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WORKINGMAN'S DEATH – BURIALS OF BRONZE AGE COPPER PRODUCERS IN EASTERN SERBIA

Mario GAVRANOVIĆ¹  – Aleksandar KAPURAN² 

This paper discusses metal-producing Bronze Age societies in East Serbia with a particular focus on the associated urn cemeteries of local copper producers. As recent investigations have revealed, copper production sites and the associated urn cemeteries are significantly older (EBA-MBA) than previously assumed. The study delves into the complexity of resource exploitation, technological processes, and socio-economic implications associated with copper mining and smelting. Initially seen as a source of wealth and prestige, current archaeological evidence suggests that direct enrichment and significant prosperity from copper production was limited and at least debatable. Despite their extensive engagement in copper production, communities in the territory of today's eastern Serbia show minimal signs of social hierarchy or wealth accumulation, as their archaeological record reflects communal burial practices and egalitarian societal structures. In contrast, neighbouring regions exhibit opulent metal objects that highlight disparities in socio-economic dynamics.

A tanulmány kelet-szerbiai fémelőállító társadalmakat vizsgál, különös tekintettel a helyi rézelőállításban aktív egyének urnasírhaira. Amint azt a legújabb kutatások megmutatták, rézelőállító helyszínek és az azokhoz köthető urnatemetők jóval régebbiek (korai és középső bronzkor) a korábban feltételezetténél. A tanulmány a rézbányászat és -olvasztás kapcsán elemzi a nyersanyagkitermelés komplexitását, technológiai folyamatokat és szocioökonómiai vonatkozásait. Bár korábban a vagyon és a presztízs forrásaként azonosították, az új régészeti bizonyítékok fényében a réztermelés közvetlen hatása a vagyonosodásra és prosperitásra korlátozott és legalábbis vitatható. Réztermelésbe való kiterjedt bekapcsolódásuk ellenére a mai Kelet-Szerbia területén élő közösségekben minimális jelei látszanak a társadalmi hierarchiáknak vagy a vagyonfelhalmozásnak, mivel régészeti hagyatékuk közösségi temetkezési szokásokat és egalitáriánus társadalmi struktúrákat tükröz. Ezzel ellentétben a szomszédos területeken gazdagon találunk fémtárgyakat, amelyek a szocioökonómiai folyamatokban az egyenlőtlenségek szerepére hívják fel a figyelmet.

Keywords: Bronze Age, copper smelting, Balkans, urn cemeteries, metallurgy

Kulcsszavak: bronzkor, rézöntés, Balkán, urnás temetők, fémművesség

In memory of Michael Glawogger (1959–2014)

Introduction

Access to resources and their exploitation are often seen as catalysts of wealth and affluence for prehistoric communities. In the case of the Bronze Age, this mainly applies to raw materials such as copper and tin needed for the production of both everyday and exceptional, prestigious objects. The bronze al-

loy shaped our continent for more than 2,000 years and facilitated the development of crafts, arts, warfare, trade, and long-distance connections between different societies (Pare 2000; Kristiansen, Larsson 2005; Harding 2013; Earle et al. 2015; Vankilde 2016). Bronze finds and their extraordinary appearance and abundance represent one of the standard criteria when it comes to determining leading and

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outstanding personalities and groups on a local, regional, or supra-regional scale. The enormous demand for copper during the later stages of the Bronze Age often led to the quick assumption that the production and control over this commodity may also represent a source of wealth accumulation and enrichment. Yet, the circumstances appear to be far more complex than the simplified model, according to which the discovery and exploitation of mineral deposits and the production of copper imply the prosperity of the communities directly involved.

Our current knowledge of Bronze Age mining, copper ore processing, metal trading, and the social implications of metallurgy is mainly based on extensive research in the Alpine region (Eibner 1982; Stöllner et al. 2004; Stöllner et al. 2011; Kienlin 2014; Pernicka et al. 2016). Thanks to the long research history, the metallurgical *chaîne opératoire* from the ore to the finished copper product, including ore mining, beneficiation, crushing, grinding, water separation, roasting, and repetitive smelting and extracting, can be well reconstructed for the Alpine area (Eibner 1982; Metten 2003). The fact that the smelting places were situated in the vicinity of mining areas indicates that miners and smelters were, if not the same people, then at least specialised members of the same communities (Shennan 1995, 300). Thanks to the well-documented smelting places like Jochberg (Northern Tirol) or Mühlbach (Mitterberg) (Goldenberg 2004, 165; Herdits, Löcker 2004, 177), the technological aspects of copper production in this particular area are described in detail. The socio-economic organisation of Bronze Age copper mining and smelting communities in the Alps has also been the focus of several studies. Considering the early occupation of Alpine valleys, it is thought that mining may have been first a supplementary and occasional activity of the agricultural societies (Kienlin, Stöllner 2009, 90). The subsequent, more intensive exploitation of copper ore may have triggered the establishment of fortified settlements in the Early Bronze Age (Krause 2009, 47). The foundation of hillforts like St. Veit-Klinglberg and Götschenberg in the Salzach Valley or Bartholomäberg in Vorarlberg demonstrates the need for protection and indicates possible rivalry (Lippert 1992; Shennan 1995; Krause 2009). The existence of fortified settlements also raises the question of whether mining communities in the Alps were organized hierarchically, with hillforts as con-

trolling strongholds (Kienlin, Stöllner 2009; Krause 2009) or relatively egalitarian with no central power over access to deposits, production, and distribution (Shennan 1995; Kienlin, Stöllner 2009). The results of botanic and faunal material analysis from settlement sites like St. Veit-Klinglberg (Shennan 1995) or the Mauken mining district in the Lower Inn Valley (Schibler et al. 2011) suggest that most of the food for miners and smelters was brought from outside. This leads to the assumption that metal-producing communities were dependent on exchange or trade with nearby agrarian settlements. In consequence, the agrarian settlements were also the primary and first customers of the metal products from the mining areas (Bartelheim 2007). The current archaeological record provides no indications that copper ore processing yielded significant wealth among operating Early and Middle Bronze Age groups in the Alpine regions and eventually caused social stratification. In contrast, evidence of prosperity and abundance in terms of rich graves and prestige metal objects is found more frequently among agrarian societies of the Alpine forelands (Bartelheim 2007, 211). With the significant increase in copper production during the Late Bronze Age (Eibner 1982; Bartelheim 2007; Pernicka et al. 2016), the first signs of the social hierarchy in terms of richly equipped graves or hoards started, however, to appear also in the mining and smelting districts (Sperber 2004), with the cemetery of Vomp in the Inn Valley as one of the most impressive examples (Sölder 2007; Sölder 2009). Social and economic wealth was nevertheless still clearly concentrated in the communities settled in the agrarian forelands which are further distributors of copper and thus main beneficiaries, (Winghart 2000; Sperber 2004; Bartelheim 2007). As a primary subsistence provider for mining communities, agrarian settlements in the forelands must have been closely linked with miners and smelters in the higher mountainous areas to the extent that they also might represent the same community, yet with different specialisations.

The comprehensive research in the Late Bronze Age gold mine and associated settlement in Ada Tepe in Bulgaria also provided a similar picture, pointing at the relatively lower socio-economic status of groups and individuals involved in the exploitation of precious metals (Popov et al. 2017). Moreover, it has been attested that most of the time, the settlement of gold producers had a seasonal character with relatively simple houses and no traces of multi-

layer buildings. The distribution of the final products from Ada Tepe remains, however, still unknown. At this stage of investigations it is still unknown who distributed the gold from Ada Tepe and which individuals of group gained wealth out of this trade.

Noteworthy are also investigations in western Transylvania in the Apuseni Mountains with large deposits of copper, gold, silver, and evidence of ancient mining (Ciugudean 2012; Ciugudean, Thomas 2020). Although most of the mining traces are from later periods (Roman time), there is also evidence of prehistoric occupation of the area, yet no details about Bronze Age mining and smelting exist at the time. However, detailed landscape and catchment analyses of the registered Bronze Age sites concerning accessibility to the metal sources and land use demonstrated that the local communities prioritised positions favourable for agriculture and control of trade routes (Quinn, Ciugudean 2018). Hence, the access and control of local ores had a subordinate role in the settlement organisation. One should nevertheless add that the Bronze Age mining in smelting in this particular area, despite the abundant deposits, is still just an assumption as tangible data is lacking.

The examples from different European regions suggest that Bronze Age mining and metal-extracting communities, regardless of the kind of metal they produced, did not significantly advance in economic prosperity, at least judging by the available archaeological record. In the case of western Transylvania, the metal source itself appears to be not decisive for the prehistoric occupation strategies.

What is, however, missing in the case of Alpine copper producers or gold producers from Ada Tepe are associated cemeteries, which would offer a more substantial insight into metal-producing populations. Although restricted by beliefs, ritual practices, and deposition patterns, burials and burial gifts often serve as a good starting point for hypotheses about the possible socio-economic complexity. An excellent opportunity to investigate the burial practices of Bronze Age copper producers is given in the region of East Serbia. As the results of our recent research in this region showed, previous assumptions about the Late Bronze Age dating of settlements with clear traces of copper smelting and associated urn cemeteries (Jovanović, Janković 1996; Jovanović 1999) require a considerable revaluation and reinterpretation in terms of chronology, copper extracting technologies, and cultural contextualisation.

Copper producers in East Serbia

Situated between the Rivers Danube in the North, Timok in the East and Morava Valley in the West, East Serbia is well known for its abundant copper ore deposits, which are exploited until the present day (Fig. 1). This region is regarded as the cradle of metallurgy in Europe, with traces of intensive copper ore exploitation dating back to the final Neolithic and Early Copper Age with a well-known site Rudna Glava, discovered by B. Jovanović in the 1960s and being intensively studied and discussed in the following decades (Renfrew 1969; Jovanović 1980; Glumac, Todd 1991; Pernicka et al. 1993; Borić 2009). The more recent investigations of nearby settlement sites, such as Belovode, demonstrated that the local Late Neolithic or Early Copper Age communities of Vinča culture were not involved only in mining but also in the extraction of copper (Radivojević et al. 2010; Radivojević et al. 2021). Judging by the radiocarbon dates, the peak of this first stage of copper ore mining and extraction in Eastern Serbia spans between 5500 and 4500 BC, with only a few singular dates indicating later activities (3500–2500 BC) (Borić 2009; Marić et al. 2021). As the comprehensive analyses of the Vinča culture metallurgical sites Belovode and Pločnik revealed, the pioneering copper metallurgy had almost no impact on social stratification in terms of complexity, wealth accumulation or possible centralisation (Porčić, Nikolić 2021, 480; Radivojević, Roberts 2021, 616). It should be, however, noticed, that most of the estimations on social complexity and demography of Vinča communities engaged in metallurgical production were made based on settlements, while the associated burial grounds remained, to a large extent, unknown.

Until the late 1980s, little was known about the Bronze Age developments in Eastern Serbia. First insights were provided with the investigation of the site Trnjane, about 5 km to the west of the city of Bor. The numerous finds of copper slags and the pottery on the surface led to the excavation of the site located on a natural terrace without any signs of fortification (Fig. 2). The results from eight smaller trenches with a cultural layer of 40–50 cm confirmed the existence of a single-phase Bronze Age settlement (remains of house floors, pits, pottery and stone tools). The course of the investigation at Trnjane changed in 1987 with the discovery of the urn cemetery immediately east of the settlement area. In the following years, B. Jovanović, the leader of investigations,



Fig. 1. Map with the sites in East Serbia (map by I. M. Petschko)

1. kép. Kelet-szerbiai lelőhelyek térképe (I. M. Petschko térképe)

excavated the urn cemetery with 43 graves, characterised by circular stone constructions of a diameter between 1.5 and 4 meters and an urn placed in the central part (Jovanović, Janković 1996; Jovanović 1999; Gavranović et al. 2020; Kapuran et al. 2020). Such burial practice was, up to that point, unknown in East Serbia, while some analogies considering the

shape of urns prompted Jovanović to link the Trnjanje site with the Late Bronze Ages Paraćin culture in the middle Morava Valley (Jovanović, Janković 1996; Vasić 2013). Apart from urns, the graves contained only a small number of other finds, including ladle-shaped cups or lamps, spindle whorls, and one knife with distant analogies in the Aegean (Parović-



Fig. 2. Position of the sites Trnjane and Hajdučka Česma (map by Thomas Urban)
 2. kép. Trnjane és Hajdučka Česma lelőhelyek topográfiai helyzete (Thomas Urban térképe)

Pešikan 1995; Hänsel, Teržan 2000, Type IIb). Summarising his work on Trnjane, B. Jovanović argued for the Late Bronze Age dating of the site (14th–11th centuries BC) and underlined the, in his opinion, close ties with the burial practice of the neighbouring Urnfield Culture (Jovanović, Janković 1996; Jovanović 1999). The later reevaluation of the finds from Trnjane, including the knife mentioned above (Hänsel, Teržan 2000, 178), and new excavations in the settlement area clearly showed that the dating, as proposed by Jovanović, is not correct (Kapuran et al. 2020). The radiocarbon dates from the settlement and a couple of graves, including the one with a knife, confirmed that the settlement and the associated cemetery date to between the 19th and early 17th centuries BC or in the transition between the Early and Middle Bronze Age. Herewith, the previous assumption about the Late Bronze Age dating of Trnjane can be discredited.

The numerous finds of different slag types from the older and new excavations in Trnjane have demonstrated a strong engagement of the local population in copper smelting and extraction (Mehofer et al. 2021). However, smelting installation could not be

attested due to the modern destruction. Judging by the different slag shapes and sizes, it is assumed that the extraction of the metal involved at least three different technological steps, which all took place within the wider settlement area. There is also little doubt that the adjoining urn cemetery represents the burial ground of the copper-producing population in Trnjane. The results of the anthropological analyses showed the presence of all age groups, indicating the communal character of the graveyard (Kapuran et al. 2020).

In the time after the discovery of Trnjane, several urn cemeteries of the same appearance with circular stone constructions and urns in the central part were unearthed in the same region around the city of Bor (Fig. 1) (Kapuran, Miladinović-Radmilović 2011; Kapuran et al. 2013; Kapuran et al. 2017). Sites such as Borsko Jezero or Krivaljski Kamen exposed not only the same type of grave architecture as in Trnjane but also a very similar repertoire of urn shapes and a conspicuous lack of grave goods. At the same time, ongoing and more recent research identified a number of settlement sites in the same area, all of them with finds (slags) pointing at copper smelting activities and a pot-

tery spectrum resembling the one from Trnjane. Particularly to highlight are Ružana and Čoka Njica sites, with remains of smelting installations and radiocarbon dates corroborating the dating into the period between the 19th and 17th centuries BC (Kapurán 2019; Mehofer et al. 2021; Gavranović et al. 2025).

Even more profound insight into the copper-producing population of this area was provided by the investigations at the urn cemetery of Hajdučka Česma. The site is located just 1.5 km west of Trnjane and extends over the natural terrace right next to the creek Brestovačka Reka (Fig. 2).

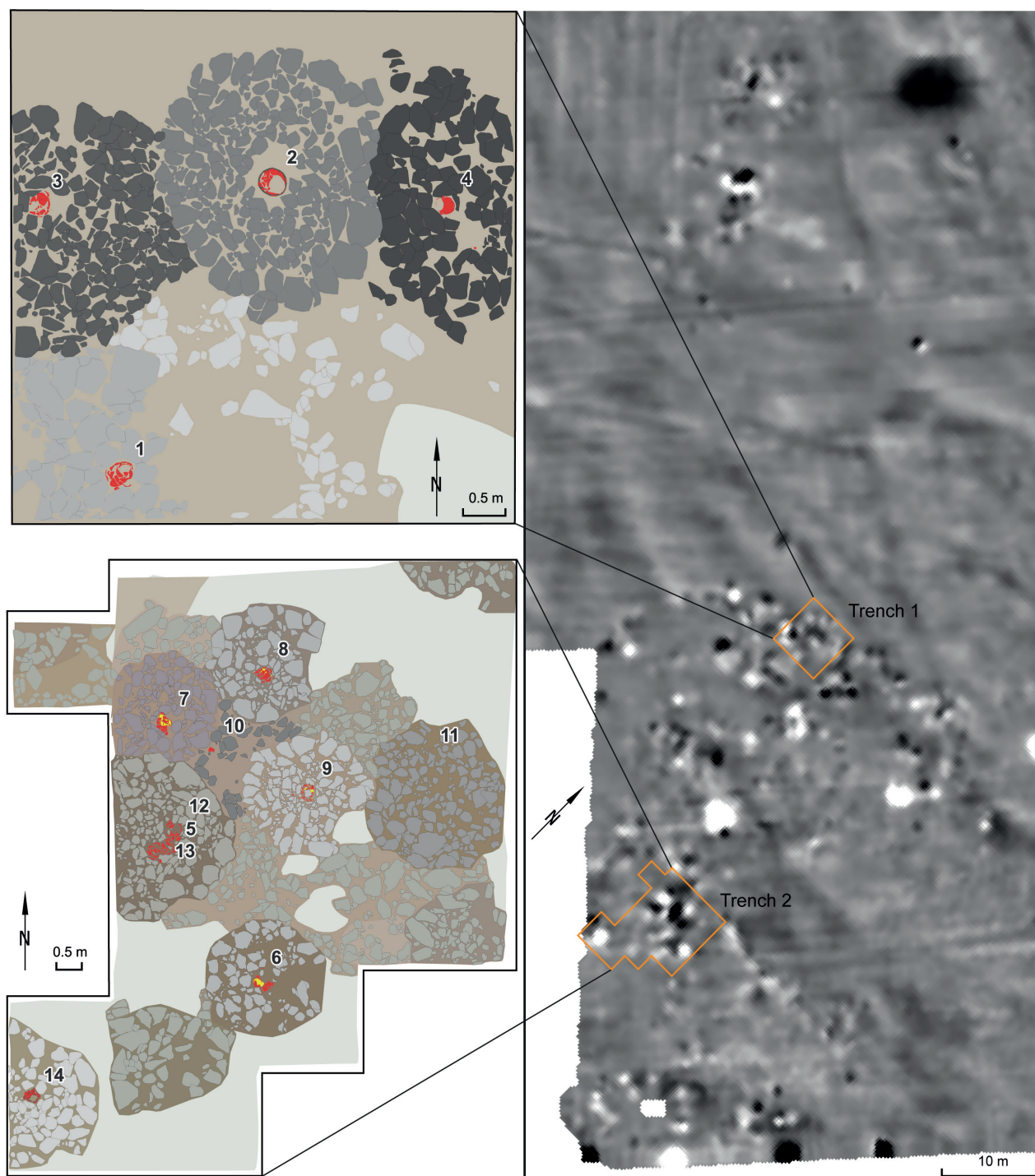


Fig. 3. Results of the geophysical survey at the site Hajdučka Česma and two excavated trenches with circular stone constructions (figure by I. M. Petschko)

3. kép. A Hajdučka Česma lelőhely geofizikai eredményei és a két feltárt szelvény kör alakú kőkonstrukcióval (I. M. Petschko képe)

Finds of three urns in 1992 hinted at the existence of the cemetery. The geophysical prospecting in 2017 revealed a large area with numerous bipolar anomalies (Fig. 3). Subsequent excavations in 2018 and 2019 gave evidence that the bipolar anomalies are, in fact, grave constructions of the same shape and appearance as was the case in Trnjane, Borsko Jezero or Krivaljski Kamen. Based on excavation results, which thus far brought to light 14 graves, the burial ground includes at least 80 further stone constructions in a dense arrangement.

The urns were regularly placed in the central part of the stone construction and put either in a small pit or on the stone slabs and finally covered with large stones (Fig. 4). As the stones, some of them weighing over 50 kilos, are not present in the geological underground, most of the building material for the grave constructions was most probably brought from the nearby riverbed of Brestovačka Reka. The unearthed urns were mainly well preserved and could be fully reconstructed, showing a variety of forms and even some decorations in the shape of grooved garlands (Fig. 5). The majority of the stone circular construction was built only for one urn, with a notable exception of one construction with three urns (Graves 5, 12 and 13). Such multiuse represents a novum among the uncovered graves in Eastern Serbia and hints at the possible use of a single construction as a burial place for families or particular social groups.

The results of anthropological analyses identified the presence of all body parts in the urns. The cremated remains were mainly whitish and calcinated, pointing to a high burning temperature (800 C°) on the pyre (Gavranović et al. 2020). Except for Grave 2, which is also the only one with a lid on the urn (reverted cup) and the remains of two individuals (Ju-

venis 13–17 years and Infans 1b 3–7 years), all other urns contained cremated bones of one individual (Fig. 5). In the course of the post-fieldwork micro-excavation of the urns, we also observed a tendency of vertical anatomical layering of body parts, starting with the skull fragments at the top, followed by the upper body and the lower limbs. Comparable with nearby Trnjane, all age groups appear to be buried in the cemetery of Hajdučka Česma. Noteworthy is, however, a smaller cluster in Trench 1 (Graves 1–4) with graves of predominately younger individuals (3–17 years, including two Infants) (Gavranović et al. 2024a).

The repertoire of grave goods from Hajdučka Česma is, as in Trnjane, modest and includes differently shaped spindle whorls, ladle-shaped cups, and one sewing pin (Fig. 6). The grave goods are found both inside and directly beside the urns. On the fringe of the circular stone constructions, fragments of beakers, jugs, and larger cups have been found – probably the remains of funerary feasts and gatherings. Taking into account the appearance of the grave constructions and cemetery arrangement, it remains an open question whether the stone burial monuments were visible during the use of the cemetery. The excavations provided no evidence of tumuli or other significant covering of graves, yet the possibility that more recent surface transformation activities (e.g., modern farming) could altered the topography of the site cannot be excluded. At the current stage, we assume that the graveyard was well visible and had an important role in the local Bronze Age landscape. One further intriguing feature in Hajdučka Česma is the group of isolated geophysical anomalies in the northern part of the geophysically prospected area (Fig. 3). According to the results from



Fig. 4. Hajdučka Česma, Graves 2 and 7 (figure by Mario Gavranović)
4. kép Hajdučka Česmaról származó 2. és 7. sírok (fotó: Mario Gavranović)



Fig. 5. Urns from Hajdučka Česma (figure by Thomas Urban)
 5. kép. A Hajdučka Česma-i urnák (fotó: Thomas Urban)

the first two trenches, the anomalies almost certainly represent very similar grave constructions, which are, however, for some reason clearly separated from the main part of the cemetery. The upcoming field investigations will specifically target this grave group.

The radiocarbon dates indicate that the cemetery of Hajdučka Česma was actively in use during the 19th and 18th centuries BC (Gavranović et al. 2025). Both cremated bones and charcoal from the urn pointed to this time with very few deviations between the dates from the bones or charcoal. Regardless of possible pitfalls when it comes to radiocarbon dating of cremated remains, the cemetery of Hajdučka Česma is essentially simultaneous with nearby burial grounds of the same type in Trnjane, Borsko Jezero and Krivaljski Kamen, and it can doubtlessly be associated with copper-producing Bronze Age population of this particular area. The contemporary settlement sites with abundant traces of copper production, such as Trnjane, Ružana or Čoka Njica, are all located in the immediate vicinity. The connection between Hajdučka Česma and settlements of copper producers is attested not only by the radiocarbon dates but also by the remarkable resemblance in material culture with common pottery forms (cups,

beakers) and technology of pottery productions (colour, tempering, surface).

Even though only a smaller part of the cemetery has been excavated, the present results lead to the assumption that Hajdučka Česma represents, similar to nearby Trnjane, a communal burial ground. The presence of all population groups and the relative uniformity of grave architecture, regardless of the age or grave belongings, indicate more or less uniform post-mortem treatment of deceased community members. Moreover, the graves from Hajdučka Česma support the previous observations about almost non-existent or not pronounced social stratification among the copper producers in Eastern Serbia. Finds of finished, alloyed metal objects are not only rare in Bronze Age settlements and graves but also do not occur as single or hoard finds within this region. The Museum in Bor stores only a handful of bronze objects from the entire area, including two socketed axes, two knives, and several pins (Jovanović et al. 2018, 22). Hence, despite the strong engagement of the local population in copper production, the alloying of the metal and casting of the objects were performed by communities in other regions. To stress is also the fact that none of



Fig. 6. Finds from urn graves in Hajdučka Česma (figure by Thomas Urban)
6. kép. A Hajdučka Česma-i urnasírok leletei (fotó: Thomas Urban)

the settlements with evidence of copper production has been fortified, pointing to a non-existent rivalry among local groups and a very low need for protection despite the production of raw materials.

Neither settlements nor associated urn cemeteries in Eastern Serbia signal the existence of any kind of centralised power or authority of specific individuals or groups who could potentially have a supreme role in the process of copper ore processing and further disposition of the raw material. The archaeological record currently provides no evidence that copper-producing communities gained from metal production and accumulated significant wealth as expressed in metal objects or other prestigious commodities and goods. There are also no signs that access to resources and technology was restricted by any means, making the Bronze Age communities in Eastern Serbia a promising candidate in the discussion about prehistoric egalitarian societies (Mann 1986; Paynter 1989; Earle, Kristiansen 2010).

Copper distribution

The striking absence of finished bronze objects and the widespread small-scale copper production in almost every documented Bronze Age settlement in Eastern Serbia both underline the fact that metal was almost certainly not extracted and smelted for the requirements and needs of local communities. But who was the recipient or customer of the fresh copper from Eastern Serbia? Where did alloying take place, and which finished objects were made out of the copper raw material produced in the above-mentioned settlements, such as Trnjane, Ružana or Čoka Njica? The first crucial step in the search for metal objects with raw materials from Eastern Serbia was

the radiocarbon dating of the settlements with traces of production and associated burial sites. Thanks to the series of available data from almost every investigated site, we now can reliably determine the heyday of the Bronze Age copper production in Eastern Serbia in the period between the 19th and 16th centuries BC (Gavranović et al. 2025). Even though it is certainly possible that copper from Eastern Serbia could be in circulation either as an ingot in plano-convex shape or recycled raw material after this period, the extensive metallurgical (chemical composition, lead isotope) analyses from the broader regions of western and central Balkans did not provide any evidence of this specific copper raw material in the Late Bronze Age objects (15th–9th centuries BC) (Mehofer et al. 2021; Gavranović et al. 2022; Gavranović et al. 2024b).

First indications regarding the possible use of copper from Eastern Serbia for the founding of finished objects from the Early and Middle Bronze Age (Reinecke Ba A2–Ba B), i.e., in the time the fresh copper was produced, came with the early (1960s) chemical analyses of metal objects from hoards Kórós and Kelebia in Hungary and Tručevac in Serbia made of a specific copper with a low amount of impurities (Schubert, Schubert 1967, 189; the copper group is described as E00). As a possible source of this copper, authors suggested “northern Yugoslavia”, referring to the copper ore from the region between the Danube, Timok and Morava Rivers. The first applications of lead isotope analyses, as the most robust tool for the determination of the copper provenance (Lutz, Pernicka 1996; Niederschlag et al. 2003), on the finds from Serbia (Pernicka et al. 1993) and neighbouring Bosnia and Croatia showed that only a few Early and Middle Bronze objects (two shaft-hole axes from the

Dalmatian hinterland) could potentially be linked with copper from Eastern Serbia (Schmitt-Strecker, Begemann 2005, Nos. 780 and 1028). The results of the recently conducted analyses on a large number of Bronze Age objects from the Balkan area pointed, however, at the specific group of objects made of copper with isotopic values that very well correspond both to copper deposits and the slags found in the above-mentioned sites Trnjane, Ružana or Hajdučka Česma (Mehofer et al. 2021; Mitrović et al. 2024). First, the new results (lead isotope analyses) confirmed the previous assumption that objects from the Tručevac hoard (two flanged axes, two bracelets of the type Juhor) were made of local copper from East Serbia (Garašanin 1994, Pl. 1–2; Mehofer et al. 2021). As several extensive typo-chronological studies demonstrated, the Tručevac hoard belongs to a period Ba A2 to Ba B1. It is thus contemporary with the dating of the copper-producing sites and urn cemeteries in East Serbia. In terms of composition, with four flanged axes and a jewellery set (necklace, two bracelets, spirals, and two gold ring pairs), the Tručevac hoard could represent the personal equipment of one or two individuals. The presence of gold ring pairs underlines the prestigious character and advocates for the association of Tručevac with preeminent individuals. Even more striking were the results of the analyses on bracelets of Juhor type from the broader area of the Morava Valley in central Serbia, including extremely opulent, massive pieces (up to 2 kg weight) with elaborate incised decoration and occasional gold appliques (Vukmanović 1992; Stojić, Jacanović 2008, 377; Mitrović 2022). As our results revealed, all analysed bracelets are made of copper with isotopic values very close to ores and slags from East Serbia (Mehofer et al. 2021; Mitrović et al. 2024).

There is little doubt that this exceptional jewellery type represents the highlight of the regional metal craft with a specific distribution along the Morava Valley and on the southern fringes of the Carpathian Basin (Vukmanović 1992, 23, map). At the same time, their linking with the leading individuals or groups in terms of socio-economic and religious power seems likely. Although only a few of them were found in a reliable context, they are not everyday objects with functional purposes but prestigious items of high symbolic value. Judging by the several finds from closed contexts, the chronological span of the bracelets of the Juhor type covers the time between the 18th and 16th/15th centuries BC, which means that most of them were made at

the time when copper production in East Serbia was highly active (Mitrović 2022, 24). Currently, there are no hints concerning the possible location of the founding workshop(s) involved in the alloying of bronze and casting of the bracelets. However, the constant, relatively high amount of tin in the metal (8–10%) bespeaks a profound metallurgical knowledge and deliberate alloy choice, probably due to the specific colour.

Poor producers – wealthy consumers?

The current archaeological record of the time between 19th/18th and 16th/15th centuries BC in the central Balkans offers a strikingly opposite picture when it comes to social stratification and connection with copper raw metal production and consumption. The copper-producing communities in Eastern Serbia, according to the current state of research, do not display visible social hierarchy despite the direct access to copper deposits and advanced production of a valuable good. Their burial rite (exclusive cremation), uniformity in the treatment of cremated remains (all body parts in the urn), and lack of ostentatious grave offerings are all indicators of intended actions with the aim to erase any kind of inequality, even if there was one during the lifetime. Only the grave architecture stands out, considering the amount of work and effort invested in building circular stone constructions. Yet even if relatively elaborate by means of needed workload, there are hardly any differences in the appearance of the grave monuments, apart from varying sizes. Interestingly, there are no finds or features in the urn cemeteries that would imply copper production as the main activity of the interred population. Even if we consider age and gender bias, at least some of the buried individuals must have been directly involved in copper extraction and production. However, this activity is not mirrored in burials, with graves of metal workers and small children being equally built and similarly arranged. The age structure, frequency, and size of the urn cemeteries all support their interpretation as communal burial grounds where most of the deceased community members were interred after cremation. But what are the reasons for the relatively modest appearance of settlements and graves of people engaged in copper production? Was fresh copper really that much in demand, as we often assume? Was “the market” possibly oversaturated with fresh metal, leading to

the devaluation of the commodity? Due to the complexity of copper extraction in Eastern Serbia with several different technological steps, each of them demanding high skills and experience (Mehofer et al. 2021), we find it hard to believe that metal production was just an additional occupation of the Bronze Age people in this area. Moreover, the area around Bor is not favourable for any kind of extensive agriculture, making the copper deposits one of the main reasons why the Bronze Age communities were so intensively settled here (Kapurán 2014). Yet, despite the direct engagement in metal production for at least three centuries (according to the range of radiocarbon data), there are no archaeological traces that this activity led to the formation of any kind of leading groups or individuals.

In contrast, the signs of opulence and stronger social stratification are more recognisable among

neighbouring groups in Morava Valley, who were apparently the first consumers of the raw metal produced in Eastern Serbia. The occurrence of extraordinary metal objects such as bracelets of Juhor type with the primary purpose of representation and impression suggests the existence of groups or individuals whose desire and goal were to distinguish themselves through the possession or tenancy of sumptuous metal objects. At the present state of research, we can only speculate about the relationship between the Bronze Age copper producers and the first consumers in the central Balkans, which appear to be so different in terms of the available archaeological picture. Our knowledge and possibility of interpretation and storytelling are still limited by huge research gaps (tangible data about mobility, dating, and environment) that we just started to close with our work in Eastern Serbia.

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MUNKÁSHALÁL – BRONZKORI RÉZTERMELŐK SÍRjai KELET-SZERBIÁBAN

Összefoglalás

A tanulmány a rézelőállítás és -gyártás őskori közösségekben betöltött szerepét vizsgálja Kelet-Szerbia és az Alpok régiójának bronzkori emlékanyagán keresztül, feltárva, miként befolyásolta a szükséges ércek elérése és feldolgozása az érintett közösségek társadalmi fejlődését, gazdasági és társadalmi viszonyait. Különösen fontos elemei az újonnan közölt radiokarbon adatsor és a metalurgia vizsgálati eredmények, melyek a Kelet-Szerbia területén a kora bronzkor legvégén (Kr. e. 20–19. század) meginduló rézfeldolgozás kialakulásának folyamatát segítenek megérteni. A bronzkor során a réz és az ón egyaránt nélkülözhetetlenek voltak a bronz gyártásához, melynek megjelenése meghatározó jelentőséggel bírt számos társadalmi folyamat – kézművesség, művészet, hadviselés, társadalmi kapcsolatok – tekintetében. A kutatás korábban elsősorban meggazdagodási lehetőségként tekintett az ércelelőhelyek felfedezésére és kiaknázására; ám a valóság ennél jóval összetettebb. Az alpi régióban végzett kiterjedt kutatás új megvilágításba helyezi a metalurgia fejlődés számos elemét, köztük a bányászatot, valamint az érc tisztítás és -olvasztás folyamatait is. A régészeti emlékegyet azonban arra enged következtetni, hogy a rézfeldolgozással asszociált meggazdagodás nem feltétlenül közvetlenül magukat a feldolgozási és gyártási folyamatban részt vevőket érintette.

A tanulmány második részében a fókusz Kelet-Szerbia területére tevődik át, mely jól ismert gazdag rézlelőhelyeiről és a korai, még a neolitikum és a rézkor időszakában meginduló fémfeldolgozás emlékeiről. Habár az itteni közösségek élete alapvetően a rézfeldolgozás és -gyártás körül forgott, régészeti anyagukban kevés nyom utal jelentékenyebb társadalmi rétegződésre vagy vagyonfelhalmozásra. Urnás temetőik közösségi temetkezési helyek, melyekben minden elhunyt azonos bánásmódban részesül, ami egalitárius társadalmi struktúrára enged következtetni.

Az utolsó rész a Kelet-Szerbiából származó réz elterjedését és felhasználását vizsgálja a szomszédos régiók területén. A rézfeldolgozó közösségek leletanyagában kevés a kész bronztárgy, ami arra utal, hogy azok elsősorban kereskedelmi vagy cserecikkek voltak és más, távolabbi területekre kerültek. A tanulmány kiemeli a rézfeldolgozó közösségek temetkezéseiben tapasztalt visszafogottság és a környező területek közösségeinél megjelenő gazdag, presztízsjellegű fémtárgyak közötti kontrasztot, melyek eltérő társadalmi folyamatokat jelezhetnek. Kirajzolja az őskori gazdasági rendszerek komplexitását és hangsúlyozza – az egykori társadalmak kontextusában – a további kutatás szükségességét a nyersanyaglelőhely-kihasználás, a társadalmi szerveződés és gazdaság dinamikája között fennálló kapcsolatok jobb megértésében.

