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# BRONČANE SJEKIRE I NJIHOVI DIJELOVI OPAŽANJA NA PRIMJERU NALAZA S MONKODONJE U ISTRI

## BRONZE AXES AND THEIR FRAGMENTS OBSERVATIONS BASED ON FINDS FROM MONKODONJA IN ISTRIA

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*Sljedeće retke posvetit ćemo nekim našim zapažanjima o sjekirama iz vremena ranog i srednjeg brončanog doba odnosno o njihovim dijelovima, prije svega oštricama i vratovima. Cilj nam je predložiti nekoliko argumenata i razmišljanja koji bi mogli doprinijeti razjašnjavanju namjene kako samih sjekira, tako i njihovih dijelova. Kako se u našim istraživanjima pokazalo, pojedini dijelovi sjekira, ovisno o njihovoj očuvanosti, mogu imati posebnu namjenu. Svi promatrani nalazi potječu iz utvrđenog naselja Monkodonja, smještenog tik uz jadransku obalu istarskog poluotoka, nedaleko od Rovinja. Činjenica da su sve sjekire razmatrane u ovome radu pronađene na jednome mjestu, odnosno u zatvorenom naseobinskom i kulturološkom kompleksu, svakako olakšava njihovo funkcionalno određivanje.*

*The following lines treat some of our observations regarding axes from the period of the Early and Middle Bronze Age, and their fragments, focusing especially on blades and butts. Our aim is to propose several arguments and reflections that could perhaps clarify to what end these axes and their parts were produced and used. As our investigations showed, it is feasible that certain axe parts, depending on their state of preservation, could have had a specific purpose. All of the investigated finds stem from the fortified settlement of Monkodonja, which is located close to the Adriatic coast of the Istrian Peninsula, not far away from Rovinj. The fact that all the axes discussed in this paper were discovered on a single site -i.e., in a closed settlement and cultural complex, certainly facilitates their functional determination.*

**KLJUČNE RIJEČI:** Monkodonja, brončane sjekire sa zalicima, ulomci sjekira

**KEY WORDS:** Monkodonja, bronze winged axes, axe fragments

Arheološka istraživanja na Monkodonji obavljana su zadnjih 12 godina svakog ljeta u četverotjednim kampanjama. Istraživanje pritom nije ograničeno samo na iskopavanje određenih površina, već smo pokušali i rekonstruirati znatan dio otkopanih zidova i vanjske obrambene konstrukcije, zatim ulaznih vrata na sjeveru i zapadu naselja, kao i nekoliko objekata na samoj akropoli i terasama ispod nje.

S obzirom da je već objavljeno nekoliko izvještaja<sup>1</sup>, kao i izvjestan broj publikacija namijenjenih široj

Every summer for the past 12 years archaeological excavations were carried out on Monkodonja, which lasted for four weeks at a time. The explorations were by no means limited to the excavation of certain areas, as we also tried to reconstruct a substantial part of the excavated walls and the other defensive structures, including the entrance gates located on the north and west of the hillfort, as well as several structures on the acropolis itself and on terraces below it.

In consideration of the fact that several reports<sup>1</sup> have



Sl. 1 Pogled na utvrđeno naselje Monkodonja kod Rovinja u Istri/Hrvatska (O. Thiel)

Fig. 1 A view of the fortified settlement of Monkodonja near Rovinj in Istria/Croatia (Photo O. Thiel).

<sup>1</sup> Hänsel 2002.; Hänsel 2003.; Hänsel, Mihovilić, Teržan, Teßmann 2000.; Hänsel, Mihovilić, Teržan, Teßmann 2002.; Hänsel, Mihovilić, Teržan 1999.; Hänsel, Matošević, Mihovilić, Teržan 2008.; Hänsel, Matošević, Mihovilić, Teržan 2009. a - b; Hänsel, Mihovilić, Teržan 2010.; Hänsel, Teržan, Mihovilić 2007. a - b; Hänsel, Teržan, Mihovilić 2008.; Mihovilić 2004.; Mihovilić, Hänsel, Teržan 2005.; Teržan, Mihovilić, Hänsel 1998.; Teržan, Mihovilić, Hänsel 1999.

<sup>1</sup> Hänsel 2002; Hänsel 2003; Hänsel, Mihovilić, Teržan, Teßmann 2000; Hänsel, Mihovilić, Teržan, Teßmann 2002; Hänsel, Mihovilić, Teržan 1999; Hänsel, Matošević, Mihovilić, Teržan 2008; Hänsel, Matošević, Mihovilić, Teržan 2009a - b; Hänsel, Mihovilić, Teržan 2010; Hänsel, Teržan, Mihovilić 2007a - b; Hänsel, Teržan, Mihovilić 2008; Mihovilić 2004; Mihovilić, Hänsel, Teržan 2005; Teržan, Mihovilić, Hänsel 1998; Teržan, Mihovilić, Hänsel 1999.

javnosti<sup>2</sup>, nije potrebno na ovome mjestu iznositi osnovne uvodne podatke o topografiji samog lokaliteta i situaciji na terenu. Istaknut ćemo samo da se radi o naselju veličine 300x200 metara, smještenom na vrhu brežuljka nadmorske visine između 70 i 80 metara, na oko dva kilometra od obale. Površina naselja ovalnog je tlocrta, a stjenovita podloga brijege je prilikom samog osnivanja naselja zaravnjena radovima u kamenolomu *in loco*.

Najstarije naseljavanje na Monkodonji datira u vrijeme oko 2000. g. pr. Kr., a po radiokarbonskim datumima i nešto ranije (sl. 1), dok kraj naseljavanja, opet po radiokarbonskim mjerenjima, pada oko 1200. g. pr. Kr.<sup>3</sup> Izgradnja većine objekata u naselju, kao i velikog obrambenog zida, najvjerojatnije nije bila završena prije 1800. g. pr. Kr. Intenzivno korištenje naseobinskog prostora prestaje koncem 14. st. pr. Kr., tako da se može zaključiti da je naselje u punom intenzitetu trajalo oko 500 godina.

Specifične karakteristike kraških uvjeta razlog su zašto na Monkodonji nije došlo do taloženja kulturnih slojeva, što bi bio slučaj u drugačijim geološkim uvjetima.

Dobro su uočljivi, međutim, ostaci kamenih građevina, iako su i ovdje dugotrajni meteorološki procesi doveli do znatnog oštećenja kamenih blokova nekadašnjih objekata.

Pojedine dionice obrambenih zidova oko naselja očuvane su do visine od jednog do tri metra, dok su kuće i ostali manji objekti većinom prepoznatljivi samo na osnovu jednog ili dva niza kamene supstrukcije. Položaj, veličina kao i oblici pojedinih građevina mogu se djelomice razaznati i uz pomoć položaja rupa za potporne stupove, uklesanih u matičnu stijenu.

Među pokretnim nalazima očekivano prevladava keramika, a dobro stanje očuvanosti na vapnenačkoj podlozi pokazuju i koštani artefakti. Obje grupe nalaza uskoro će biti predstavljene u zasebnim monografijama. Životinjske kosti pronađene su također u velikom broju, dok je količina biljnih ostataka, usprkos intenzivnom istraživanju, ostala skromna.

Predmeti od metala kao i razni metalni ulomci dosta su česti, ako se uzme u obzir da se radi o naselju i ako se Monkodonja usporedi s drugim, sličnim lokalitetima sjevernog Sredozemlja<sup>4</sup> ili južnog ruba Karpatske kotline<sup>5</sup>.

been published to date, as well as a certain number of publications intended for the public at large<sup>2</sup>, we do not deem it necessary to list here the basic introductory data regarding site topography and the situation in the field itself. We will merely mention that this is a hillfort settlement measuring around 300 x 200 meters, which is located atop a hillock that rises approximately 70 to 80 meters above sea level, and lies approximately two kilometers from the coast. The surface of the settlement of oval shape has the rocky base of the hillock, which was flattened by a stone quarry *in loco* which had been in use by the foundation of the hillfort-settlement.

The beginning of the settlement of Monkodonja dates back to the period around 2000 BC, or even earlier according to some radiocarbon dates (Fig. 1). Its end has to be presumed approximately around 1200 BC, again based on radiocarbon analyses.<sup>3</sup> The construction of most of the structures in the settlement, and this is also valid for the large defensive wall, was in all probability not concluded before 1800 BC. The intensive use of the settlement area ceased towards the end of the 14<sup>th</sup> century BC, and we can therefore conclude that the settlement was in full use for a period lasting approximately 500 years.

The specific characteristics of the Karst region caused a lack of sedimentation of culture layers, which would undoubtedly have been preserved in different geological conditions.

Better preserved, however, are the remains of stone structures, but even here the long-lasting erosion resulted in considerable damages to the blocks of stones that were used for the erection of these structures.

Long sections of the defensive walls around the hillfort settlement were preserved up to a height ranging from one to three meters, whereas the great majority of buildings and other smaller structures can be discerned only on the basis of one or two layers of stones from the substructure. The position, size, as well as the shapes of certain buildings can also be partially recognized by the positioning of the postholes, carved out of the rock, which served to insert the supporting wooden pillars.

As was expected, pottery is predominant amongst the small mobile finds, and bone artifacts were well preserved because of the limestone underground. A large number of animal bones have thus been discovered, but the quantity of vegetal remains remained very modest in spite of our intensive exploration efforts. These groups of finds will be presented in separate monographs soon.

Metal objects as well as different metal fragments are rather numerous too, especially if we take into

<sup>2</sup> Hänsel 2009.; Hänsel, Teržan 2004.; Hänsel, Mihovilić, Teržan 2006.; Hänsel, Teržan, Matošević, Mihovilić 2008.; Mihovilić 2005.; Mihovilić, Hänsel, Teržan 2005. i 2011.; Mihovilić, Teržan, Hänsel, Matošević, Becker 2001.; Mihovilić, Hänsel, Teržan, Matošević 2009.a; Mihovilić, Hänsel, Matošević, Teržan 2009.b; Teržan, Hänsel, Mihovilić 2006.

<sup>3</sup> Hänsel, Teržan, Mihovilić 2007.a.

<sup>4</sup> Npr. Kastanas: Hochstetter 1987., 15 - 44

<sup>5</sup> Npr. Feudvar: Hänsel, Medović 1991.

<sup>2</sup> Hänsel 2009; Hänsel, Teržan 2004; Hänsel, Mihovilić, Teržan 2006; Hänsel, Teržan, Matošević, Mihovilić 2008; Mihovilić 2005; Mihovilić, Hänsel, Teržan 2005 and 2011; Mihovilić, Teržan, Hänsel, Matošević, Becker 2001; Mihovilić, Hänsel, Teržan, Matošević 2009a; Mihovilić, Hänsel, Matošević, Teržan 2009b; Teržan, Hänsel, Mihovilić 2006.

<sup>3</sup> Hänsel, Teržan, Mihovilić 2007a.

Pored većeg broja recentnih željeznih ostataka (najčešće dijelovi obuće), pronađeno je i nekoliko dijelova pastirske opreme, kao što su kresivo ili okov štapa, i jedna rimska srebrna kovanica te manji broj postolarskih čavala, također iz rimskog razdoblja<sup>6</sup>.

Rastopljeni ostaci olova, prosječne veličine vrha prsta, pronađeni su također u velikom broju. Za pretpostaviti je da se doista radi o brončanodobnim produktima. Primjena olova u metalurgiji ranog brončanog doba nije nimalo neobična pojava<sup>7</sup>. Najčešći su međutim brončani nalazi<sup>8</sup>, od kojih je većina već analizirana.

Metalni objekti ustanovljeni su u svim sondama obuhvaćenim arheološkim istraživanjem. Brončani predmeti sa same površine ili iz neznatne dubine ispod travnatog pokrivača sakupljeni su na cijelom prostoru naselja uz pomoć detektora za metal i kartirani<sup>9</sup>. Prilikom pretrage detektorom posebnu pozornost obratili smo na to da se prikupe samo oni objekti koji zaista leže na površini, dok su nalazi na većim dubinama ostavljeni da ne bi bili istrgnuti iz arheološkog konteksta<sup>10</sup>. Detektorom otkriveni brončani, ali i željezni i olovni predmeti izvađeni su šiljatim predmetom s dubine do najviše 6 cm, a samo u iznimnim slučajevima i do 11 cm. Nisko raslinje i grmlje onemogućilo je međutim da se potraga detektorom na cijeloj površini naselja provede jednako sustavno, jer je na nekim dijelovima bilo nemoguće pristupiti tankom travnatom pokrivaču odnosno površinskom humusnom sloju.

Određen broj metalnih nalaza svakako je još ostao dublje u zemlji među kamenim blokovima, što su na koncu pokazale i površine obuhvaćene našim iskopavanjem. Na pojedinim površinama na kojima je detektor metala dao negativan rezultat kasnijim sustavnim iskopavanjima ipak su otkriveni metalni predmeti, na većim dubinama.

Detektorom metala pronađen je dio ovdje detaljnije razmatranih sjekira i njihovih dijelova, kao i nekoliko manjih, jako istrošenih alatki i nešto nakita. Bronca je na Monkodonji, kao uostalom i na cijeloj rudama siromašnoj jadranskoj obali, očito predstavljala izuzetnu dragocjenost.

<sup>6</sup> Starost novčića odredio je P. Kos, Narodni muzej Slovenije, Ljubljana, kojem najljepše zahvaljujemo. Pronađenu kovanicu odredio je kao rimski Augustus - Denarius (R/C 4/0) iz 13. g. pr. Kr.

<sup>7</sup> Batora 2000., 436

<sup>8</sup> N. Trampuž-Orel analizirala je do sada 45 brončanih predmeta po sadržaju kemijskih elemenata. Na ovom se mjestu želimo zahvaliti za podatke i diskusiju. Rezultati njenih analiza bit će objavljeni u publikaciji posvećenoj metalnim nalazima, dok u ovom članku predstavljamo samo dio prvih, preliminarnih rezultata.

<sup>9</sup> Mihovilić, Teržan, Hänsel, Matošević, Becker 2001., 53 dolje.

<sup>10</sup> Ispitivanja detektorom za metal proveo je iskusni Jonas Paulsson s Univerziteta u Lundu/Švedska. Njemu također zahvaljujemo na suradnji.

consideration that we are dealing with a settlement, and comparing it with other similar sites in the Northern Mediterranean<sup>4</sup> or the southern edge of the Carpathian basin<sup>5</sup>.

Besides a small number of recent iron remains, mostly nails of footwear and items associated with shepherds, such as strike-a-lights or a metal part used to strengthen a rod, a Roman silver coin<sup>6</sup> and a smaller number of Roman shoenails were also found.

A large number of molten lead remains were also discovered, whose average size was that of a nail. It is to be presumed that these are indeed remains of Bronze Age products. Namely the use of lead in Early Bronze Age metallurgy is by no means an unusual occurrence<sup>7</sup>. The most frequent finds are, however, those made of bronze, most of which have already been analyzed by N. Trampuž Orel<sup>8</sup>.

Metal objects were detected in all excavation areas, respectively trenches, named by us "Sonda", that were carried out during the archaeological exploration. Bronze objects from the surface itself or from negligible depths underneath the grass cover were collected on the entire area of the settlement with the help of a metal detector, and subsequently mapped<sup>9</sup>. During the search with the metal detector we were very careful to collect only those items which were actually located on the surface; the finds that were located at greater depths were left there in order not to take them out of their archaeological context<sup>10</sup>. The bronze, iron and lead objects that were located with the detector were then extracted with the help of a pointed tool from a depth of no more than 6 cm, which only in exceptional cases increased to 11 cm.

Low-growing vegetation and shrubbery prevented us, however, from conducting the detector search on the entire area of the settlement with an equal degree of thoroughness; this because on certain sections it was not possible to access the thin grass cover or the superficial layer of humus.

A certain number of metal finds was certainly left buried deeper in the ground and amongst the stone boulders, as was later corroborated in the areas that were

<sup>4</sup> For example Kastanas: Hochstetter 1987, 15 - 44.

<sup>5</sup> For example Feudvar: Hänsel, Medović 1991.

<sup>6</sup> The age of the coin was determined by P. Kos from the National Museum of Slovenia at Ljubljana, whom we thank for his efforts. He determined that the discovered Roman coin is an Augustus - Denarius (R/C 4/0) from 13 BC.

<sup>7</sup> Batora 2000, 436.

<sup>8</sup> N. Trampuž-Orel has so far analyzed 45 bronze objects to determine their content of chemical elements. At this point we want to express our thanks for the information and discussion. The results of her analyses will be published in a separate study on metal finds, while in this article we present only a part of the first preliminary results.

<sup>9</sup> Mihovilić, Teržan, Hänsel, Matošević, Becker 2001, 53 below.

<sup>10</sup> The metal detector search was carried out by Jonas Paulsson from the University at Lund/Sweden, who has a huge experience in this field. We also thank him for his cooperation.

Kod brončanih predmeta s Monkodonje radi se konkretno o dljetima i puncama, noževima i bodežima, ostacima lijevanja i dijelovima neodredivih predmeta. Dijelovi nakita uglavnom su neprepoznatljivi u smislu bliže tipološke odredbe, no valja istaknuti jedan limeni i jedan spiralni tutulus kao i nekoliko ulomaka igli. Oružju možemo pripisati vrhove strijela, jedan vrh koplja i jednu od ovdje predstavljenih sjekira.

K. Buršić-Matijašić u svom je 1998. godine objavljenom radu odbacila mogućnost da je bronca iz Monkodonje lijevana na licu mjesta<sup>11</sup>. U međuvremenu su se međutim pojavile neke naznake drugačijih mogućnosti. Na rubnom području tzv. gornjeg grada, odnosno u zoni između unutarnjih zidina i terasastih padina ispred jugozapadnog kuta akropole, na vrlo erodiranoj površini, veličine 20x20 metara, prekrivenoj samo tankim zemljanim slojem nad matičnom stijenom, pronađen je izrazito velik broj manjih metalnih kapljica, koje su mogle nastati isključivo pri lijevanju, odnosno preradi tekućeg metala.

Osim jedne iznimke, ovi ostaci metalurške djelatnosti nisu pronađeni ni na jednom drugom prostoru u naselju. Postoji dakle osnovana pretpostavka da se na ovom mjestu lijevala bronca, a možda se čak radilo i o nekoj vrsti radionice. U prilog pretpostavci da se na ovom mjestu doista višekratno lijevao metal govori ne samo velik broj sitnih kapljica, već i spektrometrična kemijska analiza 12 uzoraka, koja je pokazala da se radi o kapljicama različitog kemijskog sastava. Ovakav je rezultat najvjerojatnije posljedica više različitih i međusobno odvojenih procesa lijevanja bronce. Treba ukazati i na geomagnetska snimanja terena, koja je proveo B. Mušić<sup>12</sup>. Ona su pokazala tragove intenzivne paljevine neposredno istočno od navedene površine. Tako jake anomalije tla nisu zabilježene u drugim dijelovima naselja. U svakom slučaju, u blizini pronađenih metalnih kapljica paljena je vatra jakog intenziteta ili je možda čak i pretpostavljena radionica ljevača metala zauzimala veću površinu nego što to sugerira rasprostiranje radioničkih ostataka.

No, postoje i druge indicije koje upućuju na preradu metala na Monkodonji. Tako je u neposrednoj blizini Zapadnih vrata, s vanjske strane, 1999. godine, tik iznad prirodne stijene, pronađen dio kalupa od žućkastog pješčenjaka (nalaz br. 4.120), u kojem je lijevan masivni predmet nepoznate namjene. Kalup je gotovo sigurno ovdje bio u sekundarnom položaju, daleko od izvornog mjesta primjene.

opened by our excavations and where metal objects were nevertheless discovered at greater depths in the course of subsequent systematic excavations.

Some of the axes and their fragments, which are discussed in detail here, as well as a few smaller implements that showed a high degree of use, and some jewellery, were discovered by regular excavations as well as by the metal detector. Bronze was obviously a very precious commodity at Monkodonja, as was also the case on the entire Adriatic coast that yields poor ore.

The bronze objects from Monkodonja come in the form of chisels and awls, knives and daggers, casting remains, as well as parts of unidentifiable objects. In the majority it has been difficult to identify parts of jewellery, as far as a closer typologically determination is concerned; however, we have to mention a tutulus of metal sheet and a tutulus of a spiral wire, as well as a few pin fragments. In the group of weapons arrowheads have been found, a single spearhead, and one of the axes presented here.

The question (or possibility) of bronze casting having been carried out at Monkodonja, has been dismissed by K. Buršić-Matijašić in her study published in 1998<sup>11</sup>. In the meantime some indications have surfaced that allow for other possibilities. In the border area of the so-called "upper town", in a zone along the acropolis defensive walls, especially in front of its southwestern corner, on the terraces, on a very eroded surface measuring 20 x 20 meters, which was only covered by a thin layer of earth above the natural rock, there were discovered a particularly large number of small metal drops that could have been created only in the course of the melting and cleaning process, i.e. during the handling of molten metal.

Except for this single place, there were no other remains of metallurgical activities discovered anywhere else on the settlement. We are confronted, consequently, with a plausible presumption that bronze was cast here, and that perhaps there even existed some sort of workshop. Confirming the presumption that metal had been cast on several occasions at this location, is not only the large number of small drops that were discovered, but also the spectrometric (ICP-AES) analysis of 12 samples, which showed that these drops all differ in the composition of their metal contents. Such a result is most probably a consequence of several different and separate processes of bronze casting. It also has to be mentioned the geomagnetic survey of the terrain, which was performed by B. Mušić<sup>12</sup>. These measurements showed traces of intensive burning immediately to the east of the above mentioned area. Such strong anomalies of the terrain

<sup>11</sup> Buršić-Matijašić 1998., 109

<sup>12</sup> Autori zahvaljuju Branku Mušiću na višegodišnjoj suradnji na Monkodonji. Rezultati njegovih mjerenja biti će objavljeni u završnoj publikaciji.

<sup>11</sup> Buršić-Matijašić 1998, 109.

<sup>12</sup> The authors wish to express their gratitude to Branko Mušić for his cooperation on the Monkodonja project, which lasted several years. The results of his measurements will be published in the final publication.

Služio je za lijevanje predmeta oblika krnjeg stošca, s kružnim presjekom promjera 2 cm, očuvane dužine otiska 3,3 cm. Možda se radilo o nekom dijelu manjeg nakovnja. Položaj proreza za dovod tekućeg metala isključuje mogućnost da se radilo o kalupu za brončane šuplje sjekire.

Pored već poznatog kalupa za bodež ili vrh koplja, koji je pronašao Bačić<sup>13</sup>, ovaj nalaz daje dodatnu težinu tezi da je na Monkodonji prerađivan metal. Tu su još i dva fragmenta brončanih šipki, koji po tumačenju N. Trampuž-Orel ukazuju na opskrbu naselja sirovim metalom, koji se zatim dalje lijevanjem prerađivao u određene predmete.

Kao što je već istaknuto, N. Trampuž-Orel analizirala je 12 metalnih kapljica. S obzirom na učestalost kemijskih elemenata odnosno tzv. nečistoća, sastav ispitanih uzoraka dosta je ujednačen. Svi također sadrže 6–8% kositra, kao i jedna od pronađenih sjekira (sl. 2). Druga sjekira s Monkodonje (sl. 3) sadrži daleko više kositra, ali se u rasporedu i količini drugih kemijskih elemenata (nečistoća) ne razlikuje bitnije od metalnih kapljica.

Usporedbama s drugih nalazišta N. Trampuž-Orel je uspjela dokazati da je određena količina kositra specifično izabrana i namjerno dodavana u leguru bronze za izradu određenih kasnobrončanodobnih predmeta<sup>14</sup>. Slično se može pretpostaviti i za ranu fazu srednjeg brončanog doba na Monkodonji. Budući da se ove dvije sjekire, osim u količini kositra, kemijski bitno ne razlikuju jedna od druge, a sličan sastav ima i bar jedna metalna kapljica, moguće je da se radilo o istoj ili sličnoj sirovini, koja je u više navrata prerađivana na ovome mjestu.

Neke od kapljica pokazale su međutim i znatno drugačiji sastav. Primjerice, jedan uzorak isticao se visokim udjelom antimona u odnosu na sva druga mjerenja uzoraka s Monkodonje (2,41% u odnosu na uobičajene vrijednosti, 0,01 do najviše 0,52%). To ukazuje na prerađivanje inače neuobičajenog metala bogatog antimonom ili se možda radilo o sekundarnom topljenju nekog predmeta.

Sve ove činjenice mogu se uzeti u obzir kao dodatni pokazatelj da je na opisanoj površini doista prerađivan, odnosno lijevan metal, mada se radionica uslijed specifične erozije tla ne može dokazati. Iako se dakle radionica ljevača bronze arheološki ne može potvrditi, više činjenica govori u prilog nego protiv teze da je na Monkodonji postojala jedna ili više radionica u kojima je u duljem vremenskom razdoblju prerađivana bronca.

had not been recorded anywhere else in the settlement. Therefore the hypothesis that high intensity fire had been burning in the vicinity of the discovered metal drops is permitted, or, that the presumed metal casting workshop was even bigger in size than what has been concluded on the basis of the discovered traces.

However, there are still other indications that metal was cast on Monkodonja. In 1999, in the immediate vicinity of the Western Gate, immediately above the rocky underground, we discovered the fragment of a mold made of yellowish sandstone (find no. 4.120), for casting a massive object. There is almost no doubt that this mold was discovered in a secondary position, most probably far away from its original place of usage. This mold was used to cast objects in the shape of a truncated cone, which had a circular cross-section with a diameter of 2 cm, and a preserved length measuring 3.3 cm. Perhaps it was part of a small anvil. The position of the slit used for pouring the molten metal excludes the possibility that it was a mold used for the production of socketed bronze axes.

Beside the already known mold used for a dagger or a spearhead, which was discovered by Bačić<sup>13</sup>, this find adds additional credibility to the thesis that there was a metal workshop on Monkodonja. Then there are the two found fragments of bronze bar-ingots, which according to N. Trampuž-Orel indicate that the settlement had been supplied with raw metal that was subsequently processed into certain objects by casting on the spot.

As was already pointed out, N. Trampuž-Orel analyzed 12 metal drops. Based on their metal contents as well as impurity patterns it could be concluded that the composition of the examined samples is rather uniform. All of them contain 6–8% of tin, as is also the case with one of the unearthed axes (Fig. 2). The other axe from Monkodonja (Fig. 3) contains a far higher amount of tin, but it does not differ significantly in the impurity pattern.

Namely in some other papers N. Trampuž-Orel succeeded to prove that for the manufacture of certain Late Bronze Age objects a certain amount of tin was specifically chosen and intentionally added to the bronze alloy<sup>14</sup>. A similar assumption could be made for the earlier phases of the Bronze Age period as shown by these examples from Monkodonja. Since metal contents of these two axes do not differ substantially from one another, except in the quantity of tin, and at least one of the metal drops possesses a similar chemical composition, it is possible that this was one and the same raw metal that was repeatedly processed at this location.

However, some of the drops show a substantially different composition. For example, one of the samples stood out on account of the high content of antimony in relation to all other sample measurements from

<sup>13</sup> Buršić-Matijašić 1998., 109, tab. 39, 554

<sup>14</sup> Trampuž-Orel 1996.a, 213 i 218; Trampuž-Orel et al. 1996.b.

<sup>13</sup> Buršić-Matijašić 1998, 109, Tab. 39, 554.

<sup>14</sup> Trampuž-Orel 1996a, 213 and 218; Trampuž-Orel et al, 1996b.

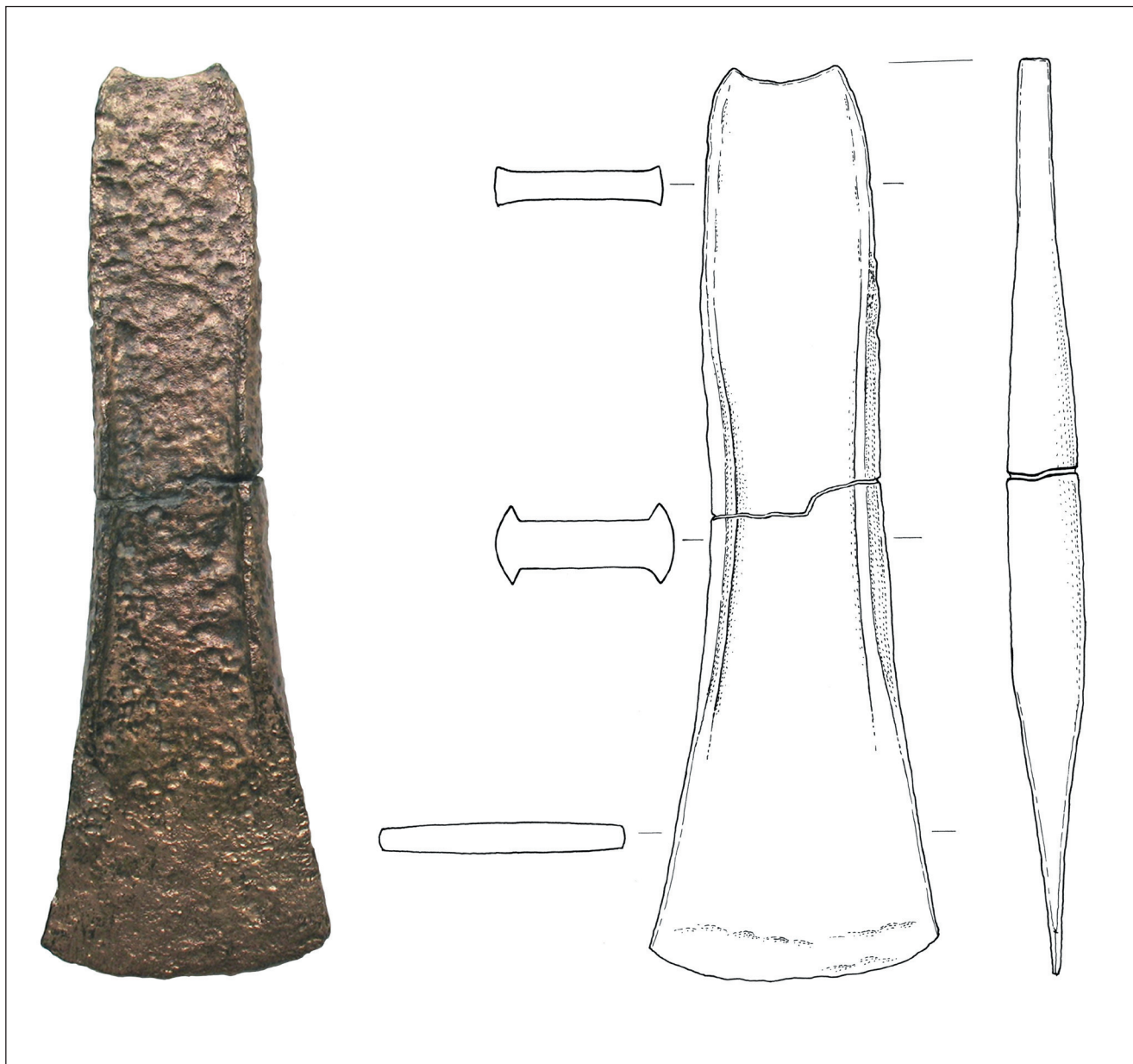
No, vratimo se sjekirama, glavnoj temi ovoga rada. Na području cijelog utvrđenog naselja pronađene su dvije cijele sjekire (sl. 2-3), najmanje šest manjih ulomaka sječiva (sl. 4) i tri zaravnjena tjemena dijela (sl. 5, 9). Upadljivo je da su svi ulomci sječiva vrlo maleni, dok veći dijelovi sasvim nedostaju. Autori su mišljenja da ovakva selekcija nalaza nije plod slučajnosti, iako je ukupan broj predmeta relativno malen.

Najprije ćemo opisati sve nalaze sjekira i njihovih dijelova.

Dvije sjekire očuvane su u cijelosti:

Monkodonja (2.41% in comparison with the customary values that are in the range from 0.01 to at most 0.52%). This indicates a processing of metal with an unusually high content of antimony, or perhaps the secondary melting of some object.

Taking into account all these facts as indicators it is possible to conclude that metal was indeed processed and cast on this site, even though we are not in a position to corroborate the existence of a workshop here due to the specific erosion of the ground. Even though it is



Sl. 2 Sjekira s pojačanim rubovima, sastavljena iz dva komada; iskopavanja B. Bačića 1955. godine (fotografije su izradili Đeni Gobić Bravar i Monika Petrović, Arheološki muzej Istre, Pula, sve crteže je izradila Ida Murgelj, Ljubljana)

Fig. 2 A flanged axe assembled from two pieces; excavation conducted by B. Bačić in 1955 (the photographs were taken by Đeni Gobić Bravar and Monika Petrović, Archaeological Museum of Istria, Pula; all drawings were made by Ida Murgelj, Ljubljana).

1. Sjekira s pojačanim rubovima (Randleistenbeil), vitkog, blago lučnog oblika (sl. 2). Sječivo je blago izvijeno, s umjereno zakrivljenom oštricom. Oštrica je asimetrično obrađena, s tragovima oštrenja i korištenja (sl. 8, 4). Pojačani rubovi postavljeni su centralno i samo su na svom središnjem dijelu izrazitije izbočeni. Stranice sjekire konveksno su oblikovane. Tanki vrat sužava se u obliku trapeza. Tjeme je blago lučno usječeno, s nešto zašiljenim kutovima na kojima se vide tragovi obrade čekićem (sl. 8, 3). Sjekira je slomljena po sredini, po jednim udarcem pod pravim kutom na bočne strane. No, udarci su izvedeni tako da pukotine s jedne i druge strane nisu nastale na istoj visini (sl. 8, 1-2). Napukla sjekira vjerojatno je morala biti više puta savijana preko napuklog dijela ne bi li se konačno razlomila na dva dijela.

Ukupna dužina sjekire je 16,3 cm, širina u središnjem dijelu odnosno na početku pojačanih rubova iznosi 2,9 cm, a širina sječiva je 4,8 cm. Teži 246,1 g.

Sjekiru je pronašao Bačić u prvim iskopavanjima Monkodonje. Već tada je elektrolizom uklonjen najveći dio patine, zbog čega su zapažanja glede tehničkih detalja u današnjem stanju dosta ograničena.

Pronađena je u prostoru kuće br. 2, kako ju je opisao Bačić, na sjeverozapadnom dijelu akropole<sup>15</sup>. Detaljan crtež s istraživanja 1955. godine, na kojem su prikazani komadi sjekire kao i njihova okolina, donosimo u kopiji (sl. 6). Dva dijela sjekire ležala su pravokutno jedan do drugoga, u istom sloju s ostacima ognjišta, određenom koncentracijom školjaka i puževa i jednom glinenom pločom. Radilo se dakle o podnici kuće, ispod koje je iskopan još jedan sloj sivkastog tla s brojnim keramičkim nalazima. Sjekira je najvjerojatnije nakon određenog vremena uporabe završila na podnici kuće, mada okolnosti nalaza navode na zaključak da je tamo dospjela s namjerom, a nikako kao rezultat slučajnog gubitka. Inače, ova kuća pripada jednoj starijoj, ali ne i najstarijoj fazi naselja na Monkodonji.

2. Manja sjekira vitkog oblika sa zaliscima prosječne visine (Lappenbeil) (sl. 3). Nešto izvijena oštrica više puta je brušena te stoga i asimetrične forme. Bočne stranice sjekire se osjetno zadebljavaju sve do početka dvaju lagano izvana konveksnih, a iznutra konkavnih zalistaka, da bi zatim prešle blagim savinućem u ravnomjerno zadebljani središnji i čeonni dio sjekire, bez izrazitog prijelaza.

Karakterističan je rub pod tupim kutom na čeonnoj strani početka zalistaka. Na gornjem dijelu čela vidljivi su tragovi korozije, nastali truljenjem drvene drške, što znači da je sjekira najvjerojatnije dospjela u tlo

not possible to archaeologically confirm a bronze casting workshop at Monkodonja, there are more facts that speak in favor than against our thesis, whereby one or more workshops for bronze processing existed at Monkodonja over a prolonged period of time.

However, let us get back to the axes, the main theme of this article. On the area of the entire fortified settlement two complete axes were discovered (Fig. 2-3), at least six smaller blade fragments (Fig. 4), and three straightened top sections (Fig. 5; 9). It is conspicuous that all blade fragments are small in size, whereas the bigger ones are non-existent. The authors suppose that this is not a random occurrence even though the total number of objects is relatively small.

First we are going to describe all the discovered axes and their parts.

Two axes have been completely preserved:

1. A flanged axe (Randleistenbeil) with a slim, slightly arched form (Fig. 2). The blade is mildly everted, with a moderately curved cutting edge, which is asymmetrically worked, with traces of both sharpening and wear (Fig. 8, 4). The flanges are placed centrally and only in their central section are they conspicuously protruding. The sides of the axe are convex in shape. The thin butt narrows in the form of a trapeze. The top had been cast in a slightly arched manner, with somewhat pointed angles with traces of hammering (Fig. 8, 3). The axe had been broken down the middle, with a single stroke at a right angle on the lateral sides. However, the strokes had been executed in such a manner that the cracks on both sides do not appear at the same level (Fig. 8, 1-2). The cracked axe was probably bent over a sharp base to split it into two parts.

The total length of the axe measures 16.3 cm, the width in the central section, or at the beginning of the flanges, measures 2.9 cm, the width of the blade is 4.8 cm. It weighs 246.1 g.

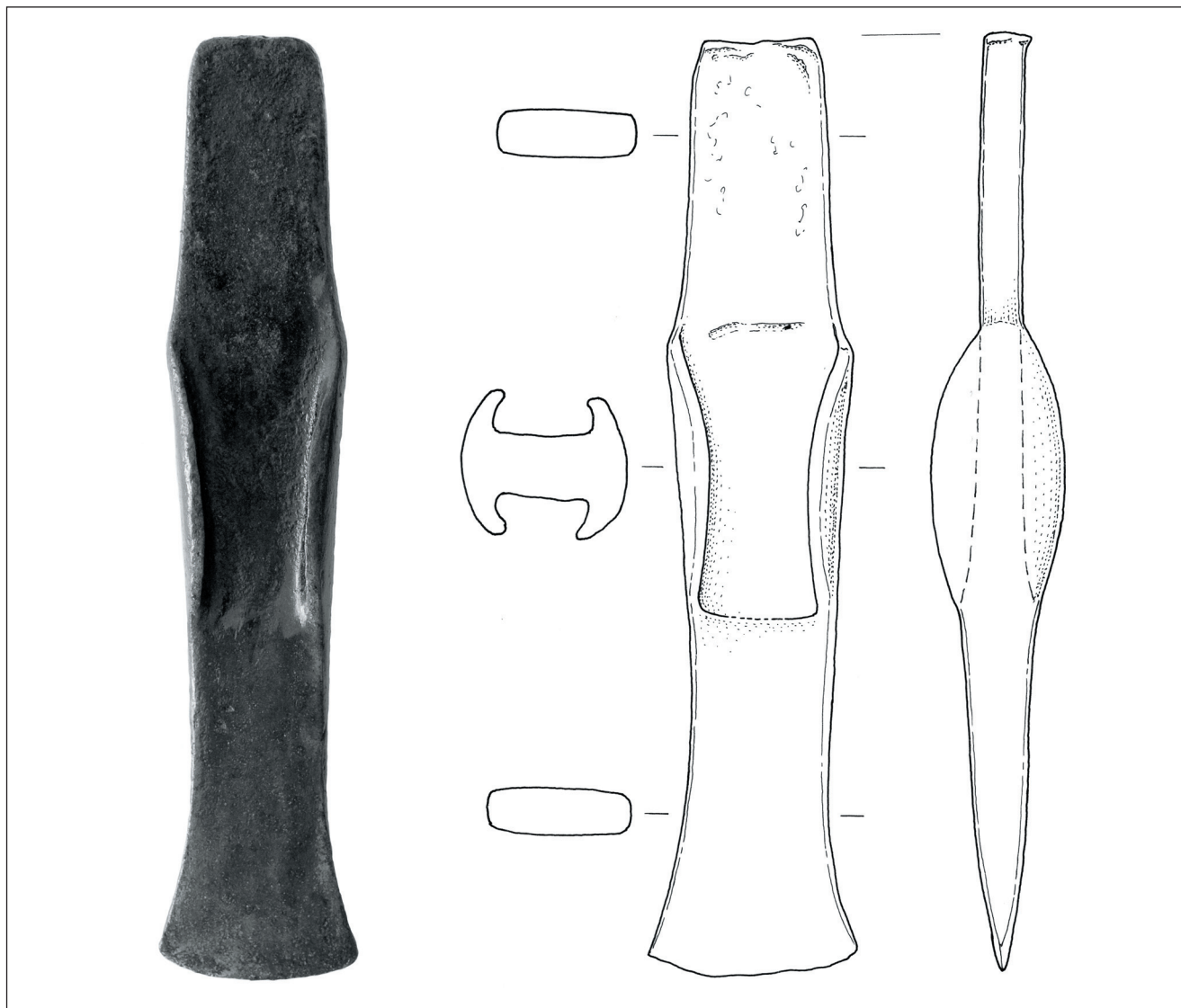
The axe was discovered by Bačić during the first excavations executed on Monkodonja. Most of the patina had been removed by electrolysis already at that time, and that is why now the observations related to technical details are rather limited.

It was unearthed in the area of house no. 2, as described by Bačić, on the northwestern section of the acropolis<sup>15</sup>. The detailed drawing from the excavation in 1955, reproduced in Fig. 6 shows well the position of axe parts and their surroundings. Two parts of the axe were located next to each other at a right angle, in the same layer containing the remains of a fireplace, a certain concentration of shells and snails, and a clay slab. This was the flooring of a house underneath which another layer of grayish ground with numerous pottery finds had been excavated. After a certain period of usage, the

<sup>15</sup> Buršić-Matijašić 1998., 109, sl. 22

<sup>15</sup> Buršić-Matijašić 1998, 109, Fig. 22.





Sl. 3 Sjekira sa zaliscima, pronađena 1999. godine među kamenim blokovima obrambenog zida sjeverozapadnog dijela akropole  
 Fig. 3 A winged axe, discovered in 1999 amongst stone blocks of the defensive wall on the northwestern section of the acropolis.

zajedno s drškom. Na čeonom, neznatno uvijenom rubu primjetno je neravnomjerno zadebljanje nastalo udarcima po predmetu.

Dužina je 13,8 cm, a najveća širina je na dijelu gdje počinju zalisci i iznosi 2,6 cm. Dužina zalistaka je 4,4 cm, a visina 2 cm. Vrat sjekire dug je 4,5 cm, debljine 0,6 cm. Širina oštrice je 3,1 cm.

Težina (zajedno s korodiranim česticama) iznosi 193,4 g.

Mjesto nalaza je neuobičajeno i upućuje na to da je sjekira korištena kao oružje. Pronađena je naime u gornjem dijelu dobro očuvanog zida akropole. Zid je na toj dionici građen od manjih i većih kamenih blokova (sl. 7). Sjekira je ležala na oko 10 cm dubine, između dva velika kamena bloka, u samom zidu, a ne u njegovim ostacima ili građevinskoj štuti oko njega. Prilikom

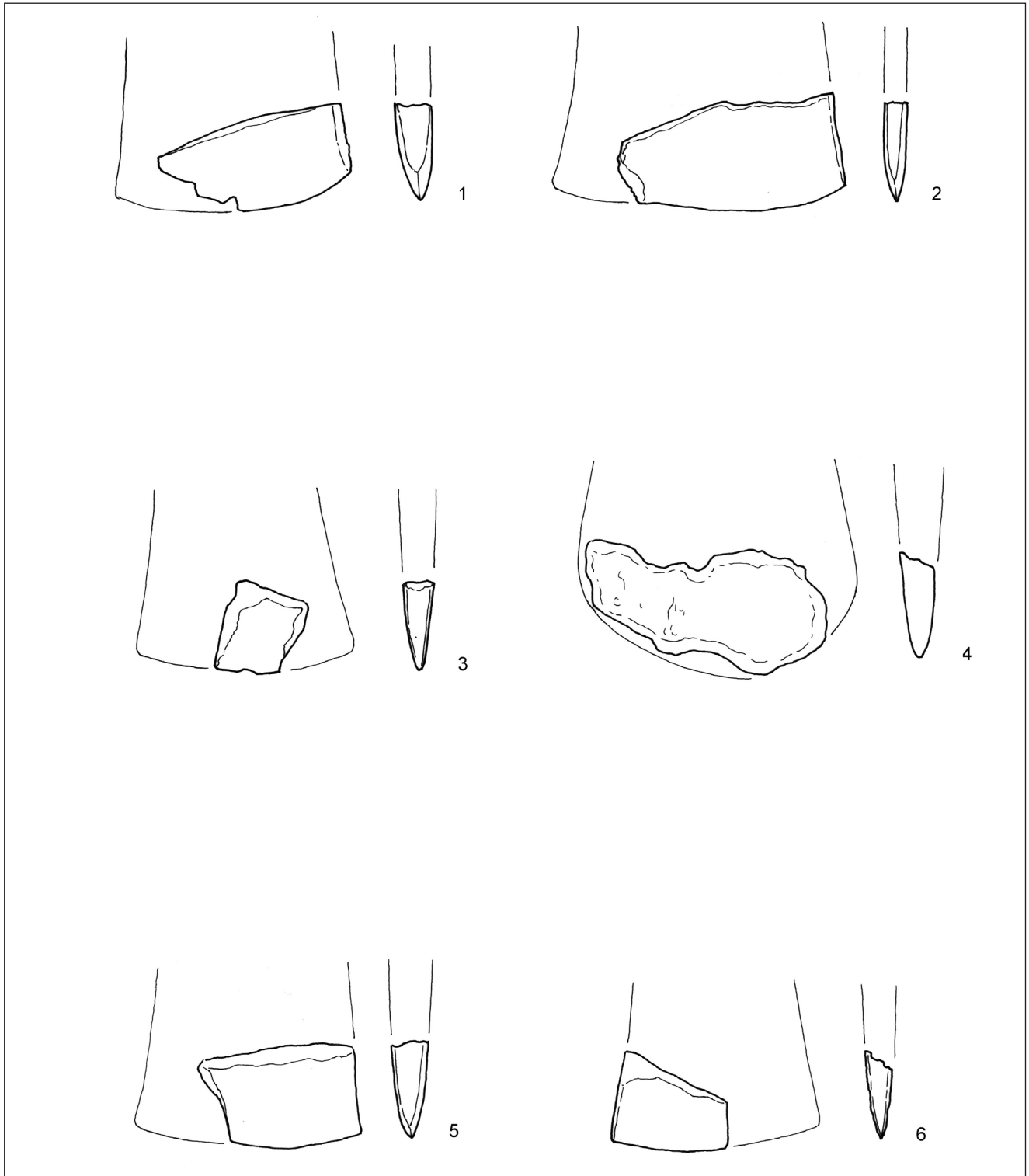
axe most probably ended on the flooring of the house, even though the circumstances of the find indicate that it was placed there intentionally, and by no means as a result of a random loss. Otherwise, this flooring belongs to an older but not the oldest phase of the settlement on Monkodonja.

2. A smaller winged axe, slim in form, featuring wings of an average height (Lappenbeil) (Fig. 3). The somewhat everted cutting edge had been sharpened several times and is consequently asymmetrical in form. The lateral sides of the axe thicken considerably towards the beginning of the two wings that are slightly convex on the outside and concave on the inside. Then they pass over with a slight bend into a uniformly thickened central and front haft of the axe, without a distinct transition.

There is a characteristic edge under an obtuse angle at the beginning of the wings on the haft. Visible on the

napuštanja i rušenja zida, sjekira je ovdje “pokopana”. Točno mjesto nalaza je u kvadrantu T/17, sonde III, na 47 cm od sjevernog ruba i 70 cm od zapadnog ruba kvadranta. Apsolutna visina je 80,36 cm (vidi crtež planuma 2, Knjiga nalaza - br. 3.755 (1999.) - sl. 7).

upper section of the haft are traces of corrosion that were created by the decay of the wooden handle, which means that the axe most probably came into the ground together with its handle. On the slightly inverted butt there is a non-uniform thickening that was created by blows that the object received.



Sl. 4 Ulomci oštrica sjekira  
Fig. 4 Fragments of axe cutting edges.

Dijelovi oštrica sjekira (sl. 4):

Odlomljeni dijelovi oštrica pronađeni su u više navrata na samoj akropoli, ali i u nižim dijelovima naselja na raznim, uglavnom ne izrazito specifičnim mjestima. Određena interpretacija na osnovu samog mjesta nalaza u svakom slučaju nije moguća.

3. Kutni ulomak dijela oštrice brončane sjekire. Oštrica je umjereno zakrivljena, stranice sjekire su bile gotovo paralelne, bez primjetnog sužavanja.

Površinski nalaz sa zapadnog dijela akropole, zapadno od recentnog zida, koji dijeli zemljišne posjede.

Broj nalaza D 85<sup>16</sup>, težina 8 g, sl. 4,1.

4. Isto kao pod 3. Oštrica je tek malo zakrivljena, očuvani dio sjekire u istoj je ravni, s neznatnim savinućem.

Površinski nalaz na jednoj od terasa donjeg grada.

Broj nalaza D 536, težina 9 g, sl. 4,2.

5. Manji ulomak unutarnje strane oštrice brončane sjekire. Rub oštrice je naoštren.

Površinski nalaz na istočnom dijelu akropole.

Broj nalaza D 73, težina 2,2 g, sl. 4,3.

6. Ulomak brončane sjekire, koja se prema oštrici vidljivo sužava. Sam rub oštrice je međutim izbijen i nije sačuvan. Vrlo vjerojatno se radilo o oštrici gotovo polukružne forme, kakva inače nije zabilježena kod drugih primjeraka s Monkodonje.

Površinski nalaz na istočnom dijelu akropole.

Broj nalaza D 65, težina 11,4 g, sl. 4,4.

7. Kutni ulomak oštrice brončane sjekire vitkog oblika. Oštrica je neznatno zakrivljena, kao i bočna stranica, koja se minimalno uvija prema unutrašnjoj strani.

Površinski nalaz s jedne od terasa.

Broj nalaza D 346, težina 9,1 g, sl. 4,5.

8. Isto kao pod 7. Oštrica je dosta zakrivljena, stranice sjekire se uvijaju prema unutra.

Površinski nalaz na zapadnom dijelu akropole, zapadno od graničnog zida privatnog posjeda.

Broj nalaza D 89, težina 3,9 g, sl. 4,6.

Nekoliko brončanih fragmenata moglo bi se također pripisati oštricama, no njih nećemo navoditi ovdje, među jasno odredivim ulomcima.

Osobito je zanimljiva grupa brončanih ulomaka koji pripadaju vratnom dijelu sjekira i koji su nakon lomljenja očigledno još dodatno obrađivani (sl. 5; 9):

9. Ulomak vrata vitkije brončane sjekire s paralelnim bočnim stranicama. Tijelo sjekire se sužava prema konkavno uvijenom gornjem, tjemenom rubu (nasuprot oštrici). Rub prijeloma točno je pod pravim kutom u odnosu na glavnu os predmeta. Sjekira je očito lomljena s dva precizna udarca pod pravim kutom, a ti su udarci prouzročili i napuknuća na središnjem dijelu.

<sup>16</sup> Slovo D ispred broja nalaza znači detektor. Radi se dakle o objektima pronađenim uz pomoć detektora za metal.

The length measures 13.8 cm, and the greatest width of 2.6 cm is in the section where the wings begin. The length of the wings is 4.4 cm, the height 2 cm. The haft of the axe is 4.5 cm long and 0.6 cm thick. The width of the blade measures 3.1 cm. The weight (together with the corroded particles) is 193.4 g.

The findspot is not at all common and indicates that the axe was used as a weapon, as it was discovered in the upper section of the otherwise well-preserved wall of the acropolis. This part of the wall was built with larger and smaller blocks of stone (Fig. 7). The axe was located at a depth of approximately 10 cm, between two large blocks of stone in the wall itself, and not in the remains thereof or in the rubble surrounding it. The axe was "buried" there during the abandonment and collapse of the wall. The exact findspot is in quadrant T/17 of trench (sonda) III, 47 cm from the northern border and 70 cm from the western border of the quadrant. The absolute height measures 80.36 meters (see drawing of planum 2, Book of Finds - no. 3.755 (1999) - Fig. 7).

Axe blade fragments (Fig. 4):

The broken off blade parts were discovered on several occasions/ places on the acropolis itself, but also in the lower parts of the settlement, on various locations that were not distinctly specific. We are not in a position to furnish an interpretation on the basis of the location of the findspots themselves.

3. A corner fragment from a section of a bronze axe blade. The cutting edge is mildly curved; the sides of the axe were almost parallel, without any noticeable narrowing. This is a surface find from the western section of the acropolis, to the west from a recent wall that divides the plots of land.

Find number D 85<sup>16</sup>, weight 8 g, Fig. 4,1.

4. Similar to item no. 3. The blade is only slightly curved; the preserved part of the axe is in the same plane, with a negligible curvature.

This is a surface find from one of the terraces of the lower section of hillfort.

Find number D 536, weight 9 g, Fig. 4,2.

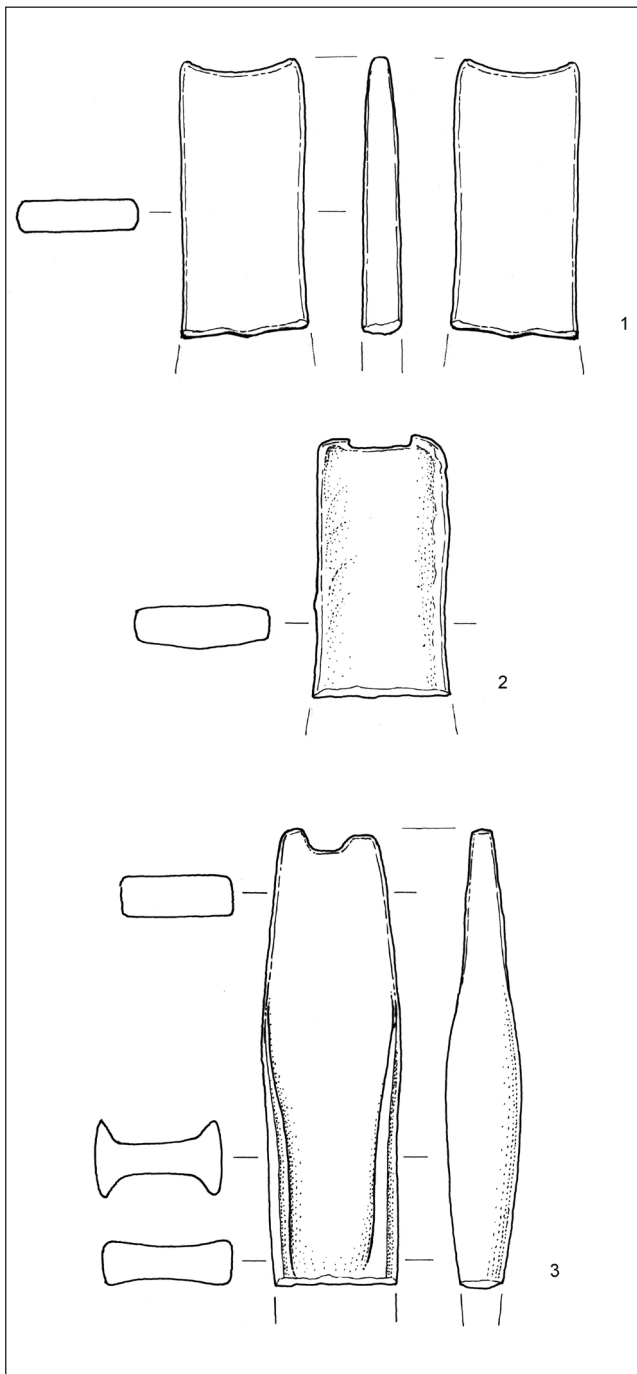
5. A smaller fragment of the interior side of a bronze axe blade. The edge of the blade is sharpened.

This is a surface find from the eastern section of the acropolis.

Find number D 73, weight 2.2 g, Fig. 4,3.

6. A fragment of a bronze axe that visibly narrows towards the cutting edge. The cutting edge itself was knocked off and is not preserved. It is highly probable that we are dealing with an almost semi-circular cutting edge, the likes of which were not recorded elsewhere on Monkodonja.

<sup>16</sup> The letter D in front of the find number stands for Detector. This is therefore an object discovered with the help of a metal detector.



Sl. 5 Dijelovi vrata triju sjekira  
Fig. 5 Haft parts belonging to three axes.

Dužina 4 cm, širina 1,8 cm, najveća debljina 0,5 cm. Ovaj komad pronađen je u krajnjem jugoistočnom kutu sonde VIII, u kvadrantu P/9; apsolutna visina je 80,80 metara. Brončani fragment ležao je na obrađenoj matičnoj stijeni, ispod humusnog sloja debljine 15 cm. Broj nalaza 8.252 (godina 2001.), težina 38,7 g, sl. 5,1 i 9,1.

10. Sličan ulomak vratnog dijela brončane sjekire s blago savijenim, paralelnim bočnim stranicama i

This is a surface find from the eastern section of the acropolis.

Find number D 65, weight 11.4 g, Fig. 4,4.

7. A corner fragment of the cutting edge of a slim bronze axe. The cutting edge is mildly curved, as is the lateral side that inverts minimally.

This is a surface find from one of the terraces.

Find number D 346, weight 9.1 g, Fig. 4,5.

8. Similar to item no. 7. The cutting edge is quite a bit curved; the sides of the axe turn inwards.

This is a surface find from the western section of the acropolis, to the west from a wall delineating a private plot of land.

Find number D 89, weight 3.9 g, Fig. 4,6.

Several other bronze fragments could likewise be included amongst cutting edges; however, we will refrain from mentioning them here among the fragments that are clearly definable.

Of particular interest is a group of bronze fragments that belong to the butts of axes, which were further worked after they had been broken (Fig. 5; 9).

9. A haft fragment of a slim bronze winged axe featuring parallel lateral sides. The body of this axe narrows towards the inverted butt (opposite the cutting edge). The breakage edge is exactly at a right angle in relation to the main axis of the object. The axe was obviously split with two precision blows at a right angle, and it was these blows that also caused cracks in the central section.

Length 4 cm, width 1.8 cm, maximal thickness 0.5 cm.

This item was discovered in the extreme southeastern corner of trench (Sonda) VIII, in quadrant P/9; the absolute height measures 80.80 meters. The bronze fragment was located on carved natural rock, underneath a layer of humus 15 cm thick.

Find number 8.252 (2001), weight 38.7 g, Fig. 5,1 and 9,1.

10. A similar fragment of the haft of a bronze winged axe with mildly curved, parallel lateral sides and a shallow right-angled notch at the butt. This fragment was likewise intentionally broken off at a right angle from the rest of the object. Visible on the breakage edge are traces from the blow in the form of compressed metal, as well as the beginnings of wings located in the central section of the axe. After the completion of casting the axe was additionally worked by oblique strokes that caused the slightly thickened edges.

Length 4.2 cm, width 2 to 2.2 cm, thickness 0.6 cm, weight 33.4 g.

The findspot is in trench (Sonda) III, to the west from the acropolis defensive wall in the vicinity of an older entrance, in between the stone ruins from one of the later construction phases of defensive walls and structures on the terrace of the "upper town". Quadrant CC/3, 40 cm from the western and 34 cm from the southern border of

pravokutnim, plitkim urezom na tjemenu. I ovaj je fragment očito ciljano odbijen pod pravim kutom od ostatka predmeta. Na rubu prijeloma vide se tragovi udarca u vidu sabijenog metala kao i počeci rubnih ojačanja, smještenih u središnjem dijelu sjekire. Nakon završetka lijevanja sjekira je dodatno obrađena kosim udarcima, zbog čega su nastali blago zadebljani rubovi. Duljina 4, 2 cm, širina 2 do 2,2 cm, debljina 0,6 cm. Težina 33,4 g.

Mjesto nalaza je sonda III, zapadno od zida akropole u blizini starijeg ulaza, između urušenog materijala s jednog od mlađih građevinskih faza obrambenih zidova i objekata na niže pozicioniranoj terasi "gornjeg grada". Kvadrant CC/3, 40 cm od zapadnog i 34 cm od južnog ruba kvadranta. Apsolutna visina 80,38 metara.

Broj nalaza 30.728 (godina 2001.), sl. 5,2 i 9,2.

11. Vratni dio sjekire s visokim i masivnim pojačanim rubovima, koji počinju 3 cm od samog vrata. Rubna pojačanja sužavaju se prema precizno obrađenom i u odnosu na sjekiru pravokutno postavljenom rubu prijeloma. Vratni dio pravokutnog je presjeka i znatno se sužava od početka pojačanih rubova prema duboko zarezanom tjemenu.

Dužina 7,2 cm, najveća širina 2,2 cm, širina na kraju vrata 1,6 cm, širina na rubu prijeloma 2 cm, debljina vrata 0,7 cm, najveća visina pojačanih rubova 1,2 cm. Težina nakon čišćenja 77,1 g.

Fragment je pronađen u sondi IX, ispod urušenog zida najmlađeg i posljednjeg kazamata. Kvadrant H/43, apsolutna visina 77,68 metara (planum 4-5).

Broj nalaza 9.767 iz kompleksa 9.759 (godina 2005.), sl. 5,3 i 9,3.

Iako navedene sjekire u bližoj okolini imaju samo mali broj analogija, njihova tipološka i vremenska determinacija ne predstavlja osobito težak zadatak. U potrazi za sličnim primjercima uzet ćemo stoga u obzir i nalaze s nešto udaljenijih područja. Tipološko-kronološko određivanje naših primjeraka moguće je prije svega uz pomoć razrađenih tipologija u nekim susjednim zemljama. To naravno vrijedi prije svega za cjelovito očuvane sjekire, ali i ostali se dijelovi mogu dosta jasno pripisati određenom tipu odnosno vrsti sjekira.

Najstarija je sjekira s pojačanim rubovima pronađena 1955. godine (sl. 2 i 6). Promatrajući četiri glavne tipološke karakteristike (1. trapezoidni vratni kraj s lagano konkavnim tjemenu, 2. umjerena visina rubnih pojačanja, zaoštrenih samo na središnjem dijelu, 3. gotovo pravolinijnska, neznatno zakrivljena osnovna kontura, i 4. tek malo proširena i jedva zakrivljena oštrica), začuđujuće je mali broj sličnih primjeraka u

the quadrant. The absolute height measures 80.38 meters. Find number 30.728 (2001), Fig. 5,2 and 9,2.

11. The haft of an axe with high, massive, reinforced wings that start at a distance of 3 cm from the butt. The wings narrow towards the precisely worked and, in relation to the entire axe, perpendicularly placed breakage edge. The cross section of the haft is rectangular in shape, and narrows considerably from the beginning of the reinforced edges towards the deeply notched butt.

Length 7.2 cm, maximal width 2.2 cm, width at the end of the butt 1.6 cm, width at the breakage edge 2 cm, haft thickness 0.7 cm, maximum height of the wings 1.2 cm. weight after cleansing 77.1 g.

The fragment was discovered in trench (Sonda) IX, underneath the ruins of the wall of the later and the last fortification. Quadrant H/43, absolute height 77.68 meters (planum 4-5).

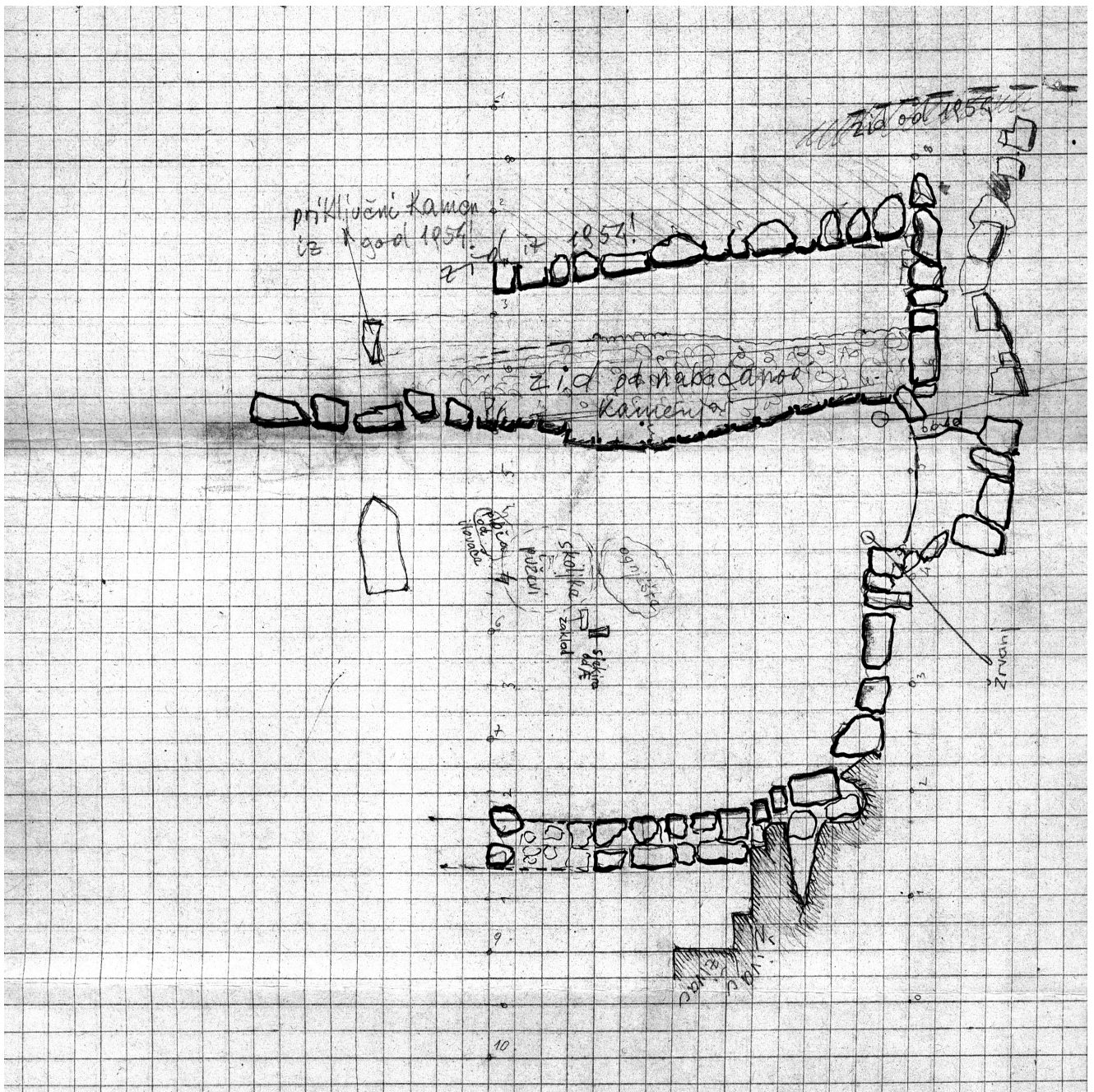
Find number 9.767 from complex 9.759 (2005), Fig. 5,3 and 9,3.

Even though the described axes have only a small number of analogies in the immediate surroundings, it is nevertheless not difficult to determine them typologically and temporally. In our search for similar finds, we will therefore also take into account the finds that were discovered on the more distant sites. The typochronological determination of our samples is possible primarily according to typological classifications that have been worked out in some neighboring countries. This is, above all, true for the winged axes that have been preserved in their entirety, but the other parts could likewise be attributed rather clearly also to some type of winged axes.

The oldest flanged axe was discovered in 1955 (Fig. 2 and 6). If we take in account the four main typological characteristics of it (1. a trapezoidal haft with a slightly concave butt; 2. a moderate height of the lateral flanges that are sharpened only in the central section; 3. an almost straight, insignificantly curved basic contour; and 4. only a slightly widened and barely curved cutting edge), we come to conclusion that there are surprisingly few similar examples in the immediate and more distant surroundings. This is all the more astonishing as the majority of axes from neighboring regions have been published through monographs and presented in the easily accessible edition of *Prähistorische Bronzefunde* (PBF).

Bronze axes are a rather rare phenomenon amongst the already small number of hoards and grave finds from Istria, whose dating more or less corresponds with the period of existence of the settlement at Monkodnja<sup>17</sup>. Flanged axes are not a particularly common occurrence even in the surrounding regions. Likewise, there are no adequate analogies in the region to the south and southeast of the Istrian Peninsula, with the possible exception of a few axes

<sup>17</sup> Mihovilić 1991.



Sl. 6 Mjesto nalaza sjekire s rubnim pojačanjima; crtež iz dokumentacije B. Bačića  
 Fig. 6 The findspot of a flanged axe; drawing from the documentation of B. Bačić.

bližoj i daljoj okolini. Tim više što je većina sjekira sa susjednih područja solidno monografski obrađena i predstavljena u lako dostupnoj ediciji Prähistorische Bronzefunde (PBF).

Brončane sjekire rijetka su pojava među ionako malobrojnim ostavama i grobnim nalazima iz Istre, čija se datacija unekoliko poklapa s trajanjem naselja na Monkodonji<sup>17</sup>. Ni u susjednim regijama slične sjekire s pojačanim rubovima nisu osobito česte. Na području

<sup>17</sup> Mihovilić 1991.

from the Spič hoard in the coastal region of Montenegro<sup>18</sup>. The shortage of axes of this type in the interior regions of Bosnia, Montenegro and Serbia speaks in favor of the assumption that the axe from Spič came there by sea from the north, perhaps even from Monkodonja itself?

Northern Croatia and Western Hungary are likewise not amongst the regions featuring a characteristic

<sup>18</sup> Žeravica 1993, 69f., t. 19, 236–239. In this work an assumption was presented, whereby the hoard belongs to the Late Bronze Age; however, this has not been corroborated either with adequate finds or with the listed analogies.

južno i jugoistočno od istarskog poluotoka, s iznimkom nekoliko sjekira iz ostave Spič na crnogorskom primorju, također se ne mogu pronaći odgovarajuće paralele<sup>18</sup>. Nedostatak sjekira ovog tipa u unutrašnjosti Bosne, Crne Gore i Srbije govori u prilog pretpostavci da je sjekira u Spič dospjela morskim putem sa sjevera, možda baš iz Monkodonje?

Sjeverna Hrvatska i zapadna Mađarska također ne pripadaju regijama s izraženim deponiranjem sjekira u vrijeme prije nastupanja kulture žarnih polja a niti su sjekire kao oruđe prisutne u naseljima srednjeg brončanog doba. Za dataciju istarskog primjerka bitna je stoga ostava iz Sárbogárda, Kom. Fejér. Radi se o ne baš s krajnjom sigurnošću zatvorenom nalazu, koji A. Mozsolics datira u stupanj Koszider (MD I)<sup>19</sup>. Istom vremenskom "horizontu" ova autorica pripisuje i južnonjemačke ostave Bühl i Ackenbach, poznate i kao stupanj Reinecke Bd A3. Nadalje, autorica u istom vremenskom kontekstu navodi i ostavu Uzd, Kom. Tolna, koja se sastoji isključivo od srpova i sjekira. Uzd je ujedno i jedini zatvoreni nalaz s odgovarajućim paralelama za obje sjekire iz Monkodonje<sup>20</sup>. Izrazito ranom datiranju ostave Uzd, s vremenski teško odredivim materijalom, proturječio je Hänsel, koji ovaj nalaz stavlja u razvijeno srednje brončano doba (MDII)<sup>21</sup>. Radi se svakako o datacijski i po sadržaju neuobičajenom nalazu, koji je i dalje posebna zagonetka.

U studiji M. Novotné o sjekirama u Slovačkoj, koja obuhvaća stanje istraživanja do 1970., opisan je uz ostalo i tip "sjekire s pojačanim rubovima, zaravnjenim tjemenom i lučno oblikovanom oštricom". Među predstavnicima ovoga tipa nalazi se i jedna sjekira slična primjerku iz Monkodonje, no za nju ne postoje čak ni podaci o mjestu nalaza<sup>22</sup>. U okružju ostalih sjekira sa slovačkog prostora ovaj primjerak doista djeluje strano. M. Novotná ga međutim s pravom datira u vrijeme Koszider-horizonta. Moguće je da ova sjekira iz Slovačke predstavlja i sjeveroistočnu granicu rasprostiranja ovog tipa.

U krajevima sjeverno od Istre bliže analogije mogu se prije svega pronaći u Furlaniji<sup>23</sup> i riječnim nalazima iz susjedne Slovenije. No, kako se ovdje radi isključivo

depositing of axes in the periods before the arrival of the Urnfield culture, and axes as implements are also very rare in the settlements of the Middle Bronze Age. Of crucial importance for the dating of the specimen from Istria is therefore the hoard from Sárbogárd, Kom. Fejér. This is a find for which it is not absolutely certain that it represents a closed context. Anyway, A. Mozsolics dates it into the phase Koszider (MD I)<sup>19</sup> and puts it parallel to the south German hoards of Bühl and Ackenbach, which are also known as phase Reinecke Bz A3. Furthermore, the same author also includes the hoard of Uzd, Kom. Tolna, which consists in its entirety of sickles and axes, in that temporal context. Uzd at the same time represents the only closed context with the corresponding analogies for both axes from Monkodonja<sup>20</sup>. This distinctly early dating of the Uzd hoard has been opposed by Hänsel due to the scarcity of analogies for its classification; he dates it - most probably still valid - into the developed Middle Bronze Age (MDII)<sup>21</sup>. As far as dating and content are concerned, it represents an unusual find that remains enigmatic to this day.

In the publication of M. Novotná about axes in Slovakia, which encompasses discoveries to 1970, a type of "langed axe, with a straightened top, and an arch-shaped cutting edge" has been described. Amongst examples of this type there is just one axe that resembles the specimen from Monkodonja, for which, however, there is no additional information as even its findspot is not known<sup>22</sup>. Amongst the other axes from Slovakia, this example truly stands out as strange. However, M. Novotná is right to date it into the period of the Koszider-horizon. It is possible that this axe from Slovakia also represents the most northeastern border for the distribution of this type of axe.

In regions to the north of Istria, closer analogies can be found above all in Friuli<sup>23</sup>, and in river finds in neighboring Slovenia. However, as these are exclusively individual finds without a corresponding context, their contribution towards a more detailed dating is negligible<sup>24</sup>. The small number of closed contexts where axes have been discovered is not at all surprising if we take into consideration the fact that hoards from the Middle Bronze Age are generally rare in Slovenia.

More or less similar axes are known from Austria, both to the south and to the north of the Alps. In his treatise, E. F. Mayer ascribed two examples, similar to the Istrian axe, to the Salzburg type<sup>25</sup>. One of the axes

<sup>18</sup> Žeravica 1993., 69f., t.19, 236-239. U ovom je radu iznesena pretpostavka da ostava pripada mlađem brončanom dobu, što međutim nije potkrijepljeno ni odgovarajućim nalazima ni navedenim paralelama.

<sup>19</sup> Mozsolics 1967., 63 - 65, uz ostalo i t. 36,4

<sup>20</sup> Ista 63 - 65, t. 56,6.8.10 i ostale sjekire, koje su samo u daljoj srodnosti s našim primjercima.

<sup>21</sup> Hänsel 1968., 68 - 71,75 s prilogom 14

<sup>22</sup> Novotná 1970., 36, t. 10, 198.

<sup>23</sup> Tasca 2008., 15 ss., Fig. 2b

<sup>19</sup> Mozsolics 1967, 63-65, with the rest also T. 36,4.

<sup>20</sup> Ibidem 63 - 65, T. 56,6.8.10 and the remaining axes that are only distantly related with our examples.

<sup>21</sup> Hänsel 1968, 68 - 71, 75 with Annex 14.

<sup>22</sup> Novotná 1970, 36, T. 10, 198.

<sup>23</sup> Tasca 2008, 15 ss., Fig. 2b.

<sup>24</sup> Teržan 1995, 40, T. 3, 22-23.

<sup>25</sup> Mayer 1977, 100, T. 21, 299-300.

o pojedinačnim nalazima bez odgovarajućeg konteksta, njihov doprinos bližoj dataciji je zanemariv<sup>24</sup>. Budući da su ostave iz srednjeg brončanog doba u Sloveniji ionako rijetke, mali broj zatvorenih nalaza sa sjekirama nije nimalo začuđujući.

Manje ili više slične sjekire poznate su i iz Austrije, i to kako južno, tako i sjeverno od alpskog planinskog vijenca. E. F. Mayer u svojoj je studiji dva primjerka slična istarskoj sjekiri pripisao tipu Salzburg<sup>25</sup>. Kod jedne se sjekire radi o pojedinačnom nalazu iz samog Salzburga, dok je drugi primjerak najvjerojatnije dio ostave Niederosterwitz u Koruškoj, čija je datacija također sporna. Iako dva austrijska primjerka ne doprinose značajnije preciznijoj dataciji, svakako su bitna u kompletiranju ukupne slike rasprostiranja ovoga tipa.

Na osnovu paralela s već navedenim sjekirama iz ostava Sárbogárd i Bühl, Mayer datira dva austrijska primjerka u horizont Locham (Reinecke BdB1). Analogije našoj sjekiri mogu se međutim pronaći i među primjercima Mayerovog tipa Emmerberg, koji je opet blizak ranobrončanim sjekirama iz serije Langquiad<sup>26</sup>, kao i među tipovima Mägerkingen<sup>27</sup> i donekle među sjekirama sažetim pod nazivom "prijelazne forme s trapezoidnim vratom - varijanta I"<sup>28</sup>.

Dalje na sjever, između Moravske i zapadne Švicarske mogu se još pronaći pojedine paralele, objavljene uglavnom u odgovarajućim dijelovima edicije PBF (Řihovský<sup>29</sup>, Pásztor/Mayer<sup>30</sup>, Kibbert<sup>31</sup> i Abels<sup>32</sup>).

<sup>24</sup> Teržan 1995., 40, t. 3, 22-23

<sup>25</sup> Mayer 1977., 100, t. 21, 299-300

<sup>26</sup> Mayer 1977., 102, t. 21, 306

<sup>27</sup> Mayer 1977., 109, t. 23, 330. Pozivajući se na Abelsa, Mayer datira ovu sjekiru u fazu Bühl (BdA3) odnosno u fazu Locham (BdB1).

<sup>28</sup> Mayer 1977., 126, t. 31, 459. Nejasna je Mayerova datacija ovog primjerka na početak kasnog brončanog doba, uzimajući u obzir da se pri tome poziva na već spomenutu ostavu Uzd, koju Mayer opet nepravilno datira u ranu fazu kasnog brončanog doba, odnosno kulture žarnih polja.

<sup>29</sup> Řihovský 1992., 107, t.16, 226-227. Dvije sjekire bez bližih podataka o mjestu nalaza Řihovský je svrstao u "tip s valovitim stranicama i izraženom, blago lučnom oštricom, konkavnim vratom i visokim pojačanjem ruba - Varijanta Cd".

<sup>30</sup> Pásztor/Mayer 1998., 66-68, t. 21, 307.309.310. Ovaj tip i ovdje je označen kao Typ Nehren, Varijanta C. Autori datiraju ove primjerke u razvijeno srednje brončano doba napominjući pri tome vezu s horizontom Locham dalje na zapad. Sva tri citirana primjerka su pojedinačni nalazi, za koje se na osnovu općeg razvitka same forme bez daljnjeg može pretpostaviti i starija datacija.

<sup>31</sup> Kibbert 1980., 176, t. 28, 412; 29, 415-416. Od tri navedene sjekire niti jedna nije pronađena u odgovarajućem arheološkom kontekstu. Ako se zanemari njihova pripadnost Kibbertovom tipu "sjekire s pojačanim rubovima s uvučenim, uskim stranicama - Tip Unterbimbach, Varijanta Schwarza", njihovo datiranje u srednje brončano doba ne čini se sasvim pouzdano.

<sup>32</sup> Abels 1972., 66 i 71, t. 453 i 483

represents an individual find from Salzburg itself, whereas the other specimen was most probably part of the hoard of Niederosterwitz in Carinthia, whose dating is likewise controversial. Even though the two Austrian examples do not contribute a great deal towards a more precise dating, they are by all means important when trying to complete the entire picture regarding the spatial range of this type of axe.

Based on analogies with the already mentioned axes from the hoards of Sárbogárd and Bühl, Mayer dates the two examples from Austria into the Locham horizon (Reinecke Bz B1).

However, analogies for our axe can also be found amongst examples of Mayer's Emmerberg type that is similar to the Early Bronze Age axes from the Langquiad<sup>26</sup> series, as well as among the Mägerkingen<sup>27</sup> type, and to some extent among the axes included under the description "transitional forms with a trapezoidal haft - variant I"<sup>28</sup>.

Further to the north, between Moravia and western Switzerland, there are still some analogies that were published mainly in the corresponding parts of the PBF edition (Řihovský<sup>29</sup>, Pásztor/Mayer<sup>30</sup>, Kibbert<sup>31</sup> and Abels<sup>32</sup>).

All that remains is to consider the axes from the Italian region. Neither in the Terramare<sup>33</sup> catalogue nor in the treatise by T. Urban<sup>34</sup> are there any axes with typological characteristics that are identical with our specimen. A few of the axes that, at first sight, seem similar are nevertheless clearly different morphologically. One of the

<sup>26</sup> Mayer 1977, 102, T. 21, 306.

<sup>27</sup> Mayer 1977, 109, T. 23, 330. With reference to Abels, Mayer dates this axe into phase Bühl (BdA3) or phase Locham (Bz B1).

<sup>28</sup> Mayer 1977, 126, T. 31, 459. Mayer's dating of this specimen is unclear - he dates it at the beginning of the Late Bronze Age, taking into account that in doing so he is referring to the already mentioned Uzd hoard that was dated by Mayer, wrongly again, to the early phase of the Late Bronze Age, or the Early Urnfield culture.

<sup>29</sup> Řihovský 1992, 107, T.16, 226-227. Řihovský ranked two axes that lacked any detailed data regarding their findspot to "a type with wavy sides and an emphasized, slightly arched cutting edge, a concave neck, and a high reinforcement of the edge - Variant Cd".

<sup>30</sup> Pásztor/Mayer 1998, 66-68, T. 21, 307, 309, 310. This type is also here labelled as the Nehren Type, Variant C. The authors date these specimens into the developed Middle Bronze Age, at the same time stating the connection with the Locham horizon further in the west. All three cited examples represent individual finds for which it is possible to presume an even older dating on the basis of the general development of the form itself.

<sup>31</sup> Kibbert 1980, 176, T. 28, 412; 29, 415-416. Of the three axes, not a single one was discovered in a relevant archaeological context. If we ignore their affiliation to the Kibbert type of "flanged axe with drawn in, narrow sides - Unterbimbach Type, Schwarza Variant", their dating to the Middle Bronze Age does not appear entirely reliable.

<sup>32</sup> Abels 1972, 66 and 71, T. 453 and 483.

<sup>33</sup> Terramare 1997, Fig. S.382.

<sup>34</sup> Urban 1993, 131, Fig. 67.



Preostaje još da razmotrimo sjekire s talijanskog prostora. U katalogu sjekira Terramarra<sup>33</sup>, kao i u studiji T. Urbana<sup>34</sup>, ne postoji niti jedna sjekira s tipološkim karakteristikama identičnim našem primjerku. Nekoliko sjekira koje se na prvi pogled čine sličnima, ipak se morfološki jasno razlikuju. Za vrijeme stupnja Bronzo medio sjekire se odlikuju prije svega izrazito zakrivljenijom oštricom, kao i suženjem središnjeg dijela. Talijanske sjekire ovog tipa iz razdoblja Bronzo antico odlikuju se pojačanim rubovima duž cijeloga tijela, zbog čega je bliža usporedba i u ovom slučaju neprikladna<sup>35</sup>.

Ako na koncu rezimiramo rijetke, argumentima ili zatvorenim cjelinama potkrijepljene datacije za navedene analogije na prostoru između Crne Gore i Švicarske, doći ćemo do zaključka da se sjekira s Monkodonje vremenski može svrstati između horizonta Bühl (BdA3/MD I) i sljedećeg stupnja, odnosno horizonta Locham (BdB1/MD II), što bi odgovaralo vremenu oko 1600. g. pr. Kr. ili nešto kasnije. Iako na ovome mjestu ne bismo željeli previše govoriti o pojedinim građevnim fazama na Monkodonji, o kojima će još biti riječi, može se već sada ustanoviti da ta neovisna datacija, dobivena relativnom usporedbom sjekira, u velikoj mjeri odgovara radiokarbonskim datumima dobivenim za ovu fazu naselja.

Što se tiče porijekla ovoga tipa, zona južno i istočno od Istre svakako se može isključiti. Sjeverno od Istre ovakve sjekire su rasprostranjene na velikom prostoru između Furlanije i Slovenije, preko jugoistočne Austrije te središnje Njemačke i Švicarske, bez posebne koncentracije u jednoj od regija, koja bi eventualno mogla ukazivati na matično područje ovog tipa.

Sjekira sa zaliscima pronađena u obrambenom zidu (sl. 3 i 7) također se uz pomoć paralela i opće pozicije ovoga tipa u kronologiji brončanih sjekira centralne Europe može dosta jasno vremenski i tipološki odrediti. Ipak, kada se uzmu u obzir svi tipološki kriteriji primjerka s Monkodonje (vitka forma, trapezoidni vrat, izraženi rubovi u središnjoj zoni, s niskim i blago povijenim zaliscima, prijelaz u donji dio naznačen samo blagom kosinom te neznatno uvijena i zaokružena oštrica), broj srodnih sjekira ni ovdje nije izrazito velik.

Iz same Istre poznat je primjerice jedan noviji nalaz iz spilje Laganiši kod Oprtlja<sup>36</sup>. Radi se o djelomice sličnoj sjekiri pronađenoj zajedno s ljudskim kostima u zanimljivom i zasad ne do kraja razjašnjenom

main features of axes during the *Bronzo Medio* phase is a distinctly curved cutting edge, as well as a narrowing of the central section. Italian axes of this type from the *Bronzo Antico* period feature flanges along the entire body, and that is why a closer comparison seems inappropriate in this case as well<sup>35</sup>.

If, finally, we summarize the datings, rarely backed by well argued analogies or by closed contexts, for the mentioned analogies on the territory between Montenegro and Switzerland, we come to the conclusion that the axe from Monkodonja can be chronologically placed between the Bühl (Bz A3/MD I) horizon and the next phase, the Locham (Bz B1/MD II) horizon, which would approximately correspond to 1600 BC or somewhat later. Even though it is not our aim here to discuss excessively the individual construction phases of hillfort on Monkodonja, it is already possible to ascertain that this independent dating that resulted from a relative comparison of the axes, to a large degree corresponds with the radiocarbon data obtained for this phase of the settlement.

As far as the origins of this type are concerned, we can surely exclude the zone to the south and east of Istria. To the north of Istria, axes like these are widespread on the large territory between Friuli and Slovenia, over southeastern Austria and central Germany as well as Switzerland, without any special concentrations in any one of these regions, which could point to the area where this type originated.

The winged axe discovered in the defensive wall (Fig. 3 and 7) can be clearly defined both chronologically and typologically on the grounds of analogies, and their general position in the chronological system of bronze axes from Central Europe. Nevertheless, when we take into consideration all the typological criteria of the specimen from Monkodonja (the slim shape, trapezoidal haft, emphasized edges in the central zone, with low and mildly bent wings, the transition to the lower section marked only with a slight slant, and the slightly inverted and rounded cutting edge), here too the number of related axes is not very large.

From Istria itself, for example, a recent find is known that was discovered in the Laganiši cave in the vicinity of Oprtlj<sup>36</sup>. This is a partially similar axe that was found together with human bones in an interesting but, to date, not thoroughly clarified Middle Bronze Age context. There are no other known specimens from Northern Croatia. Further down towards the south there is an isolated individual find that was discovered in the vicinity of Zadar<sup>37</sup>, whereas on the territory of Montenegro,

<sup>33</sup> Terramare 1997., sl. S.382

<sup>34</sup> Urban 1993., 131, sl. 67

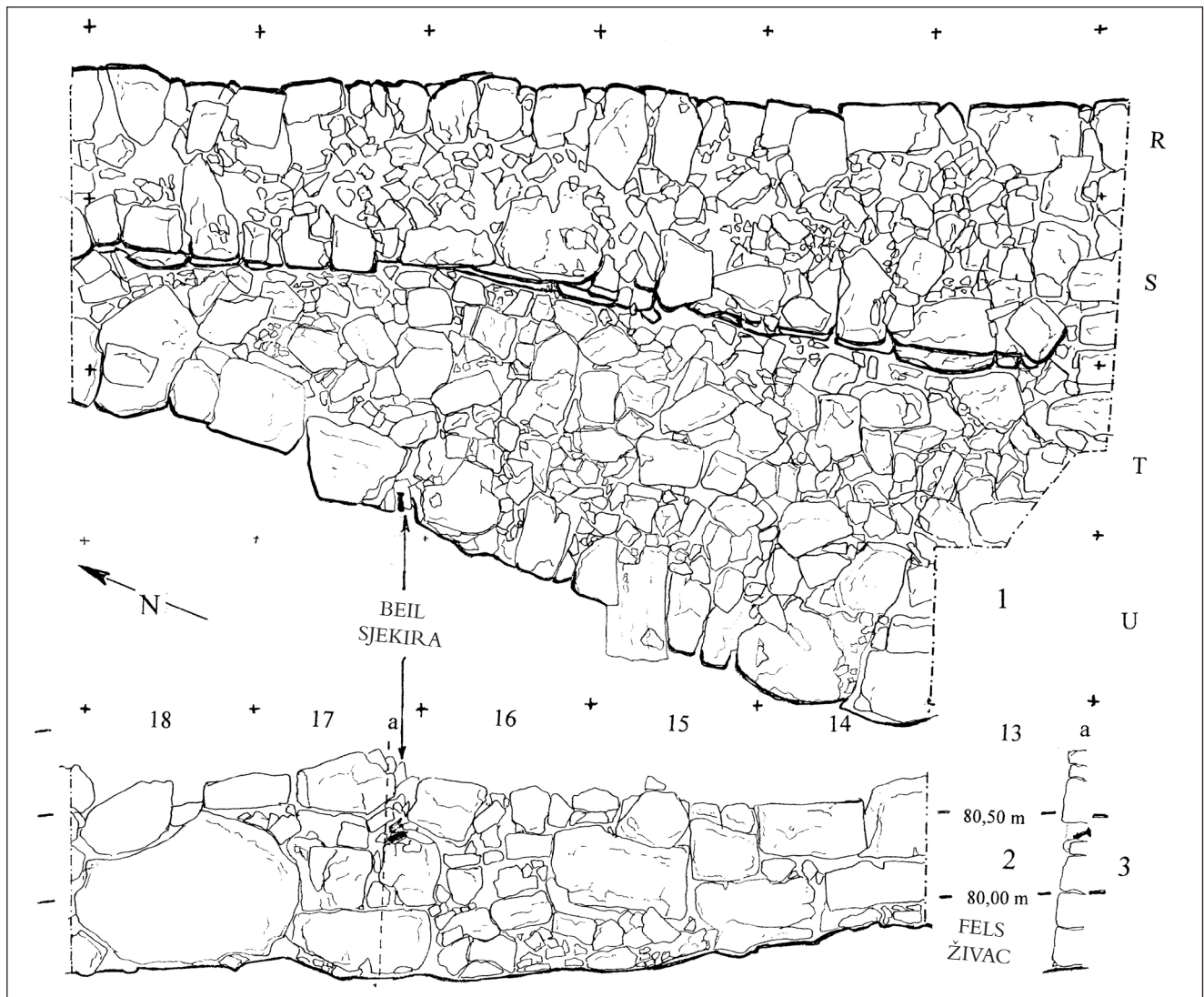
<sup>35</sup> Terramare 1997., 380

<sup>36</sup> Komšo 2008., 32 ss., sl. 36; Mihovilić 2008., 45 ss., sl. 45

<sup>35</sup> Terramare 1997., 380.

<sup>36</sup> Komšo 2008, 32 ss., Fig. 36; Mihovilić 2008, 45 ss., Fig. 45.

<sup>37</sup> Žeravica 1993, 70, T. 19, 241.



Sl. 7 Mjesto nalaza sjekire sa zaliscima, u zidu akropole  
 Fig. 7 The findspot of a winged axe in the acropolis wall.

srednjebrončanodobnom kontekstu. Drugi primjerci iz sjeverne Hrvatske nisu za sada poznati. Dalje prema jugu bilježimo još samo pojedinačni, izolirani nalaz iz blizine Zadra<sup>37</sup>, dok je na crnogorskom, srpskom i južnomadarskom prostoru ovaj tip potpuno nepoznat. To područje možemo, dakle, bez obzira na nizak stupanj istraženosti, svakako isključiti kao moguću domovinu ovoga tipa. Jedine analogije nalazimo u već spomenutoj ostavi Uzd, južno od Balatona, koja se po svom sadržaju (isključivo sjekire i srpovi) ipak dosta izdvaja iz lokalnih običaja deponiranja brončanih predmeta<sup>38</sup>. Kao što je već istaknuto, starost ove ostave nije pouzdano određena, mada se usporedbom sa sličnim nalazima dalje na sjeveru može doći do okvirne datacije u razvijeno ili završno srednje brončano doba. Jedan pojedinačni

Serbia and Southern Hungary this type is so far unknown. We can therefore exclude this territory as a possible homeland of this type of axe, notwithstanding the low level of exploration. The only analogies are found in the already mentioned hoard at Uzd, south of the Balaton, which by its content (only axes and sickles) distinguishes itself quite a lot from local customs of depositing objects made of bronze<sup>38</sup>.

As was already mentioned, the age of this hoard was not reliably determined, although a comparison with similar finds discovered further to the north can lead to an approximate dating to the developed or final Middle Bronze Age. An individual find from Slovakia, for which findspot was not known, and which Novotná describes as an axe with wings in the middle (mittelständiges Lappenbeil), could represent the northeastern boundary

<sup>37</sup> Žeravica 1993., 70, t. 19, 241

<sup>38</sup> Mozsolics 1967., 64, t. 56, 6. 10-11; 57, 2

<sup>38</sup> Mozsolics 1967, 64, T. 56, 6. 10-11; 57, 2.

nalaz iz Slovačke bez navedenog mjesta nalaza, koji Novotná opisuje kao sjekiru sa zaliscima na sredini (mittelständiges Lappenbeil), mogao bi predstavljati sjeveroistočnu granicu rasprostiranja<sup>39</sup>. Po toj autorici, ova sjekira odnosno ovaj tip pripada vremenu nakon kraja ranog brončanog doba.

Odgovarajuće sjekire su i u Austriji dosta rijetke. Bez informacija o mjestu pronalaska su i dvije sjekire iz Moravske, koje Řihovský označava kao "prijelaznu formu između sjekira s nasadom (Absatzbeile) i sjekira sa zaliscima", i svrstava ih, pozivajući se opet na ostavu Uzd, među nalaze "rane faze mlađeg brončanog doba"<sup>40</sup>.

Iz brončanim sjekirama bogatog austrijskog područja kao analogije mogu se navesti jedan primjerak iz Gmunden (tip Gmunden, varijanta Unterradl prema Mayeru), kao i dva slična primjerka, jedan iz Linza i drugi s nepoznatog nalazišta<sup>41</sup>.

Zbog blizine nalaza sjekire poznatim grobnim tumulima iz Gmunden, i navodeći opet ostavu Uzd, Mayer datira ovaj tip u klasičnu srednju fazu srednjeg brončanog doba. Iz Bavarske je poznat samo jedan primjerak ovakvih sjekira, pronađen vjerojatno u Dunavu kod Passaua<sup>42</sup>. Pászthory i Mayer datiraju ovaj nalaz u "srednje i kasno srednje brončano doba (Hügelgräberzeit)". Dalje na zapad, odnosno u južnoj Njemačkoj i Švicarskoj, ne postoje primjerci koji bi se mogli usporediti s istarskim, a egzaktne analogije nisu poznate ni u Italiji, odnosno na Apeninskom poluotoku.

Može se dakle rezimirati da rasprostiranje ovog tipa obuhvaća prostor između Moravske, zapadne Mađarske i Istre, bez značajnih koncentracija odnosno bez jasno prepoznatljive izvorne regije.

Iako navedene datacije dosta variraju, može se reći da ovaj tip sjekire pretežito spada u vrijeme klasičnog srednjeg brončanog doba ili u stupanj B2-C1 po Reineckeu, odnosno u 14. st. pr. Kr.

Traženje daljnjih paralela za fragmente oštrica (sl. 4) bilo bi svakako uzaludan pokušaj, znajući da su očuvani dijelovi samo u manjem broju karakteristični za pojedine tipove.

I za tri fragmenta vrata sjekira (sl. 5 i sl. 9) nije potrebno navoditi daljnje analogije u svrhu vremenskog i tipološkog određivanja. Iako se radi o manjim komadima, moguće ih je svakako pripisati jednom od dva tipa potpuno očuvanih sjekira. Sve što je, dakle, navedeno prije u tekstu o dataciji i rasprostiranju, vrijedi naravno i za ove primjerke.

of distribution<sup>39</sup>. According to this author, this axe type belong to a period after the end of the Early Bronze Age.

Corresponding axes are rare in Austria as well. Two axes from Moravia also lack data regarding their findspot; Řihovský referred to them as "a transitional form between a palstave (Absatzbeil) and a winged axe (Lappenbeil)", and he placed them among finds "of the early phase of the Late Bronze Age"<sup>40</sup>, again referring to the hoard at Uzd.

From the Austrian region, rich in bronze axes, we can cite as analogies a specimen from Gmunden (Gmunden type, Unterradl variant, according to Mayer), as well as two similar examples, one from Linz and the other from an unknown findspot<sup>41</sup>.

Due to the vicinity of the axe findspot to the well-known tumulus grave at Gmunden, and again referring to the Uzd hoard, Mayer dates this type to the classic middle phase of the Middle Bronze Age. Only a single specimen of such axes is known from Bavaria, which was in all probability discovered in the Danube near Passau<sup>42</sup>. Pászthory and Mayer date this find to the "middle and late Middle Bronze Age (Hügelgräberzeit)". Further westwards, in Southern Germany and Switzerland, there are no known examples that could be compared with the Istrian ones, nor are there any exact analogies that are known from Italy and the entire Apennine Peninsula.

We can therefore summarize that the spreading of this type of axe encompasses the territories between Moravia, Western Hungary and Istria, without any special concentrations and a clearly defined region of origin.

Even though the stated datings vary quite a bit, it is possible to conclude that this type of axe belongs chiefly to the period of the classic Middle Bronze Age or to phase B2-C1 after Reinecke, i.e. approximately around 14<sup>th</sup> century BC.

The search for further analogies for the cutting edge fragments (Fig. 5) would indeed prove to be a futile attempt, knowing that preserved parts are not sufficiently characteristic for individual types.

It is likewise not necessary to cite further analogies for the three axe haft fragments (Fig. 5 and Fig. 9), in order to define them chronologically and typologically. Even though we are dealing with smaller specimens, we can surely ascribe them to one of the two types of entirely preserved axes, just discussed. It follows, therefore, that all that has been stated in the text above regarding the dating and distribution, naturally also applies to these specimens.

Once we determined the approximate age of the specimens discovered, we came to some interesting questions regarding the function of these axes and their use. It is possible to find several approaches to this issue

<sup>39</sup> Novotná 1970., 44 i. d., t. 14, 265

<sup>40</sup> Řihovský 1992., 148 i. d., t. 28, 447-448

<sup>41</sup> Mayer 1977., 128-130, t. 33, 477 i 482

<sup>42</sup> Pászthory, Mayer 1998., 92 i. d., t. 32, 476

<sup>39</sup> Novotná 1970, 44 i. d., T. 14, 265.

<sup>40</sup> Řihovský 1992, 148 i. d., T. 28, 447-448.

<sup>41</sup> Mayer 1977, 128-130, T. 33, 477 and 482.

<sup>42</sup> Pászthory, Mayer 1998, 92 i. d., T. 32, 476.

Nakon što smo okvirno utvrdili starost pronađenih primjeraka, sada dolazimo do zanimljivih pitanja vezanih uz funkciju sjekira i njihovu uporabu. U opsežnoj literaturi posvećenoj brončanim sjekirama moguće je pronaći više pristupa ovom pitanju. Najčešće interpretacije polaze od pretpostavke da su sjekire bile korištene kao oružje ili kao alat, a postoje i autori koji sjekire, uslijed njihove učestalosti, opisuju kao neku vrstu premonetarnog platežnog sredstva, odnosno kao sredstvo razmjene među zajednicama brončanog doba. Uloga sjekira u žrtvenom kultu također je više puta jasno istaknuta. Sva ova tumačenja funkcije brončanih sjekira već su toliko često opisivana, razmatrana i djelomice dokazana, da je lista korisne literature izlišna.

Zašto se onda na ovome mjestu ponovno posvećujemo već riješenim problemima? Mišljenja smo da situacija na Monkodonji i stupanj istraženosti ovoga lokaliteta u svakom slučaju omogućavaju još preciznije i djelotvornije razjašnjenje tih funkcija. U svrhu dokazivanja multifunktionalnosti svakako je, u usporedbi s pojedinačnim izabranim sjekirama s različitim nalazišta, u prednosti grupa objekata koja potječe s jednog mjesta, kao i to da su zastupljeni u više varijanti. Takav je slučaj upravo na Monkodonji, iako mali ukupan broj nalaza ne dozvoljava da naša razmatranja u vezi s funkcijom sjekira odgovarajuće statistički potkrijepimo.

Kao dokaz da su neke od sjekira korištene pri obradi drva, odnosno kao svakodnevni alat, mogu poslužiti fragmenti oštrica s naoštrenim sječivima, ukupno njih sedam (sl. 4). Dobiva se dojam da se radi o slučajno izgubljenim komadima, koji su otpali sa sječiva prilikom rukovanja sjekirama i zbog veličine (maleni su) više nisu mogli biti pronađeni. Moglo bi se možda i pomisliti da su odbici oštrica posljedica korištenja sjekire u borbi. Protiv ovakve teze govori činjenica da su svi fragmenti ujednačeno mali. Kod borbenog djelovanja sjekirama bilo bi, naime, za očekivati da su dijelovi sječiva odbijani u neravnomjernim veličinama, što ovdje nikako nije slučaj.

Primjetno je međutim da nedostaju sječiva izlomljenih ili uništenih sjekira. Fragmenti oštrica mogu se na Monkodonji naći na gotovo cijelom prostoru naselja, gdje su manje ili više slučajno razasuti. To govori da se ovdje ipak najvjerojatnije radi o komadima izgubljenim prilikom svakodnevnih radova, čije traženje nije bilo dovoljno isplativo.

Fragmenti oružja bi u svakom slučaju pokazali jednu drugačiju sliku raspoređivanja, s određenim koncentracijama na mjestu nekadašnjeg intenzivnog

in the extensive literature dedicated to bronze axes. The most common interpretation starts from the presumption that the axes were used as weapons or tools, and then there are the authors who describe the axes, due to their incidence, as a sort of pre-monetary legal tender, and as a means of barter between communities from the Bronze Age. The role of axes in the sacrificial cult has also repeatedly been clearly stated. All these interpretations of the function of bronze axes have been often described, discussed and partially corroborated to date, so that a list of the respective literature seems unnecessary.

Why is it then that we again focus here on problems that have already been solved? We believe that the situation on Monkodonja and the degree of exploration of this site allow for an even more precise and effective explanation of these functions. When trying to prove multi-functionality, a group of objects originating from a single spot, and their representation in several variants, certainly has an advantage in comparison with individually chosen axes from different sites. And we have just such a case at Monkodonja, even though the small total number of finds makes it impossible to authenticate statistically our deliberations concerning the function of axes.

As proof that some of the axes were used to work wood or that they served as common tools, we can take the cutting edge fragments with sharpened blades, seven of them in total (Fig. 4). These pieces evoke an impression that they were lost by chance as they broke off from the blade during the use of the axe, and due to their size, they were too small to be picked up or found again. Perhaps it could also be supposed that the broken off parts from the cutting edge could have resulted from combat. However, the fact that all the fragments are uniformly small speaks against such a thesis. If the axe had indeed been used in combat, we could expect that the parts that broke off come in different sizes, and this is clearly not the case here. It is noticeable, however, that the blades and other parts of the broken or ruined axes are missing. At Monkodonja cutting edge fragments of axes are found almost on the entire area of the settlement, where they were more or less randomly strewn. This speaks in favor of the theory that these pieces were probably lost in the course of daily activities, and that a prolonged search for them just did not make much sense.

Weapon fragments would inevitably show a different picture of distribution, with certain degrees of concentrations at neuralgical places where intensive battles could be expected, for example by entrances. The presented situation on Monkodonja shows that axes were primarily used as implements, and that they were breaking as a result of metal fatigue. The larger parts that had broken off were probably collected in order to be recycled, while the smaller parts were left lying in the ground until the present.

sukobljavanja dvaju ili više protivnika. Situacija na Monkodonji pokazuje da su sjekire u prvom redu korištene kao alat i da su se u određenim vremenskim intervalima uslijed dotrajalosti materijala lomile. Veći odbici vjerojatno su skupljani i reciklirani, dok su manji dijelovi ostali ležati u zemlji sve do naših dana.

Nesporni dokaz da su neke sjekire korištene i kao oružje u borbi nudi nam potpuno očuvana sjekira sa zaliscima (sl. 3). Ovaj nalaz potječe iz velikog zida oko akropole, nedaleko od sjeverozapadnog kuta, gdje je ležao na dubini od oko 10 cm, prekriven urušenim ostacima fortifikacije (sl. 7). Položaj sjekire na oko jedan metar iznad samog temelja zida isključuje mogućnost da se radi o nekom žrtvenom objektu posvećenom samoj gradnji obrambenih zidina. Uostalom, ona bi u tom slučaju bila lako dostupna i samim time uklonjiva. U ovaj položaj sjekira je mogla dospjeti samo iznenadnim pomicanjem viših dijelova zida, koje bi najvjerojatnije uslijedilo tijekom sukoba. Time je sjekira ostala zatrpana upravo na onome mjestu gdje je i bila korištena kao oružje.

Je li vlasnik oružja bio napadač ili branitelj i zbog čega ovaj dragocjeni predmet nije sklonjen prije samog urušavanja zida, pitanja su o kojima samo možemo nagađati. Pozicija na vanjskoj strani zida prije će upućivati na napadača. Ako odemo korak dalje, a znajući da ovaj tip sjekire, kako smo pokazali, potječe vjerojatno s prostora sjeverno od Istre, odnosno iz današnje Austrije, možemo pretpostaviti da je vlasnik sjekire bio napadač s tog, sjevernijeg područja. Sigurno je da sjekira nije ostala ležati prilikom posljednje borbe, nakon koje je uslijedilo napuštanje naselja. Naime, dio zida u kojem je pronađena pripada prvoj većoj nadogradnji fortifikacije oko akropole naselja. Nakon ove faze slijedila je vjerovatno još jedna faza nadogradnje, prilikom koje međutim nisu uklonjeni svi ostaci građevinskog materijala/šute. Ovo opažanje baca posebno svjetlo na funkciju i kvalitetu ovoga zida, s obzirom da je zbog šute s vanjske strane njegova obrambena moć u kasnijim fazama svakako već bila značajno umanjena.

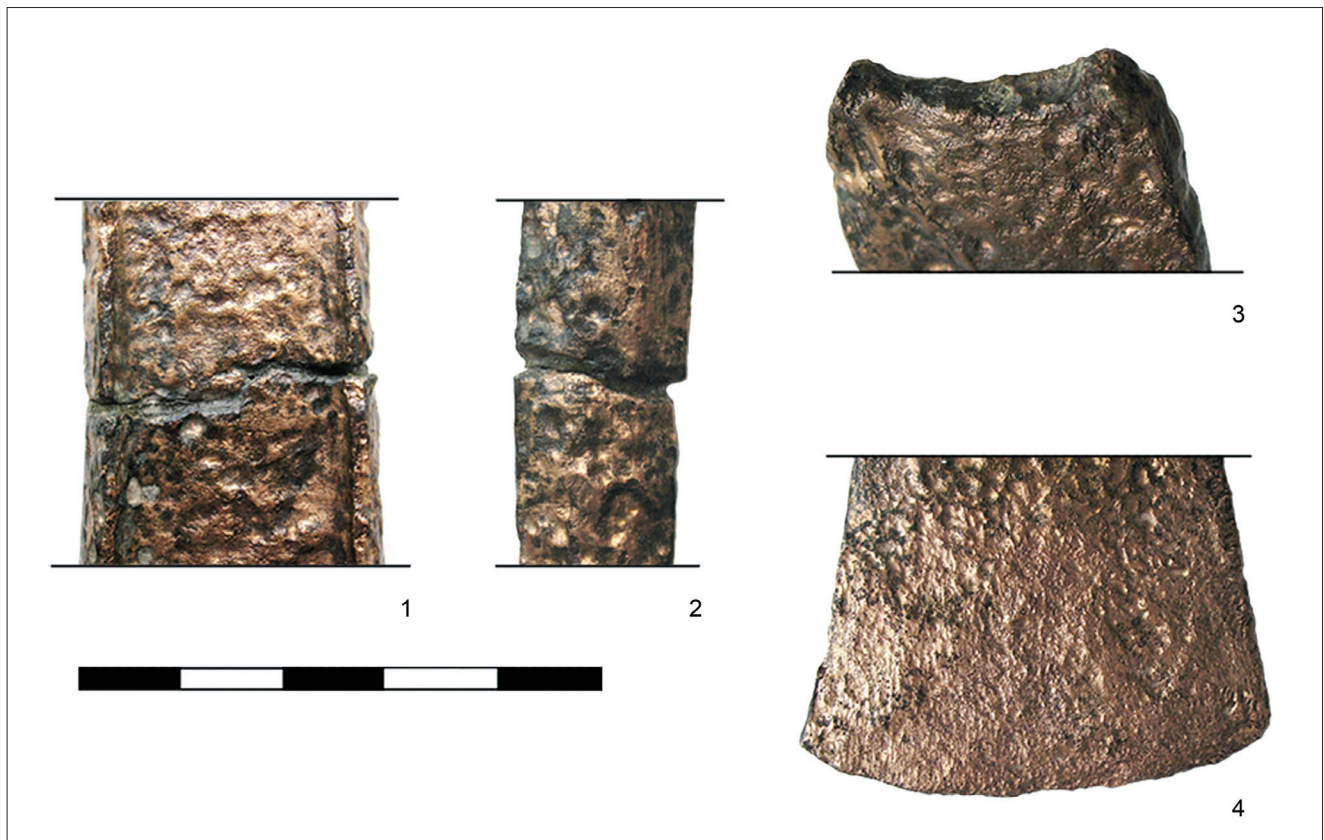
Kao što smo već pokazali, ova u borbi izgubljena sjekira može se okvirno datirati u 14. st. pr. Kr. Ovom datumu u potpunosti odgovaraju i radiokarbonski rezultati dobiveni iz proba uzetih sa zida. Time dobivamo pouzdan *ante quem* datum za izgradnju i proširenja obrambenog zida akropole. U ovo vrijeme pada dakle nasilno uništavanje i potonja obnova zida. Radi se o još jednom dokazu koji jasno pokazuje da je život u naselju bio prožet nasilnim sučeljavanjem i da su takve akcije bile dio svakodnevnice ondašnjih stanovnika.

A completely preserved winged axe (Fig. 3) offers undisputable proof that some axes were likewise used in combat as weapons. This find stems from the great wall around the acropolis, not far from the northwestern corner, where it was located at a depth of approximately 10 cm, covered with the caved in remains of the fortification (Fig. 7). The position of the axe, approximately one meter above the foundations of the wall excludes the possibility that we are dealing with a sacrificial object that was dedicated to the construction of the defensive walls itself. Only a collapse of the higher sections of the wall could have resulted in this position of the axe, which was in turn a consequence of combat. The axe thus remained covered in the vicinity of the spot where it was used as a weapon.

Was the owner of this weapon an invader or a defender, and why hasn't he removed this valuable object before the collapse of the wall – these are questions about which we can only surmise. The position on the exterior side of the wall speaks in favor of an invader. And if we go a step further, knowing that this type of axe, as we have demonstrated, probably stems from an area to the north of Istria, perhaps from present-day Austria, we can presume that the owner of the axe was an invader from this region further to the north. We suppose that the axe was not left there during the last battle that was followed by a desertion of the settlement. Namely, the section of the wall in which it was discovered belongs to the first large-scale upgrade of the fortification around the acropolis of the settlement. After this phase there follows perhaps another upgrade during which, however, not all the remains of ruins were removed. This observation sheds some light on the function and quality of this wall, considering that as a result of the rubble on the exterior side, its defensive capabilities were surely considerably diminished in the subsequent phases.

As we have already shown, this axe that was lost in combat can be dated approximately to the 14<sup>th</sup> century BC. The radiocarbon results obtained from the samples taken from the wall concur in full with this dating. By this we obtain a reliable *ante quem* date for the construction of the widened defensive wall of the acropolis. However, this is yet another proof that clearly shows that life in the settlement was permeated with violent confrontations, and that such actions were a commonplace occurrence for the inhabitants of Monkodonja at the time.

If, for an instant, we were to return to the general question regarding the functions of bronze axes, the find from Monkodonja undoubtedly shows that they were likewise used as weapons during the Middle Bronze Age period. Even though our specimen is relatively small in size (14 cm) and barely weighs 200 grams, it fulfilled as such its purpose as a weapon. Of course there is no way to deny the possibility that the axe was used for some other purpose too.



Sl. 8 Detaljni prikaz sjekire s rubnim pojačanjima; 1 = središnji dio s popravkom; 2 = isti dio, bočni pogled; 3 = tjeme sjekire; 4 = oštrica  
 Fig. 8 Photos of details of the flanged axe; 1 = central section with repair; 2 = the same section, a lateral view; 3 = the top section of the axe; 4 = cutting edge.

Ako se na trenutak vratimo općem pitanju funkcije brončanih sjekira, nalaz s Monkodonje nedvojbeno pokazuje da su one za vrijeme srednjeg brončanog doba korištene i kao oružje. Iako je naš primjerak relativno malih dimenzija (14 cm) i težine tek 200 grama, on je i takav ispunjavao svoju svrhu kao oružje. Naravno da se ne može poreći i mogućnost korištenja sjekire za neke druge namjene.

U svakom slučaju, brončane sjekire, u prvom redu primjerak s Monkodonje, dokaz su nemirnih vremena prožetih sukobima.

Neovisno o praktičnoj namjeni, sjekire su korištene i pri ritualima vezanim za prinošenje žrtve te su i na taj način mogle biti položene u zemlju. U novije vrijeme sve je uvriježenije mišljenje da su ostave sa sjekirama izraz odnosno rezultat određenih vjerovanja u kojima prevladavaju pojmovi uzajamnog davanja. O tom fenomenu postoji opširna literatura, koju na ovome mjestu nećemo posebno navoditi.

Namjerno slomljena sjekira pojačanih rubova s Monkodonje (sl. 2 i sl.8, 1-2) može se uzeti kao još jedan argument u prilog sakralnom tumačenju. Ovaj nalaz pronašao je 1955. godine Bačić u vrlo zanimljivom i neobičnom okruženju. Dva dijela prelomljene sjekire

In any case, bronze axes, and first and foremost the specimen from Monkodonja, offer proof of unstable times that were characterized by confrontations.

Regardless of the practical purpose, axes were also employed in rituals connected with sacrificial offerings, and this is yet another mode in which they could have been placed into the ground. In recent years there is an ever more deep-rooted opinion that hoards containing axes are an expression and a result of certain religious beliefs in which the notions of mutual giving are prevalent. This phenomenon is extensively described in literature that we will not mention specifically here.

The intentionally broken flanged axe from Monkodonja (Fig. 2 and Fig. 8, 1-2) can be taken as yet another argument that favors the sacral interpretation. This find was discovered by Bačić in 1955 in very interesting and unusual circumstances. Two parts of the broken axe were lying, not by chance of course, at a right angle towards each other in the middle of the flooring of an elongated building with stone foundations, marked as House 2. A fireplace was discovered on the same level with the deposited axe parts, followed by a larger concentration of snails and shells, and a clay plate (Fig. 6).

ležala su, svakako ne slučajno, pod pravim kutem jedan prema drugom na sredini podnice izduženog objekta s kamenim temeljima, označenog kao kuća 2. U istoj visini s deponiranim dijelovima sjekira pronađeno je i jedno ognjište, zatim veća koncentracija puževa i školjaka te jedna glinena ploča (sl. 6).

I sam Bačić je dijelove sjekira označio kao “zaklad”, odnosno kao ostavu, tj. rezultat namjernog deponiranja. Po našem mišljenju, ova njegova interpretacija u potpunosti je točna. Slijedom situacije u slojevima podnice dolazi se do zaključka da su dijelovi sjekire mogli biti još u vrijeme korištenja ovoga objekta bez većih problema izvađeni iz zemlje, u slučaju da je to doista bila nakana. Ovako ih moramo prije svega shvatiti kao votivne predmete u sredini centralne prostorije posebnog značenja, unutar višedijelnog objekta na akropoli naselja.

Ključna opažanja u vezi s određivanjem namjene sjekira izvedena su upravo na ova dva fragmenta (sl. 2). Prilikom restauracije patina je nažalost u cijelosti uklonjena, a dva dijela ponovno su sastavljena. Korišteno ljepilo ima međutim potpuno drugačiju boju te su konture prijeloma itekako dobro vidljive. Sjekira je, po jednim udarcem sa svake strane, prepolovljena otprilike do sredine (sl. 8, 1-2). Zanimljivo je da udarci nisu izvedeni na istoj visini pa su stoga i pukotine s obje strane odmaknute jedna od druge. Sjekira je konačno prepolovljena tek nakon dodatnog savijanja preko nekog oštrog ruba<sup>43</sup>. Ovo prelamanje, odnosno uništavanje ne može se ni u kom slučaju objasniti nekom primjenom sjekira kao oruđe ili oružje. Dijelovi sjekira morali su imati neku drugu funkciju. Po opisanoj situaciji unutar kuće može se zaključiti da su upravo dijelovi, a ne cjelovita sjekira, imali posebnu vrijednost i namjenu usko povezanu s ritualima žrtvovanja i razmjenom žrtvenih poklona.

Na ovu funkciju upućuju i ostali fragmenti sjekira s Monkodonje (sl. 5 i 9). Iako su unutar naselja pronađena još svega tri ulomka, čini nam se da nije slučajnost činjenica da su sva tri primjerka dijelovi vrata. Sva tri komada pažljivo su i očigledno s namjerom odbijena od tijela sjekire pod pravim kutom u odnosu na vertikalnu os cjelovitog predmeta. Radilo se i ovdje o najmanje dva udarca dljetom ili nekim sličnim alatom, čija je širina iznosila otprilike polovicu širine same sjekire (sl. 9, 1, dolje). Udarci su izvedeni s prednje i stražnje strane. Tako su nastale pukotine širine oštrice dljeta kojim su sjekire prelamane.

Bačić himself referred to the axe parts as “a treasure trove”, or hoard, i.e., one created as a result of intentional depositing. In our opinion this interpretation of his is entirely accurate. Under consideration of the flooring layer it could be supposed that the axe parts could have been taken away without problems even during the time when the house was still in use, if such an intention indeed existed. In this manner the axe broken into two parts could be treated as votive object in the middle of a room within the house. Therefore it indicates a special significance of this building, located on the acropolis of the settlement.

In spite of a bad preservation the key observations in determining the purpose of these axes were derived from their two constituent parts (Fig. 2). During the restoration process the patina was, unfortunately, completely removed, and two of the parts had been put together again. The glue that was used for this has a totally different color, which makes the contours of the breakage very visible. The axe was halved approximately up to the middle with a single blow on each side (Fig. 8, 1-2). What is interesting is that the blows were not executed at the same level and therefore the cracks on both sides are also different from one another. The axe was finally halved only after it had been bent over some sharp edge<sup>43</sup>. There is little probability that this breakage and destruction could be explained away as a consequence of the use of the axe as an implement or weapon. The two parts of this axe must have had some other function. In accordance with the described situation within the house, we can conclude that it was precisely these parts, and not the whole axe, which had a special value and significance, closely connected with rituals of sacrifice and exchange. The other axe fragments discovered at Monkodonja likewise point to such a function (Fig. 5 and 9). Even though merely three more fragments have been found within the settlement, we believe that it is by no means a coincidence that all three specimens are parts of the haft. All three pieces were carefully and intentionally broken off from the body of the axe under a right angle in relation to the vertical axis of the object as a whole. This too was executed with at least two blows with a chisel or some other similar implement whose width measured approximately half of the width of the axe itself (Fig. 9, 1, below). The blows were executed from the anterior and posterior sides. Thus the cracks were formed, whose width corresponds to the width of the chisel used to break up the axes.

<sup>43</sup> Glavnom restauratoru berlinskog Muzeja za prapovijest (Museum für Vor- und Frühgeschichte), gospodinu Hermannu Bornu, zahvaljujemo na korisnim savjetima i zapazanjima u vezi s načinom lomljenja sjekira.

<sup>43</sup> We thank the senior restorer at the Berlin Museum of Prehistory (Museum für Vor- und Frühgeschichte), Mr. Hermann Born, for his useful tips and observations about the method used for breaking the axes.



Sl. 9 Detaljni prikaz dijelova vrata, središnji dio sa završetkom (u sredini) i rubovi prijeloma (dolje)  
 Fig. 9 Photos of details of the axe-hafts (in the middle), the butts (above) and the breakage edges (underneath).

Po površinama udaraca može se zaključiti da su sjekire imale dvije nasuprotne pukotine, koje su mogle nastati samo u namjeri da se sječivo i vrat razdvoje s dva, ne baš u potpunosti paralelna udarca (sl. 9, 1-2 dolje). Na fotografijama (sl. 9, 1-3) jasno su vidljiva i zadebljanja na rubovima rascjepa. Vjerojatno se radi o posljedicama udaraca u cilju zbijanja samog materijala.

Može se svakako konstatirati da su brončane sjekire na Monkodonji redovito lomljene po točno određenom principu te da su tako dobiveni dijelovi očito korišteni u neke druge svrhe, različite od svrhe samih sjekira.

Da se ne radi o izoliranom primjeru svjedoči između ostalog i publikacija s 53 ilustrirane tabele posvećene najvećoj do sada poznatoj ostavi Bologna S. Francesco, koja broji ukupno 1.800 predmeta, težine nešto više

According to the surface of the blows, we can conclude that the axes had two opposite cracks that could have been created only if the intention was to sever the haft from the rest of the axes with two, not entirely parallel blows (Fig. 9, 1-2, below). The thickened areas on the edges of the cleft are clearly visible on the photographs (Fig. 9, 1-3). These are most probably the consequences of blows whose aim was to compress the material itself. One can establish that bronze axes at Monkodonja were broken on a regular basis and following an exactly determined pattern, and that the thus obtained parts were obviously used for some other purposes that differed from the use of the axes themselves.

This was by no means an isolated case, as is clear from a publication that includes 53 illustrated tables dedicated to the presently biggest known hoard of Bologna S. Francesco,



od 1.400 kg<sup>44</sup>. Dijelovi sjekira zastupljeni su u ovom nalazu u čitavim serijama. Tako veliki broj ulomaka nije moguće objasniti dotrajalošću ili redovnim zastarijevanjem materijala, već se ovdje svakako radi o intencijski slomljenim predmetima posebne namjene. Dakako da je ovaj fenomen već odavno poznat u arheološkoj literaturi, navodimo to samo kao još jedan primjer običaja razbijanja šupljih sjekira na četiri dijela, karakterističnog prije svega za jugoistočnoeuropski prostor<sup>45</sup>.

Dva dijela odbijenog vrata (sl. 5, 1-2) razdvojena su od tijela sjekira očigledno u samoj blizini početka rubnih pojačanja ili zalistaka, odnosno na mjestu gdje se sjekira proširivala. Uočljiva zadebljanja duž rubova udarca ostavljaju dojam da su nastala kao posljedica jednog jakog udarca. Kod jednog komada primjetno je i glačanje duž ruba pukotine. Oštri rubovi loma kao da su ovdje izlizani i zaobljeni mnogostrukim korištenjem odnosno dodirivanjem predmeta, mada je također moguće da se radi i o posljedicama korozije. Svakako je intrigantna pomisao da su rubovi otupili uslijed čestog dodirivanja predmeta i dodavanja iz ruke u ruku te da su eventualno korišteni kao neka vrsta mjerila za vrijednost metala koji se razmjenjivao.

Ako pogledamo težinu svih ulomaka, uočiti ćemo prvo da su dva naoko slična komada (sl. 5, 1-2) ujedno i približno jednake težine. Ondašnjim majstorima uspjelo je tako ih odbiti da je razlika među njima manja od 5 grama. Nadalje, uočljivo je da težina trećeg fragmenta s pojačanim rubovima (sl. 5, 3) iznosi do u drugu decimalu točno dvostruku vrijednost jednog sljedećeg ulomka teškog 38,7 grama (sl. 5, 2). Točno pet puta toliko iznosi težina cjelovite sjekire s pojačanim rubovima, a sjekira sa zaliscima je nešto manje od sedam puta teža od ove vrijednosti. Radi li se ovdje doista samo o pukim slučajnostima? Broj naših predmeta svakako je premalen da bismo mogli pristupiti izradi nekog mjernog sustava, no to ni u kom slučaju ne treba isključiti kao mogućnost. Kao primjer da se pri proučavanju metalnih nalaza svakako treba s posebnom pozornošću osvrnuti i na težinu i moguće mjerne sustave, navest ćemo studije R. Peronija o ostavama i mogućim kombinacijama u vezi s težinom pojedinih nalaza<sup>46</sup>.

Uzimajući u obzir tri navedene činjenice, kao prvo da su sjekire namjerno i ciljano lomljene, zatim da su među fragmentima isključivo zastupljeni dijelovi vrata i na koncu da su među ulomcima prisutni izvjesni težinski odnosi, nameće se pomisao o nekoj vrsti normirane

which numbers 1,800 objects in total, weighing more than 1,400 kg<sup>44</sup>. This discovery consists among others of whole series of axe fragments. It is not possible to explain such a large number of fragments with wear or material fatigue, and it is beyond doubt that these special purpose objects were broken intentionally. This phenomenon has been known, of course, for a long period of time now from archaeological literature. We only cite additionally one other example of a custom of breaking socketed axes into four parts, characteristic mainly for the southeastern regions of Europe<sup>45</sup>.

Two parts of the broken off haft (Fig. 5, 1-2) were severed from the body of the axes in the immediate vicinity of the beginning of edge reinforcements or wings, and on the spot where the axe widened. The noticeable thickenings along the edges of the blow leave an impression that they were created as a consequence of a strong single blow. On one of the pieces we observed traces of burnishing along the edge of the crack. It seems as if the sharp breakage edges were worn out and rounded here as a consequence of multiple use and touching of the object, even though it is possible that we are dealing with the effects of corrosion. Nonetheless, the idea that the edges became blunt as a result of frequent touching of the objects, from their being passed from hand to hand, and that eventually they were used as a measure of sorts to gauge the value of the metal that was bartered, is indeed intriguing.

Considering the weight of the fragments it is noticeable that two of the pieces that are similar at first sight (Fig. 5, 1-2), also have approximately the same weight. The craftsmen of that time succeeded in breaking them off in such a way that the difference between the two amounts to less than 5 grams. Furthermore, we noticed that the weight of the third fragment featuring reinforced edges (Fig. 5, 3), amounts to up to a second decimal point exactly the double value of a further fragment that weighs 38.7 grams (Fig. 5, 2). The entire flanged axe weighs exactly five times as much, while the winged one is a little less than seven times heavier than this value. Are we dealing with mere coincidences here? The number of our objects is indeed too small to begin working on some kind of measurement system; however, this should by no means be excluded as a possibility.

To illustrate that it is also necessary to pay special attention not only to weight but also to possible measurement systems when studying metal finds, we will cite the treatises that R. Peroni wrote on the subject of hoards, and the possible combinations tied with the weight of individual finds<sup>46</sup>.

<sup>44</sup> Zannoni 1888.

<sup>45</sup> Wanzek 1998., 158-169

<sup>46</sup> Peroni 1998.

<sup>44</sup> Zannoni 1888.

<sup>45</sup> Wanzek 1998, 158-169.

<sup>46</sup> Peroni 1998.

vrijednosti, tj. o točno određenom razmjenskom dobru ili kraće rečeno o novcu. Korištenje dijelova sjekira za sličnu namjenu uočili su primjerice i N. Trampuž-Orel i D. Heath za nešto kasnije nalaze s kraja kasnog brončanog doba<sup>47</sup>.

Na kraju bismo još jednom rezimirali ono što smo u ovom članku pokušali istaknuti. Sjekire i njihovi dijelovi u raznim veličinama i oblicima pronađeni na Monkodonji nisu svi posljedica svakodnevne uporabe i jednostavnog lomljenja dotrajalog materijala. Selektivno korištenje sjekira uzrokovalo je i različite načine na koji su predmeti dospjeli u zemlju: odbijeni manji dijelovi oštrica dokazuju čestu primjenu sjekira kao radnog alata. Sjekira pronađena u obrambenom zidu dokazuje da su čak i manji primjerci mogli biti korišteni kao oružje. Konačno, postoji niz argumenata koji govore u prilog tome da su dijelovi vrata sjekira korišteni kao neka vrsta premonetarne jedinice pri razmjeni dobara te da su na taj način višestruko rabljeni, kako u gospodarske, tako i u žrtvene svrhe.

Taking into consideration the three mentioned facts, firstly, that the axes were intentionally broken with a purpose in mind, that only parts of the haft are represented among the fragments, and lastly, that certain weight-based relationships exist between the fragments, the thought of some sort of standardized value comes to mind, i.e., an exactly defined exchange good, or to put it simply – money. The use of axe fragments for a similar purpose, for example, was also observed by N. Trampuž-Orel and D. Heath on somewhat later finds from the end of the Late Bronze Age<sup>47</sup>.

Finally, let us once again summarize what we have tried to demonstrate in this article. All of the axes and fragments that were in different sizes and forms discovered at Monkodonja, were not a consequence of daily use and simple material fatigue. A selective use of these axes was responsible for the different ways in which these objects had ended in the ground: the smaller, broken off parts of cutting edges tell us that the axes were often used as working implements. The axe discovered in the defensive wall proves that even the smaller specimens could have been used as weapons. Finally, there is a whole series of arguments that speak in favor of haft parts of axes being used as some kind of pre-monetary unit for the exchange of goods, which was used repeatedly either for economic or sacrificial purposes.

<sup>47</sup> Trampuž-Orel, Heath 1998.

<sup>47</sup> Trampuž-Orel, Heath 1998.

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