na manje segmente, primjenjujući jednu ili kombinaciju nekoliko tehnika koje uključuju cijepanje, sječenje i lomljenje. Kao poluproizvodi za izradu alatki, mogli su poslužiti i otpaci od proizvodnje ili popravka drugih alatki,[60] kao i fragmenti koji predstavljaju kuhinjski otpad. Segmenti sirovine dalje se oblikuju u željeni proizvod formiranjem radne površine te prema potrebi dodavanjem određenih funkcionalnih odlika u završnoj obradi.[61]

Production techniques

Artefact production starts with dividing the raw material into smaller pieces by applying one or a combination of several techniques including chopping, cutting and breaking. Half-products used in tool production could have included waste from production or repair of other tools,[60] as well as fragments that were actually kitchen waste. The segments of raw material were further shaped into the desired product by forming the working surface and, when needed, adding certain functional traits during the final processing.[61]

59 Vitezović 2011a, 334; 2012, 223.

60 Vitezović 2011a, 263; Krištofić 2017, 34.

59 Vitezović 2011a, 334; 2012, 223.

60 Vitezović 2011a, 263; Krištofić 2017, 34.

Kod obrade roga prvo se odstranjuju parošci, pri čemu su mogle biti korištene različite tehnike.[62] Na paroščima je najčešće formiran žlijeb ljuštenjem tanjih traka materijala, što se može smatrati tehnikom karakterističnom za vinčansku kulturu,[63] nakon čega se mogu odlomiti savijanjem ili odcijepiti sjekirom. Prirodni je oblik parožaka pogodan za oblikovanje raznovrsnih alatki formiranjem radnog vrha ljuštenjem traka materijala ili cijepanjem.[64] Unutrašnjost parožaka, koji su služili kao drške i konusni harpuni, morala je biti izdubljena (sl. 12), a što se postiže pomoću kremene alatke uz primjenu nekoga abrazivnog sredstva.[65]

Veći komadi roga zahtijevaju kombinaciju nekoliko tehnika kako bi se razdijelili na manje segmente, pogodne za daljnju obradu.[66] Kako bi se došlo do spongioznog tkiva, kompaktni je sloj roga stanjen ljuštenjem manjih komada korteksa (T. 7: 4) i višestrukim zasijecanjem sjekirom. Rog se zatim na tome mjestu prelomi, odnosno odcjepljuje sjekirom (*cut-and-break-technique*).[67] Radna je površina alatki većih dimenzija oblikovana kosim zasijecanjem većeg komada stabla jelenjeg roga ili njegovih segmenata dobivenih uzdužnim cijepanjem.[68] Predmeti izrađeni od fragmenata

In antler processing, tine is the first thing removed by using various techniques.[62] Most commonly it is removed from the beam by forming a groove by peeling off thin strips of material, a technique that can be defined as characteristic of the Vinča Culture,[63] making it possible to break by flexion or cutting off with an axe. The natural shape of tine is suitable for shaping various tools by forming a working tip by peeling off strips of material, or by splitting.[64] The inside of tines used as hafts or conical harpoons must have been hollowed out (Fig. 12) by using a chipped stone tool and some abrasive compound.[65]

In order to split larger pieces of antler into smaller fragments suitable for further processing, a combination of several techniques is required.[66] In order to reach the spongy tissue, the compact layer of the antler had to be thinned by peeling off smaller pieces of the cortex (Pl. 7: 4) and repeatedly cutting with an axe. The antler could then be split, i.e. cut off with an axe (*cut-and-break technique*).[67] The working surface of larger tools was formed by slanted cuts made on a larger piece of red-deer antler beam, or segments of it obtained by longitudinal splitting.[68]

SLIKA 12. Detalj drške od paroška jelenjeg roga (P-16858.46), čija je unutrašnjost izdubljena kremenom alatkom uz pomoć abrazivnog sredstva (snimio I. Krajcar).

FIGURE 12. Detail of a haft made out of red-deer tine (P-16858.46) showing an inner surface that was hollowed out with the help of a chipped stone tool and an abrasive compound (photo by I. Krajcar).

SLIKA 13. Detalj udarača (P-16857.63) s tragovima isijecanja korteksa roga kremenom alatkom i dubljenja (snimio I. Krajcar).

FIGURE 13. Detail of a striker (P-16857.63) with traces of cutting out the antler cortex using a chipped tool and gouging (photo by I. Krajcar).

61 Vitezović 2016, 63.
62 Billamboz 1977, 100–101; Maigrot 2005, 122; Schibler 2013, 346.
63 Витезовић 2010, 54.
64 Vitezović 2016, 73.
65 Vitezović 2016, 71.
66 Vitezović 2011a, 269.
67 Vitezović 2016, 67.
68 Vitezović 2011a, 269.

61 Vitezović 2016, 63.
62 Billamboz 1977, 100–101; Maigrot 2005, 122; Schibler 2013, 346.
63 Витезовић 2010, 54.
64 Vitezović 2016, 73.
65 Vitezović 2016, 71.
66 Vitezović 2011a, 269.
67 Vitezović 2016, 67.
68 Vitezović 2011a, 269.

SLIKA 14. Tehnika uzdužnog žlijebljenja: a) produbljivanje žlijeba kremenom alatkom, b) rascjepljivanje kosti indirektnim udarcem (Vitezović 2016, 65; prema Camps-Fabrer, 1990).

FIGURE 14. The technique of longitudinal grooving: a) deepening the groove with a chipped stone tool, b) splitting the bone by indirect impact (Vitezović 2016, 65; after Camps-Fabrer, 1990).

korteksa roga dobiveni su usijecanjem dvaju paralelnih žljebova, nakon čega se klinom (*groove-and-splinter technique*) izdvoje pločice materijala iz kojih se oblikuju dlijeta manjih dimenzija i jedna od varijanti harpuna.[69]

Dodatna obrada ovih predmeta uključuje odbijanje manjih komada materijala te struganje i glačanje kako bi se odstranile prirodne neravnine roga ili kako bi se uklonila manja oštećenja.[70] Perforacije se izvode zasijecanjem korteksa roga kremenom alatkom da bi se došlo do spongioznog tkiva koje se potom izdubljuje (sl. 13).[71] Relativno su pravilnog, kružnog oblika i najčešće se formiraju na sjekirama i predmetima za udaranje.

Za izradu alatki od dugih kostiju, posebice metapodijalnih, korištena je tehnika uzdužnog žlijebljenja (sl. 14). Prirodni uzdužni žlijeb (*sulcus*) postupno se produbljuje kremenom alatkom dok se kost potpuno ne presječe ili rascijepi indirektnim udarcem.[72] Poluproizvodi za izradu alatki od nerascijepljenih dugih kostiju, poput nekih probojaca iz zbirke, mogli su biti dobiveni lomljenjem, odnosno primjenom direktnog udarca na kost.[73] Spomenuta *groove-and-splinter* tehnika može se primijeniti i na veće duge kosti kako bi se dobili segmenti za izradu projektila ili koštanih štapića.[74]

Za formiranje radnog vrha kod različitih tipova zašiljenih predmeta od dugih kostiju koristila se tehnika struganja i brušenja koja se primjenjuje i kod popravka alatki, dok se baza predmeta oblikuje kombinacijom sječenja i glačanja.[75]

The finds made out of fragments of antler cortex were obtained by cutting in two parallel grooves, followed by using a chisel to splinter sheets of material that were used to shape smaller chisels and one variant of harpoons (*groove-and-splinter technique*).[69]

The additional processing of these finds included the removal of smaller pieces of material and polishing done to remove the natural unevenness, or lesser damage, on the antler.[70] Perforations were made by cutting the antler cortex with a chipped stone tool to expose the spongy tissue, which could then be hollowed out (Fig. 13).[71] They are relatively regular – circular – and were made mostly on axes and striking tools.

Tools made out of long bones, especially metapodials, were produced by applying the technique of longitudinal grooving (Fig. 14). The natural longitudinal groove (*sulcus*) was gradually deepened with a chipped stone tool until the bone would be completely cut or split by indirect impact.[72] The half-products for the production of tools out of non-split long bones, such as some points from this collection, could have been obtained by breaking, i.e. by directly striking the bone.[73]

The aforementioned *groove-and-splinter* technique could also be applied to larger long bones in order to obtain segments for the production of projectiles or bone rods.[74]

The formation of the working point on various types of pointed objects made out of long bones required scraping and abrasion, which were also applied in tool repair, and the base of the objects was shaped by a combination of cutting and polishing.[75]

69 Billamboz 1977, 102; Vitezović 2016, 77.
70 Billamboz 1977, 102–103; Beldiman 2005, 38–39.
71 Beldiman 2005, 40; Витезовић 2010, 49, 55, sl. 12: a–b.
72 Vitezović 2016, 65.
73 Vitezović 2016, 64, sl. VII/1a.
74 Vitezović 2011a, 263.

69 Billamboz 1977, 102; Vitezović 2016, 77.
70 Billamboz 1977, 102–103; Beldiman 2005, 38–39.
71 Beldiman 2005, 40; Витезовић 2010, 49, 55, Fig. 12: a–b.
72 Vitezović 2016, 65.
73 Vitezović 2016, 64, Fig. VII/1a.
74 Vitezović 2011a, 263.

Rebra su obrađivana lomljenjem direktnim ili indirektnim udarcem i cijepanjem, nakon čega se takvi komadi mogu longitudinalno rascijepiti kako bi se dobile koštane pločice.[76] Pločice ili nerascijepljeni segmenti rebara oblikuju se struganjem i glačanjem u alatke – zašiljene predmete (šila i probojce) te strugala i spatule.[77]

Zubi (divlje) svinje obrađivani su primjenom direktnog ili indirektnog udarca. Tako su dobiveni manji komadi sirovine ili pravilne, izdužene pločice koje se oblikuju struganjem.[78] Perforacija pravilnog oblika, poput one na nalazu privjeska iz zbirke (T. 7: 2), izvodi se kružnim pokretom pomoću kremene alatke.[79]

Kao što je slučaj i na drugim neolitičkim nalazištima, proizvodi od ljuštura mekušaca iz zbirke vrlo su fragmentirani, što onemogućava rekonstrukciju načina izrade ovakvih predmeta.[80] Poluproizvodi od ove sirovine vjerojatno su dobiveni primjenom direktnog udarca ili lomljenjem te su potom glačani i perforirani.[81]

Ribs were processed by breaking with a direct or indirect strike and splitting, making it possible to longitudinally split pieces obtained in this way in order to produce bone plates.[76] Plates and non-split rib fragments were formed into tools by scraping and polishing: pointed objects (awls and points), scrapers, and polishers.[77]

(Wild-) boar teeth were processed by applying a direct or indirect strike. Smaller pieces of raw material, or elongated plates, obtained in this way could be further processed by scraping.[78] Perforations with a regular shape, like the one on the find from this collection (Pl. 7: 2), were made by applying a circular motion using a chipped stone tool.[79]

As is the case at other Neolithic sites, products made out of mollusc shells from this collection are very fragmented, disabling the reconstruction of the production process.[80] The half-products made out of this kind of raw material were obtained by applying a direct strike or breaking, followed by polishing and perforating.[81]

Upotreba koštanih artefakata[82]

Osim nalaza koji predstavljaju nakit, predmeti od kostiju, rogova i zuba služili su za obradu različitih organskih materijala, odnosno za izradu predmeta od takvih sirovina.[83] Pojedini tipovi predmeta, kao što su spatule i strugala, korišteni su i u obradi gline, dok su svrdla, uz pomoć abrazivnog sredstva, služila za bušenje kamena.[84]

Naglašena uglačanost većeg dijela predmeta i gusto raspoređene linije na distalnom kraju nalaza, poput šila, probojaca i igli, rezultat su upotrebe ovih predmeta u obradi kože i krzna (tab. 2).[85] Probojci i veća šila od rebara i dugih kostiju (T. 1: 1–2, 4; T. 2: 1–6) služila su za rasijecanje i probijanje materijala, a igle, manja šila i svrdla (T. 1: 3, 6, 8, 11; T. 2: 7) korištena su u završnim fazama izrade.[86]

Bone-tool usage[82]

Apart from finds of jewellery, finds made out of bone, antler and teeth were used to process various organic materials, that is, to produce items from such raw materials.[83] Specific types of finds, such as polishers and scrapers, were also used to process clay, while borers, with the help of abrasive substances, were used to perforate stone.[84]

The highly accented polish on a large portion of the finds and the densely distributed lines on the distal parts of finds such as awls, points and needles, are the result of using these tools in leather and hide processing (Tab. 2).[85] Points and larger awls made out of long bones (Pl. 1: 1–2, 4; Pl. 2: 1–6) were used to split and pierce material, and needles, smaller awls and borers (Pl. 1: 3, 6, 8, 11; Pl. 2: 7) were used in the final stages of processing.[86]

75 Vitezović 2016, 72–73.

76 Vitezović 2016, 66.

77 Vitezović 2011a, 266.

78 Maigrot 2003, 77–78; Vitezović 2016, 68–69.

79 Vitezović 2011a, 272.

80 Vitezović 2011a, 273.

81 Vitezović 2016, 69–70.

82 Ovdje predstavljeni tragovi upotrebe koštanih artefakata temelje se na makroskopskom pregledu materijala iz zbirke i podacima iz literature korištene u ovome radu. U vrijeme provedbe analize nisu postojali uvjeti za mikroskopsku analizu tragova upotrebe, a potrebno je uzeti u obzir i da je ovdje riječ o materijalu koji ne potječe s recentnih iskopavanja.

83 Vitezović 2007, 56–57.

84 Vitezović 2007, 68, 73.

85 Vitezović 2011a, 367.

86 Vitezović 2011a, 367.

75 Vitezović 2016, 72–73.

76 Vitezović 2016, 66.

77 Vitezović 2011a, 266.

78 Maigrot 2003, 77–78; Vitezović 2016, 68–69.

79 Vitezović 2011a, 272.

80 Vitezović 2011a, 273.

81 Vitezović 2016, 69–70.

82 Traces of use presented here result from the macroscopic examination of the material from this collection and the literature used in this paper. At the time the analysis was conducted, it was not possible to carry out microscopic analysis of the traces of use. It should also be noted that the material presented in this paper does not come from the recent excavations.

83 Vitezović 2007, 56–57.

84 Vitezović 2007, 68, 73.

85 Vitezović 2011a, 367.

86 Vitezović 2011a, 367.

U obradi organskih materijala korišteni su i predmeti za glačanje. Gotovo sve spatule iz zbirke izrađene su od jelenjeg roga na čijoj se radnoj površini i rubovima presjeka nalaze tragovi upotrebe poput uglačanosti i okomitih linija, koji ukazuju na obradu kože.[87] Podtip strugala od zuba svinje mogao je biti korišten u različite svrhe – za obradu otpornijih biljnih materijala i gline, pa čak i u pripremi hrane.[88]

Alatke od roga, koje podrazumijevaju predmete grupa za sječenje i udaranje, namijenjene su za obavljanje aktivnosti koje su se odvijale podalje od naselja ili u njegovoj neposrednoj blizini, a čija izvedba zahtijeva određeni stupanj planiranja i organizacije (tab. 2).[89] Njihova je upotreba također vezana uz obradu organskih materijala, ali onih otpornijih, najčešće drva.

Masivne alatke, kao što su sjekire i čekići-sjekire (T. 4: 1–2; T. 5: 3; T. 6: 1), služili su u nabavi ove sirovine (sječa stabala), ali i za obradu – cijepanje većih komada drva za ogrjev ili za izradu građevinskih elemenata za izgradnju objekata.[90] U daljoj obradi sirovine korištena su dlijeta, ona većih dimenzija (T. 3: 1) u oblikovanju građevinskih elemenata, i manja dlijeta i klinovi (T. 3: 2, 3, 5) za izradu različitih predmeta od drva.[91]

Jedna od varijanti sjekira (sl. 4) vjerojatno je korištena i kao poljoprivredna alatka – za kopanje, vađenje korijenja i plodova, čemu su mogli služiti i pijuci.[92] Pijuci su, osim toga, mogli biti korišteni i kao rudarske alatke.[93] Samo je dio nalaza izrađen od roga korišten u domaćinstvu, poput udarača s dodatno obrađenim distalnim krajem, primjerice, za pripremu hrane ili mljevenje pigmenata.[94]

Predmeti korišteni kao nakit posebna su kategorija artefakata s obzirom na to da je njihova jedina funkcija bila dekorativna. Ukrasni predmeti, poput privjesaka i perli iz zbirke, vjerojatno su služili i kao sredstvo izražavanja društvenog identiteta i statusa.[95] Budući da kod ove grupe predmeta forma nije nužno povezana s funkcijom, nije moguće točno reći na koji su način oni bili korišteni – kao osobni nakit, ukras pričvršćen na odjeći ili čak kao dekoracija ambijenta.[96] U svakom slučaju, zbog truda uloženog u njihovu izradu i nabavljanje sirovine te dugotrajne upotrebe, ovakvi su nalazi u vinčanskoj kulturi predstavljali cijenjene i luksuzne predmete.[97]

Polishing tools were also used in the processing of organic materials. Almost all polishers from this collection were made out of red-deer antlers, and display traces of use, such as polishing and vertical lines, on the working surface and the edges of the cross-section, indicating that the tools were used to process leather.[87] The subtype of scrapers made out of pig teeth could have been used for various tasks – processing more resilient plant materials or clay, and even in food preparation.[88]

Antler tools, including the group of cutting and striking tools, were used in activities that took place away from the settlement or somewhere in its vicinity, and which required a certain degree of planning and organization (Tab. 2).[89] Their use is also connected with the processing of more resilient organic material, most often wood.

Massive tools like axes and hammer-axes (Pl. 4: 1–2; Pl. 5: 3; Pl. 6: 1) were used in the acquisition of this raw material (woodcutting), and also for the processing of it: chopping larger pieces for firewood, or to produce construction elements for building certain structures.[90] The raw material was additionally processed with larger chisels (Pl. 3: 1) to shape the construction elements, as well as with smaller chisels and wedges (Pl. 3: 2–3, 5) to produce various wooden objects.[91]

One of the variants of axes (Fig. 4) was probably also used as an agricultural tool – for digging, extracting fruits and roots, activities that could also have been done with picks.[92] Picks could also have been used as mining tools.[93] Only a part of antler tools was used in the household, such as strikers with additional processing at the distal end that could have been used in, e.g., food preparation or pigment grinding.[94]

Objects used as jewellery make up a separate category of artefacts, as their only function was decorative. Decorative finds, like the pendants and beads from this collection, were probably also used to express social identity and status.[95] Since, in this group of finds, the form is not necessarily linked to the function, it is impossible to definitively determine how they were used – as personal jewellery, decorations on clothes, or decorations of certain spaces.[96] In any case, due to the effort it took to make them and acquire the raw materials, as well as their long-term use, such finds were valued and luxurious goods in the Vinča Culture.[97]

87 van Gijn 2005, 56.
88 Maigrot 2003, 124; Vitezović 2007, 74; Витезовић 2010, 48.
89 Maigrot 2005, 122–123, 125.
90 Maigrot 2005, 122; Vitezović 2011a, 369–370.
91 Vitezović 2011a, 269, 369.
92 Bačkalov 1979, 36; Vitezović 2007, 69; 2011a, 299.
93 Vitezović 2011a, 314–315.
94 Витезовић 2010, 49; Vitezović 2011a, 368.
95 Vitezović 2012, 215.
96 Vitezović 2011a, 333.
97 Vitezović 2013c, 71.

87 van Gijn 2005, 56.
88 Maigrot 2003, 124; Vitezović 2007, 74; Витезовић 2010, 48.
89 Maigrot 2005, 122–123, 125.
90 Maigrot 2005, 122; Vitezović 2011a, 369–370.
91 Vitezović 2011a, 269, 369.
92 Bačkalov 1979, 36; Vitezović 2007, 69; 2011a, 299.
93 Vitezović 2011a, 314–315.
94 Витезовић 2010, 49; Vitezović 2011a, 368.
95 Vitezović 2012, 215.
96 Vitezović 2011a, 333.
97 Vitezović 2013c, 71.

Zaključak

Koštana industrija na nalazištu Jakovo-Kormadin vrlo je standardizirana u smislu tehnika izrade i konačnih forma predmeta. Ujednačenost u izboru vrsta i skeletnih elemenata nije rezultat jednostavne dostupnosti sirovine ili slučajnog odabira, već ukazuje na kulturno uvjetovan izbor. Izrada koštanih artefakata na ovome nalazištu od početka je pažljivo planiran proces, tj. od trenutka pribavljanja sirovine pa sve do izrade finalnog proizvoda.

Kosti domaćih životinja dominantna su sirovina za izradu alatki, pogotovo zašiljenih predmeta, među kojima prevladavaju šila, najčešće izrađena od rebara i metapodijalnih kostiju ovikaprida. Rog jelena također je često korištena sirovina na nalazištu, uglavnom pribavljena sakupljanjem odbačenih rogova, a od koje su izrađivani predmeti za udaranje i sječenje. Skeletni elementi odabirani su na takav način da njihova mehanička svojstva u kombinaciji s formom predmeta najbolje odgovaraju zadatku kojem su namijenjeni.

Nalazi roga srndaća malobrojni su i jedini u zbirci predstavljaju oportunističke proizvode *ad hoc* izrade. Suprotno tomu, alatke od kostiju i rogova predstavljaju proizvodnu tradiciju (koncept proizvodnog kontinuuma),[98] za čiju se izradu biraju uvijek isti skeletni elementi, ili vrste, te se na taj način odražava i ekonomska važnost djelatnosti za koju su bile upotrebljavane.[99]

Vezano uz to, njihova je upotreba pokazala kako su obrada kože i krzna te biljnih materijala bile značajne djelatnosti na nalazištu, kao i obrada drva, pa i njegova eksploatacija. Uzimajući u obzir prisutnost radioničkog mjesta na lokalitetu,[100] zasad je moguće barem pretpostaviti kako je nalazište moglo biti lokalni proizvodni centar vinčanske kulture u slučaju izrade artefakata od roga, ujedno i specijalizirano za obavljanje djelatnosti za koje su ti predmeti bili upotrebljavani.[101]

Conclusion

The bone industry of Jakovo-Kormadin is highly standardized with respect to techniques and the final shapes of the tools. The uniformity in the selection of species and skeletal elements is not the result of the mere availability of resources or random selection, but instead points to culturally conditioned choices. The production of bone artefacts at the site was a carefully planned process from its very beginning, i.e. from the acquisition of raw materials, until the completion of the final product.

The bone of domestic animals is the dominant raw material used to make tools, especially pointed tools, mostly awls, commonly made out of ribs and ovicaprid metapodial bones. Red-deer antler is also a commonly-used raw material at the site in the production of striking and cutting tools, and it was acquired by gathering shed antlers. The raw material, i.e. skeletal elements, was chosen such that their mechanical properties, combined with tool shape, best matched the task that required the use of such a tool.

Finds made out of roe-deer antlers are rare, and the only ones recorded in this collection are actually opportunistic, *ad hoc*, products. On the other hand, bone and antler tools reflect a tradition of production (the concept of a production continuum),[98] and were always made out of the same skeletal elements or species, thereby reflecting the economic importance of the activities that required the use of such tools.[99]

In this regard, the use of these tools suggests that the processing of leather and hide, as well as plant materials, were significant activities at the site, as were the processing of wood and the exploitation of this raw material. At this moment, it could at least be assumed, considering the existence of a working area for antler-tool production at the site,[100] that Jakovo-Kormadin could have been the local production centre of the Vinča Culture, specializing in conducting activities which involved the use of these objects.[101]

98 Choyke, Schibler 2007, 57–58.

99 Choyke 1997, 65–66.

100 Витезовић 2010, 57; Na lokalitetu je 2008. godine otkrivena jama s otpacima od proizvodnje predmeta od roga jelena, što pretpostavlja postojanje radioničkog mjesta na samom nalazištu, a nalazi sirovine i poluproizvoda ustanovljeni su i u ovoj zbirci.

101 Vitezović 2013c, 68–69.

98 Choyke, Schibler 2007, 57–58.

99 Choyke 1997, 65–66.

100 Витезовић 2010, 57; In 2008, the site yielded a pit with antler tool production waste, suggesting the existence of a workshop on the site. Finds of raw material and half-products were also established within this collection.

101 Vitezović 2013c, 68–69.

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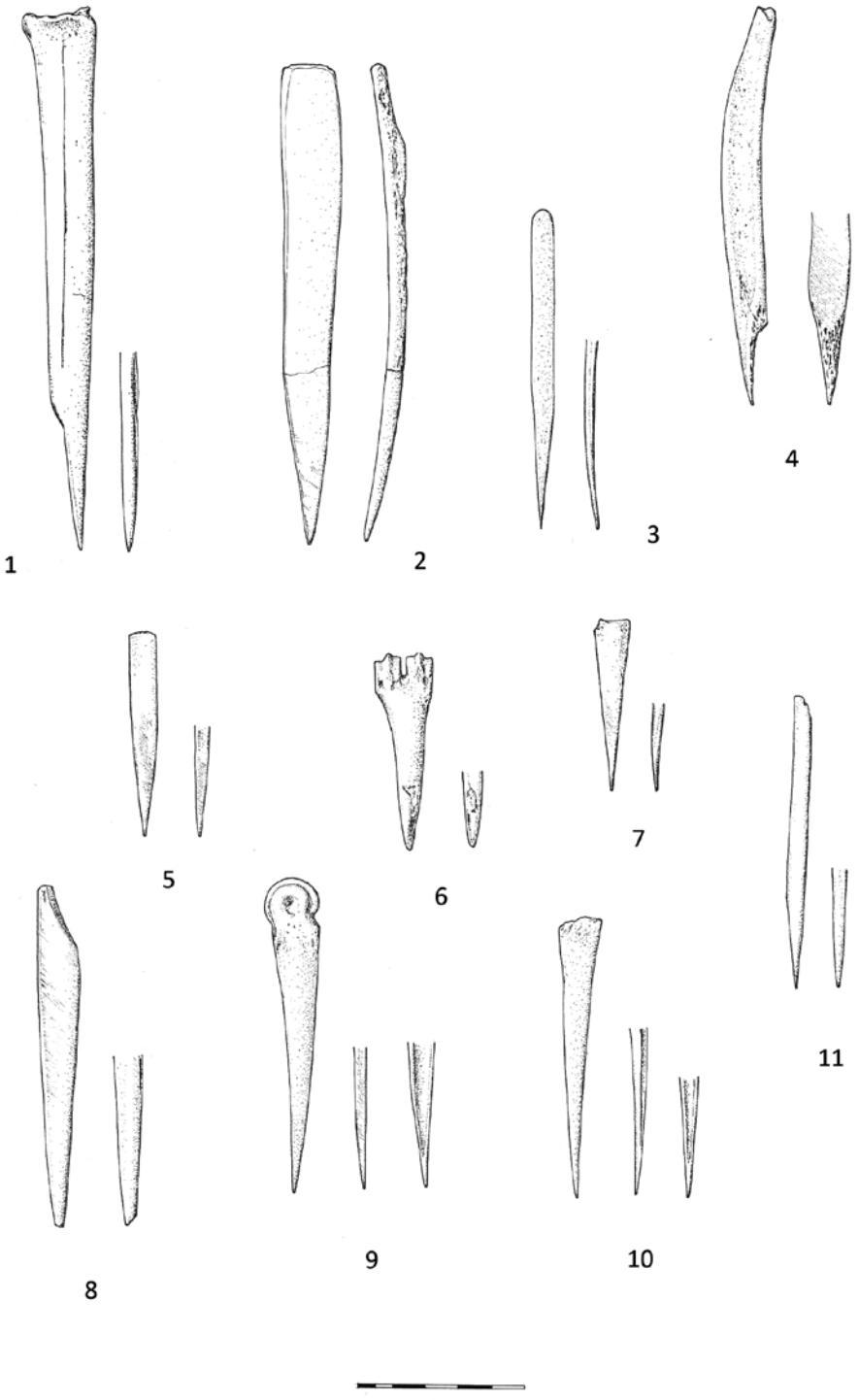

TABLA 1.
1–**10** — šila;
11 — igla;
(izradila M. Galić; obradila V. Krištofić).

PLATE 1.
1–**10** — awls;
11 — needle;
(made by M. Galić; adapted by V. Krištofić).

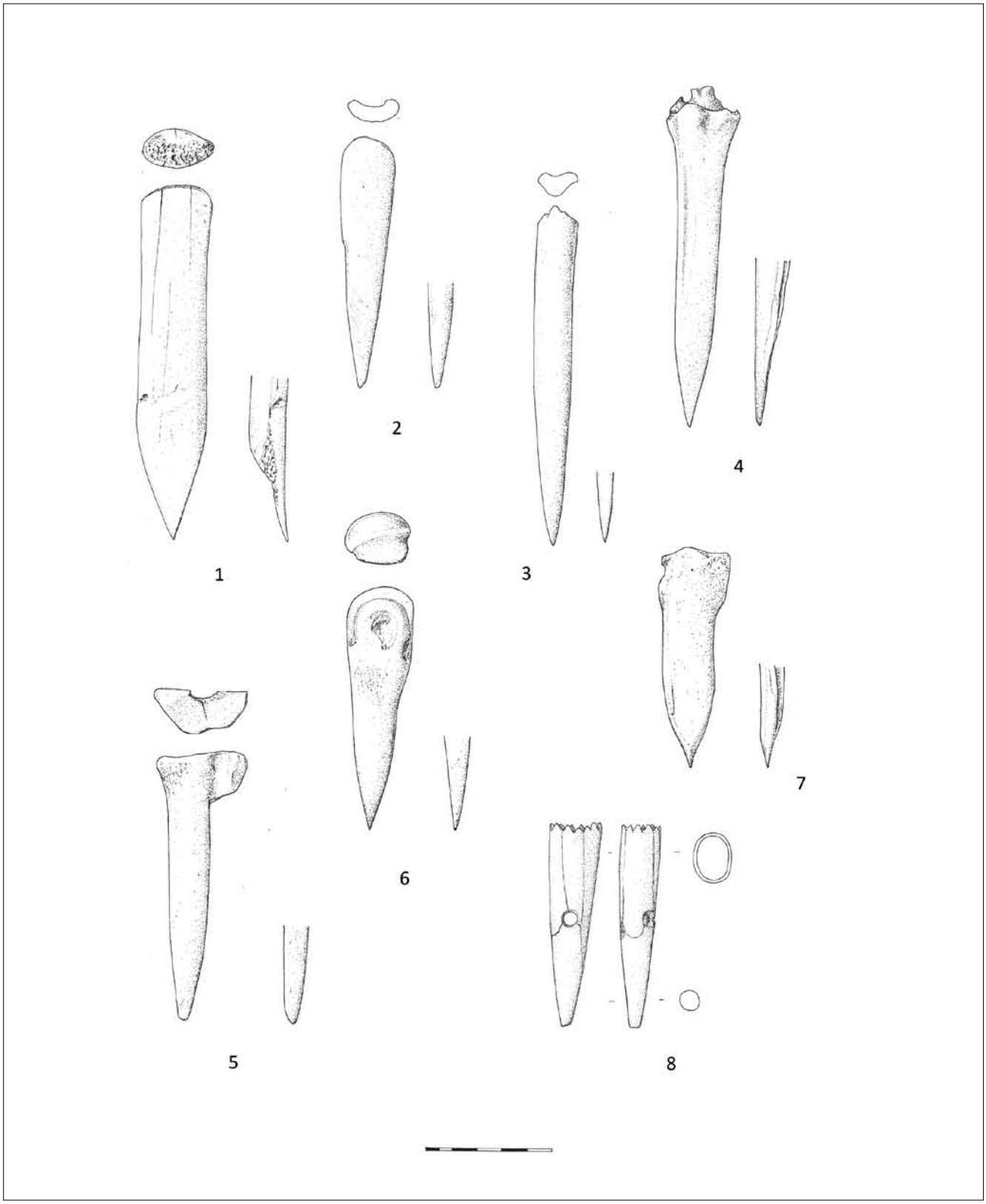

TABLA 2.
1–**6** — probojci;
7 — svrdlo;
8 — harpun;
(izradila M. Galić; obradila V. Krištofić).

PLATE 2.
1–**6** — points;
7 — borer;
8 — harpoon;
(made by M. Galić; adapted by V. Krištofić).

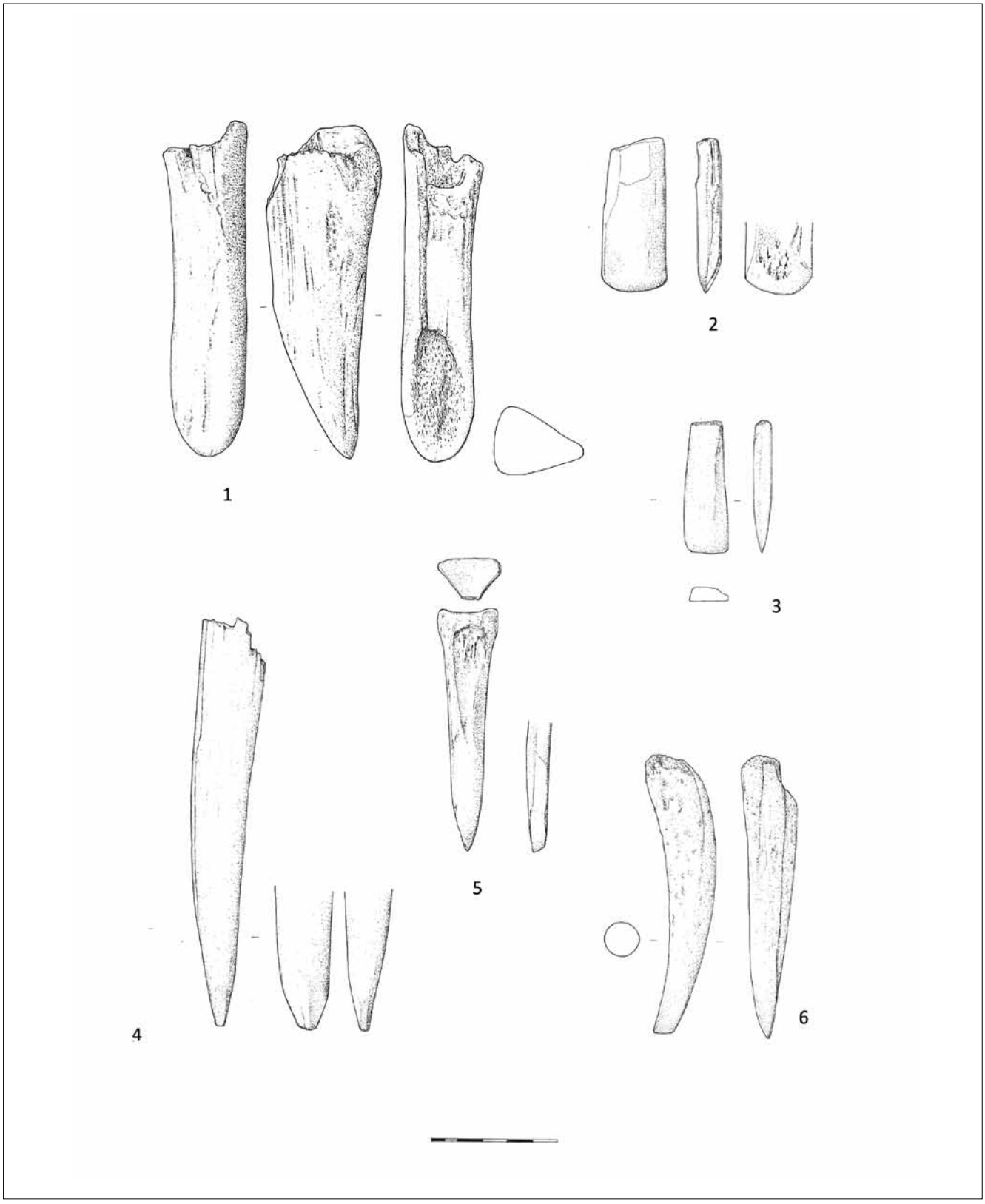

TABLA 3.
1–**4** — dlijeta;
5–**6** — klinovi;
(izradila M. Galić; obradila V. Krištofić).

PLATE 3.
1–**4** — chisels;
5–**6** — wedges;
(made by M. Galić; adapted by V. Krištofić).

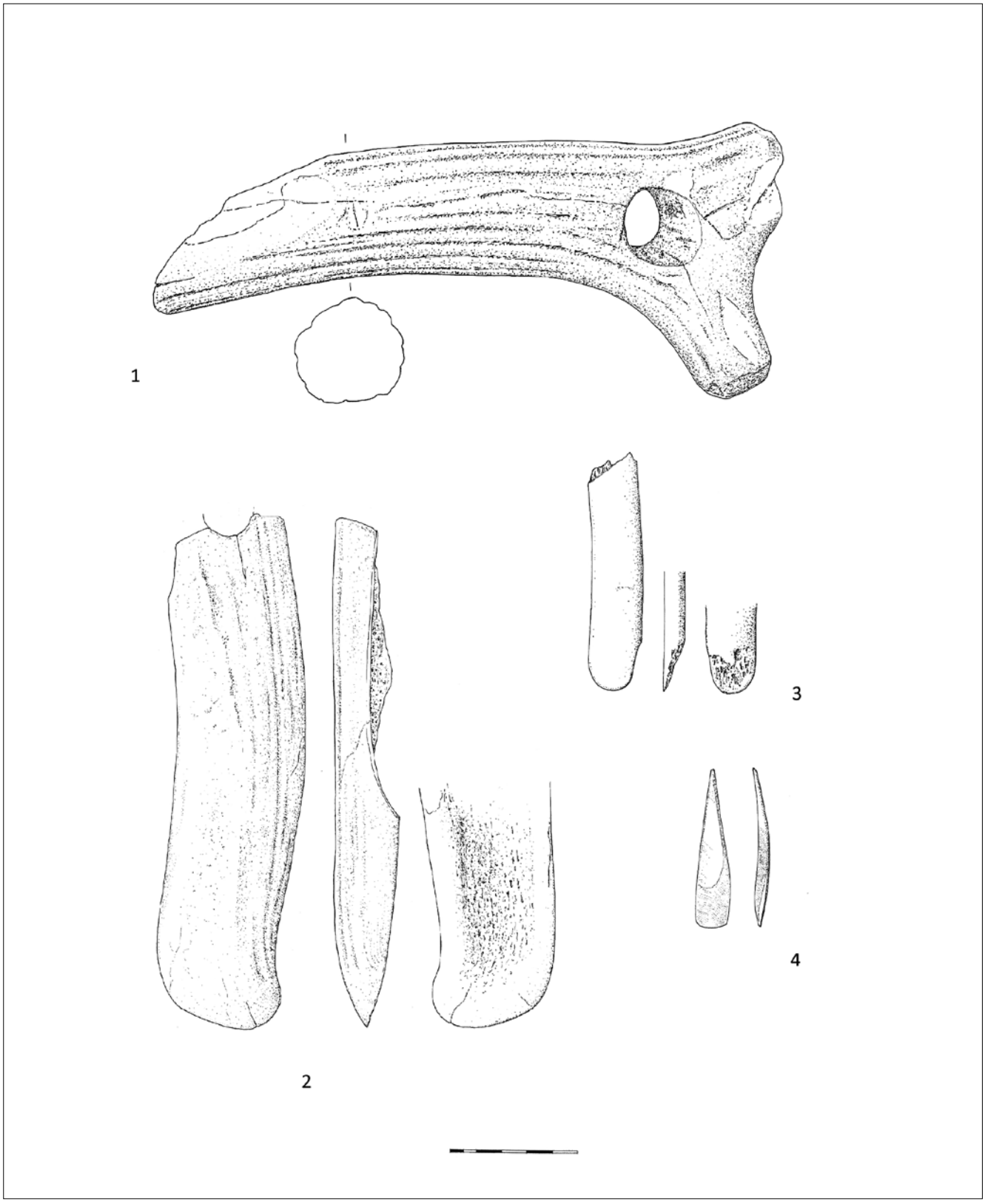

TABLA 4.
1–**2** — sjekire;
3–**4** — strugala;
(izradila M. Galić; obradila V. Krištofić).

PLATE 4.
1–**2** — axes;
3–**4** — scrapers;
(made by M. Galić; adapted by V. Krištofić).

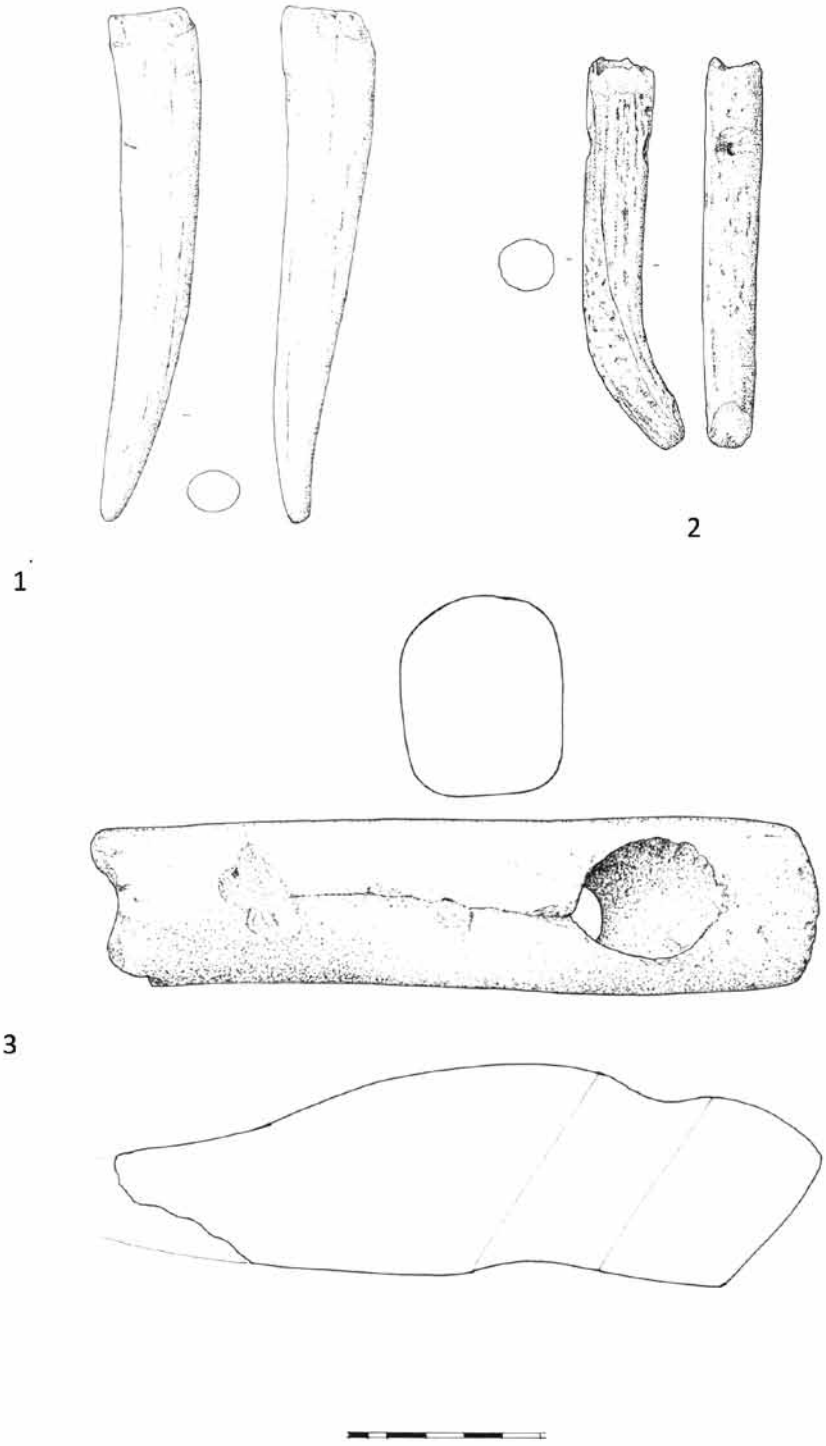

TABLA 5.
1–**2** — udarači;
3 — čekić-sjekira;
(izradila M. Galić; obradila V. Krištofić).

PLATE 5.
1–**2** — strikers;
3 — hammer-axes;
(made by M. Galić; adapted by V. Krištofić).

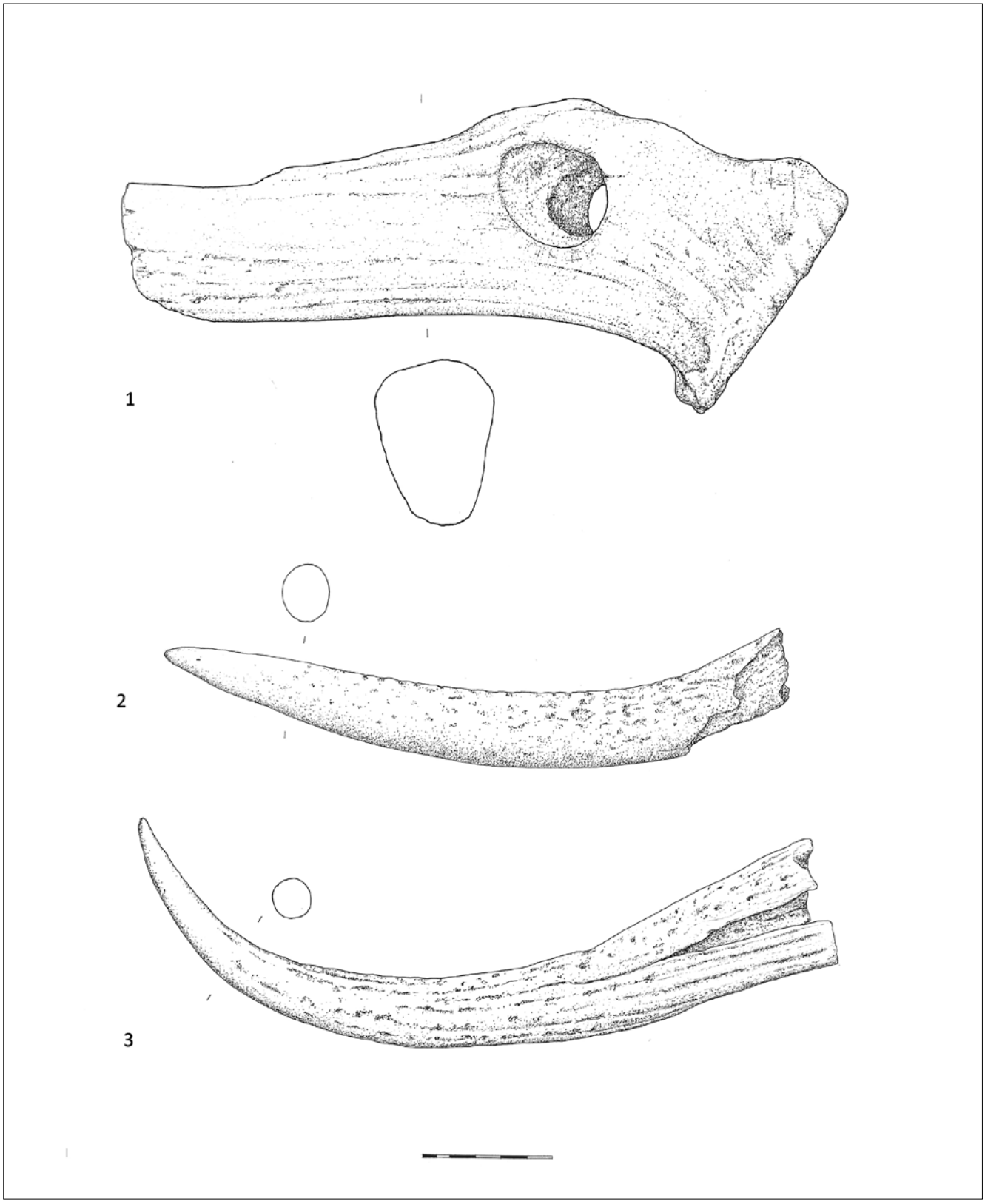

TABLA 6.
1 — čekić-sjekira;
2 — probojac;
3 — pijuk;
(izradila M. Galić; obradila V. Krištofić).

PLATE 6.
1 — hammer-axe;
2 — point;
3 — picks;
(made by M. Galić; adapted by V. Krištofić).

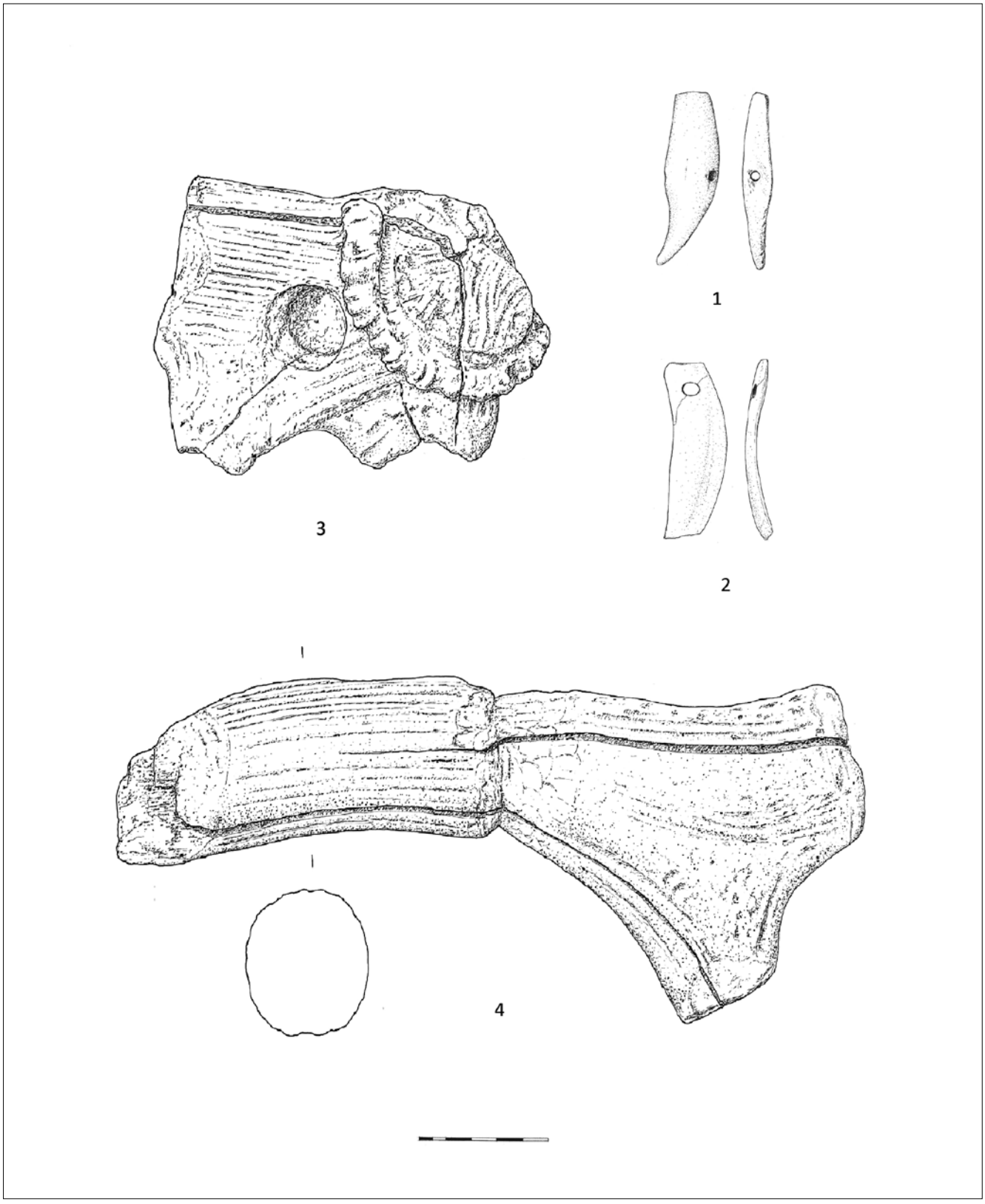

TABLA 7.
1–**2** — privjesci;
3 — poluproizvod;
4 — sirovina/poluproizvod;
(izradila M. Galić; obradila V. Krištofić).

PLATE 7.
1–**2** — pendants;
3 — half-product;
4 — raw material / half-product;
(made by M. Galić; adapted by V. Krištofić).