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Any correspondence will be sent to the editor:
Museum Arad
Piata George Enescu 1, 310131 Arad, RO
e-mail: ziridava2012@gmail.com

Layout: Francisc Baja, Florin Mărginean, Victor Sava

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Contents

A casting mould uncovered in the Bronze Age tell settlement from Toboliu. Notes on the origin and distribution of socketed chisels

Alexandra Găvan, Marian Adrian Lie

Abstract: During the 2015 excavation campaign, a stone casting mould for socketed chisels was uncovered in the tell settlement from Toboliu. In 2017, while carrying out geophysical investigations on the outer settlement surrounding the tell, a bronze socketed chisel was accidentally found at the surface of the site. Both mould and finished product belong to a group of tools that are widespread among the Bronze Age tell settlements. In the following paper, we would like to present these finds and also discuss matters related to their chronology and distribution, alongside the technological aspects of their production.

Keywords: Bronze Age; tell settlements; socketed chisels; casting moulds; casting technology.

Introduction

The tell settlement from Toboliu – *Dâmbu Zănăcanului* is located in Bihor County, close to the current border separating Romania from Hungary, at the boundary between the Crișul Repede floodplain and the high plain of Miersig[1]. Several excavation campaigns have been undertaken at the site over the years, all of them focusing exclusively on the settlement mound, which rises approximately 4 m above the surrounding floodplain[2]. Additionally, non-invasive investigations consisting of aerial photographs, surface surveys, and geophysical investigations were carried out beginning with 2014. These non-invasive investigations revealed the existence of a large open settlement of about 84 ha immediately to the east, north, and west of the tell; to the south, the site is bordered by a local stream. Based on the finds recovered during the surface survey, this outer settlement can be dated to the Middle Bronze Age (MBA; according to the local chronological system[3]), the time interval that also frames the evolution of the settlement mound[4].

The most recent excavations at the site, carried out between 2014 and 2017, also targeted the settlement mound. A total of three trenches have been opened with this occasion, one located in the centre of the mound, and another two located at its north-eastern margins[5]. Among the latter, Trench 2 was opened on top of an older archaeological trench still visible on the surface of the mound in order to verify the stratigraphic sequence at the eastern margin of the tell without damaging undisturbed layers. The mould was found within the first phase (uppermost) of Trench 2, respectively phase two of the overall tell stratigraphy[6]. The exact context of discovery was labelled 132 and represents the burned and collapsed walls of a construction (Fig 1/1). Most of the daub unearthed within this feature had twig impressions. However, not much can be said about the original size of this construction since Trench 2 was intended to follow the South-Eastern border of an older, unpublished archaeological excavation from the 1960s, and so especially for the upper layers, the discoveries could only be analyzed into their vertical stratigraphic aspects. The nearest stratigraphical unit that was dated with an AMS sample comes from context 12 of Trench 1 which was part of the latest phase that was found at Toboliu. Calibrated in 2σ this shows an interval between 1677 and 1514 cal BC (Fig 1/2). Thus being said the mould was rendered unusable, most probably due to the fact that one half broke approximately at about 1/3rd of its length, sometime before the discussed absolute date.

1 Lie *et al*. 2019, 354, fig. 1–2.
2 Lie *et al*. 2018, 64–65.
3 See Găvan 2015, 21–24; Gogâltan 2015.
4 Lie *et al*. 2018; Lie et al. 2019.
5 Lie *et al*. 2019, fig. 3.
6 for a more detailed discussion of the phases and stratigraphy at Toboliu, see Lie *et al*. 2018, 69–71, fig. 5,7; Lie *et al*. 2019, 358–363.

The socketed chisel was found by accident in spring 2017, while carrying out geomagnetic measurements on the outer settlement of the tell. The find was exposed by recent ploughing activities and lay approximately at the surface, at a distance of about 290 m north and 80 m east of the centre of the mound (Fig. 4).

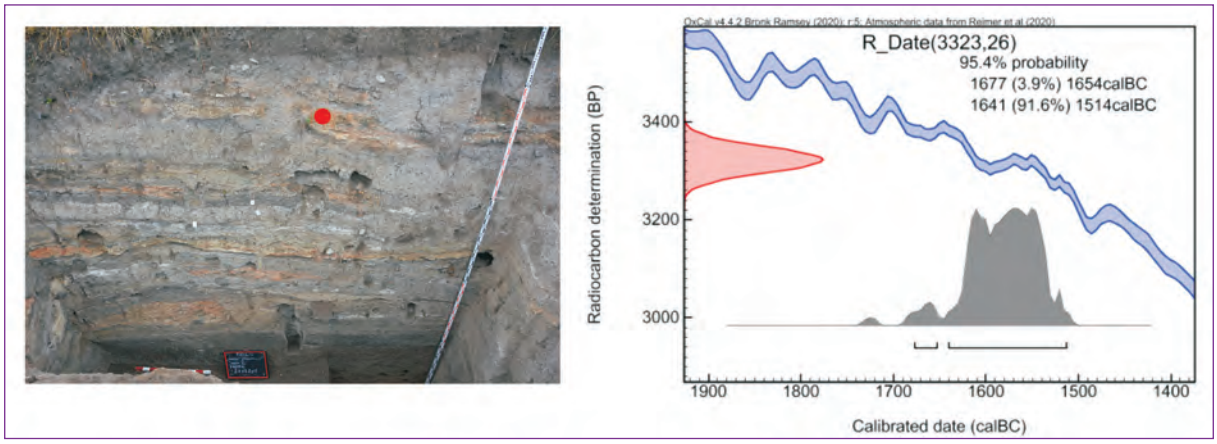

Fig.1. 1. Context of discovery. 2. AMS results for the uppermost stratigraphic phase at Toboliu.

Description of the finds

Bivalve mould made of stone for casting socketed chisels, formed of two interlocking halves. The first half (Fig. 2/1, 3; Fig. 3/1) has the following measurements: L of the mould = 10.4 cm, max. w = 3.2 cm, thickness = 1.8 cm; the mould has two breaks on both long sides. The negative has the following measurements: L of the negative = 10.2 cm, w of the mouth = 2.00 cm, w of the blade = 1.1 cm. The second half of this mould (Fig. 2/2, 4; Fig. 3/2) has the following measurements: L of the mould = 10.5 cm, max. w = 2.7 cm, thickness =1.8 cm. The negative measures: L= 10.3 cm, w of the mouth = 2.00 cm, w of the blade = 1,1 cm. The mould is broken at about 1/3rd of its length.

The mould was used for casting socketed chisels with straight-sided blades, a semi-circular shaped socket with thickened margin, and a round-shaped mouth.

Socketed chisel with straight sides and round-sectioned mouth (Fig. 3/3). The body of the chisel tapers evenly from the mouth to the cutting edge; the mouth is round and the rim is thickened, displaying a rib underneath. The surface of the chisel is strongly corroded. The socket is 6.7 cm in depth and is circular in section throughout; L= 10.1 cm; w at the mouth = 2.1 cm; w at the cutting edge = 1.1 cm.

Fig. 2. Stone mould for casting socketed chisels from Toboliu.

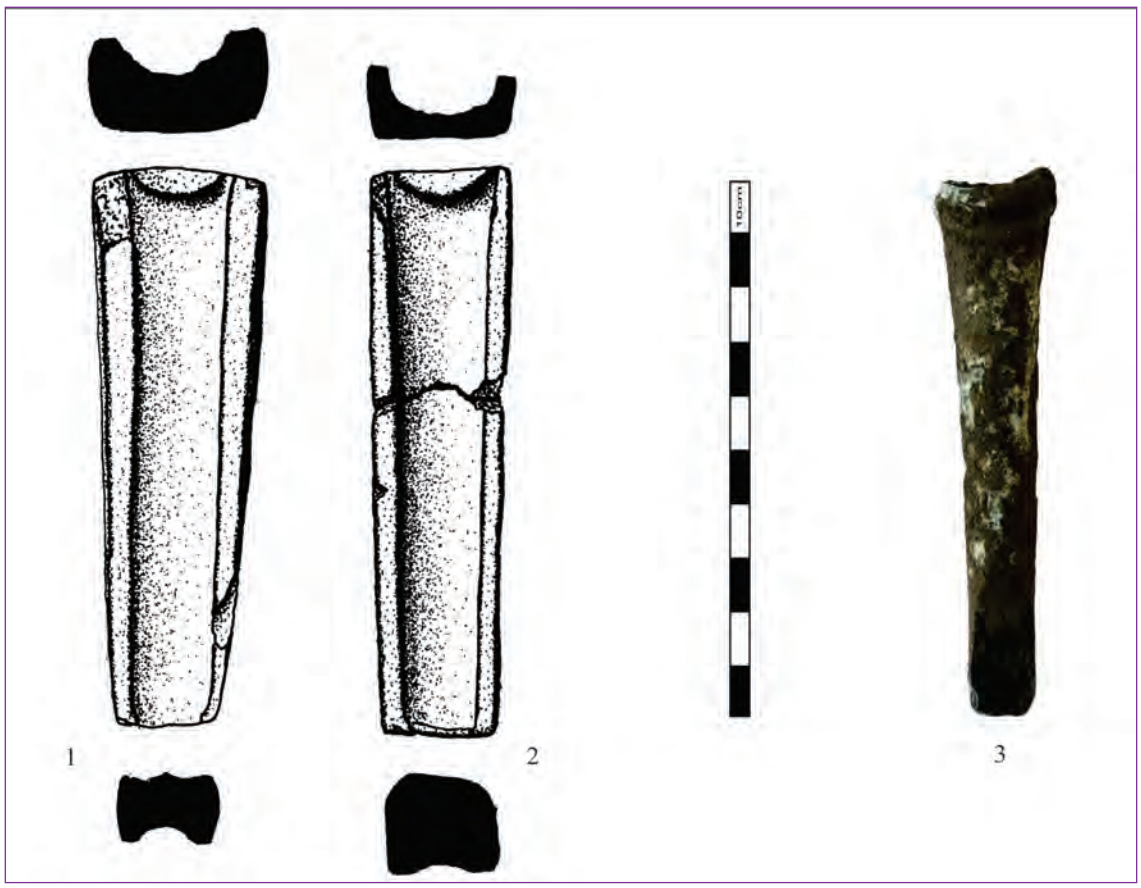

Fig. 3. 1–2. Stone mould for casting socketed chisels from Toboliu; 3. Socketed chisel with straight sides and round-sectioned mouth from Toboliu.

Fig. 4. Find-spots of the mould and the socketed chisel in Toboliu.

Casting technology

The mould had to be used together with a casting core in order to produce the hollow socket. Casting cores that could have served for the production of socketed chisels have been uncovered within the famous workshop of the tell settlement Mošorin *Feudvár*. They were made of fine clay tempered with sand and had a slightly conical shape, tapering towards one end[7]. The mould valves together with the core were most probably bound together and held in place using a cord or another material in order to prevent dislocation. No holes for joining the two mould halves are visible, as known from later moulds[8]. Although one of the valves displays a carved notch on its long lateral sides, this couldn't have been used for a correct positioning of the two halves in relation to one another during casting, as no corresponding notch could be observed on the second valve. Furthermore, the surface of the two mould halves does not display any vents – shallow incisions whose role was to allow air and gases to escape from the mould cavities during casting[9] – as known from the relatively contemporary casting moulds uncovered in the tell settlement from Pecica – *Șanțul Mare*[10].

It is assumed that in order to prevent the molten metal from adhering to the surface of the mould the matrices had to be dressed with non-reactive substances such as soot, charcoal, animal fat or fine clay[11]. Additionally, in order to avoid thermal shock, moulds were most likely pre-heated prior to casting. Nonetheless, the contact with molten metal left traces on the inner surfaces of the casting moulds, discernible through a change in the colour of the negative beds[12]. This is also the case with the mould uncovered in Toboliu (Fig. 2). The fact that the mould was indeed used for casting artefacts is also proven by the results of X-ray fluorescence spectroscopy (XRF) analyses, which yielded traces of metal on the surface of the mould[13]. This is usually considered to be a solid sign that metal was poured in the negative[14]. While copper was detected on our mould, tin and arsenic were absent. However, determining the metal alloy that was cast based on XRF analyses of the outer surface of the mould is not that straightforward, with several studies underlining that a correct identification of the metals used is problematic[15]. This is further complicated by the fact that stone moulds (such as the one from Toboliu) were repeatedly reused, making it very likely that different types of metals were cast into them, leading to different patterns of contamination. In a series of experiments, Kearns and colleagues set out to settle the issue of whether the composition of metals cast in moulds can be inferred from the results of analyses of those moulds. Their conclusion was that we cannot make direct correlations between traces detected on moulds and the metals cast. Furthermore, these experiments proved that tin contamination of the moulds used for casting bronze artefacts was extremely low, in some moulds tin only being present in concentrations comparable to those in unused moulds, while copper could always be detected, even though in lower concentrations than in the original alloys[16]. This might explain why traces of tin were not detected on the surface of our mould, although the possibility that tin was absent from the original metal cast in the mould cannot be excluded.

Socketed chisels – chronology, distribution and function

Socketed chisels make their appearance in the archaeological record from the Carpathian Basin during the second half of the local Early Bronze Age (EBA), as proven by the discovery of such a chisel within a layer ascribed to the classical phase of the Nagyrév culture in the tell settlement from Tószeg – *Laposhalom*[17]. Another early find is the copper socketed chisel uncovered within the EBA settlement

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7 Hänsel, Medović 2004, 101, no. 30–74, fig. 11/5–6, 9–15; 12/1–28; 13/1–8.
8 See, for example, Wanzek 1989, pl. 37/3; 38/6; 39/6; 40/1–10; 41–42; Armbruster *et al*. 2019, fig. 4/1.
9 Branigan 1974, 81; Philip 2006, 126.
10 Găvan 2015, 57, fig. 20.
11 Howard 1983, 136; Armbruster 2001, 625.
12 Armbruster *et al*. 2019, 142.
13 For the spectroscopy analysis we are very grateful to Prof. Dr. habil. Nicoleta Vornicu from the Mitropolitan Research Centre TABOR.
14 Biçer 2005, 84; Soares et al. 2009; Garbacz-Klempka *et al*. 2017.
15 See, for example, Dungworth 2000; Kearns *et al*. 2010.
16 Kearns *et al*. 2010, 54–56
17 Csányi, Tárnoki 1992, 200, no. 353.

in Brașov – *Schneckenberg*[18]. The local production of these artefacts beginning with the EBA is attested by the discovery of a casting mould for socketed chisels decorated with ribs within a Nagyrév layer of the tell site in Százhalombatta – *Földvár*[19]. Another two moulds for this type of chisels were found at this site, this time within layer IV, dated to the early Vatya phase from the beginning of the MBA[20]. However, the recent discovery of two moulds for socketed chisels within the EBA settlement in Üllő (Hungary) attributed to the Makó culture[21] pushes the local production of socketed chisels in the Carpathian Basin much earlier than previously thought, sometime after the middle the of the 3rd millennium BC. One of the moulds[22] was designed for casting plain socketed chisels, with bodies narrowing slightly towards the cutting edge, while the other[23] was used for casting socketed chisels with two ribs under the mouth and similar-shaped bodies, resembling the specimen from the outer settlement in Toboliu. Both moulds were found inside a pit, along with several other casting moulds for EBA axes, a crucible, stone implements, pottery sherds and animal bones[24].

Another early socketed chisel is the one uncovered within a grave in Balatonakali, Hungary[25] dated to the transition between the end of the EBA and the beginning of the MBA in Hungarian chronology[26]. This specimen is representative for a group of chisels characterized by the presence of three ribs underneath the curved socket; a very similar example is a stray find from the Tolna County[27], while several other specimens are known from the Aunjetitz milieu, found either within hoards dated to the periods Reinecke Br A1b – A2b such as the ones from Bullendorf[28] and Neusiedl an der Zaya[29], or within burials such as the one in Vedrovice[30]; another socketed chisel belonging to this group has been unearthed relatively recently within the hillfort of Dobřejovice – *Hradec* and dated to the period Br A2/B1[31]. A socketed chisel from the hoard in Rimetea[32] can also be added to this group. Additionally, a specimen uncovered within a house in the tell settlement from Sălacea – *Dealul Vida*[33], although it has a thinner body and only two ribs underneath the socket, could also be considered to be similar. Moulds for casting socketed chisels with two to three ribs underneath the mouth are known from several tell sites in western Romania, such as the ones form Derşida – *Dealul lui Balotă*[34], Pecica – *Șanțul Mare*[35] and Sântion – *Dealul Mănăstirii*[36]. The negative carved on the mould uncovered at Sântion – *Dealul Mănăstirii*, located approximately 7.2 km away from Toboliu, is also the most similar to the socketed chisel found in the outer settlement from Toboliu. All the aforementioned chisels have been grouped by G. Bălan in his type Ic[37] and by O. Dietrich in his "Bullendorf" type thought to have represented proto-types for the later socketed axes[38]. The fact that socketed chisels appear earlier than socketed axes was already noticed by Childe[39] and has since been repeatedly highlighted[40].

Socketed chisels with a thickened margin, similar to the design of the matrix on the mould from Toboliu, are known from hoards uncovered in the Bronze Age tells from Dunaújváros – *Koziderpadlás*[41]

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18 Prox 1941, 43, Pl. 34/18.
19 Poroszlai 2000, 19, fig. 17a.
20 Poroszlai 2000, 19, fig. 17b; Horváth 2012, 72, 74, fig. 13/2–3.
21 Kővári, Patay 2005.
22 Kővári, Patay 2005, 113, fig. 9/1–3; 17/1.
23 Kővári, Patay 2005, 121–122, fig. 11/4–6; 20/1.
24 Kővári, Patay 2005, 88–94.
25 Torma 1978, 16, fig. 5/2.
26 Torma 1978, 18–19; Kiss 2012, 133–134, 196.
27 Torma 1978, 18, fig. 7.
28 Mayer 1977, 220, no. 1292, pl. 88/1292.
29 Krenn-Leeb 2010, 308, no. 71.
30 Říhovský 1992, 167, no. 1188, pl. 74/1188.
31 Chvojka *et al*. 2008, 72, fig. 5/8.
32 Petrescu-Dîmbovița 1977, 42–43, pl. 7/6; Soroceanu 2012, pl. 22/6a-d.
33 Ordentlich 1972, 68, pl. 18/11.
34 Chidioșan 1980, 60, pl. 38/13.
35 Gogâltan, Găvan 2014, 19, no. 28, 35, pl. 6/3a-b.
36 Dumitrașcu 1989, 129–130, pl. 23.
37 Bălan 2009, 15–16, pl. XI/B.
38 Dietrich 2010, 126–128; Dietrich 2015.
39 Childe 1930, 71.
40 Wanzek 1989, 143; Schalk 2005, 98, 102.
41 Mozsolics 1967, 134, pl. 46/3.

and Kamenín[42] and dated to the end of the Hungarian MBA, or from the recently discovered hoard from Bistriţa – *Dealul Târgului*[43], also dated to the MBA. Further parallels for the negative on the mould from Toboliu were found in Slovakia, within the settlement from Bajč-*Vlkanovo*[44] and in Levoča[45], while two other specimens have an unknown find-spot, being currently kept in the collections of the Natural History Museum in Vienna[46]. A very similar find is also known from the Late Bronze Age (LBA) hoard found in Gârbou[47]. Parallels from the LBA period can also be found in areas situated further away, such as, for example, Bosnia[48], Poland[49], Lower Saxony[50] and western Germany[51]. However, when searching for parallels for the socketed chisels that could have been cast using the mould uncovered in Toboliu, it is important to bear in mind that hammering and annealing made it easier to remodel the cutting edge, and were in fact necessary as the blades wore down through repeated use[52]. These operations led to a change in the shape of the cutting edge and a reduction in the size of the chisel[53]. Therefore the form of any specimen should not be regarded as immutable, but rather diagnostic of a particular point in its life-cycle[54].

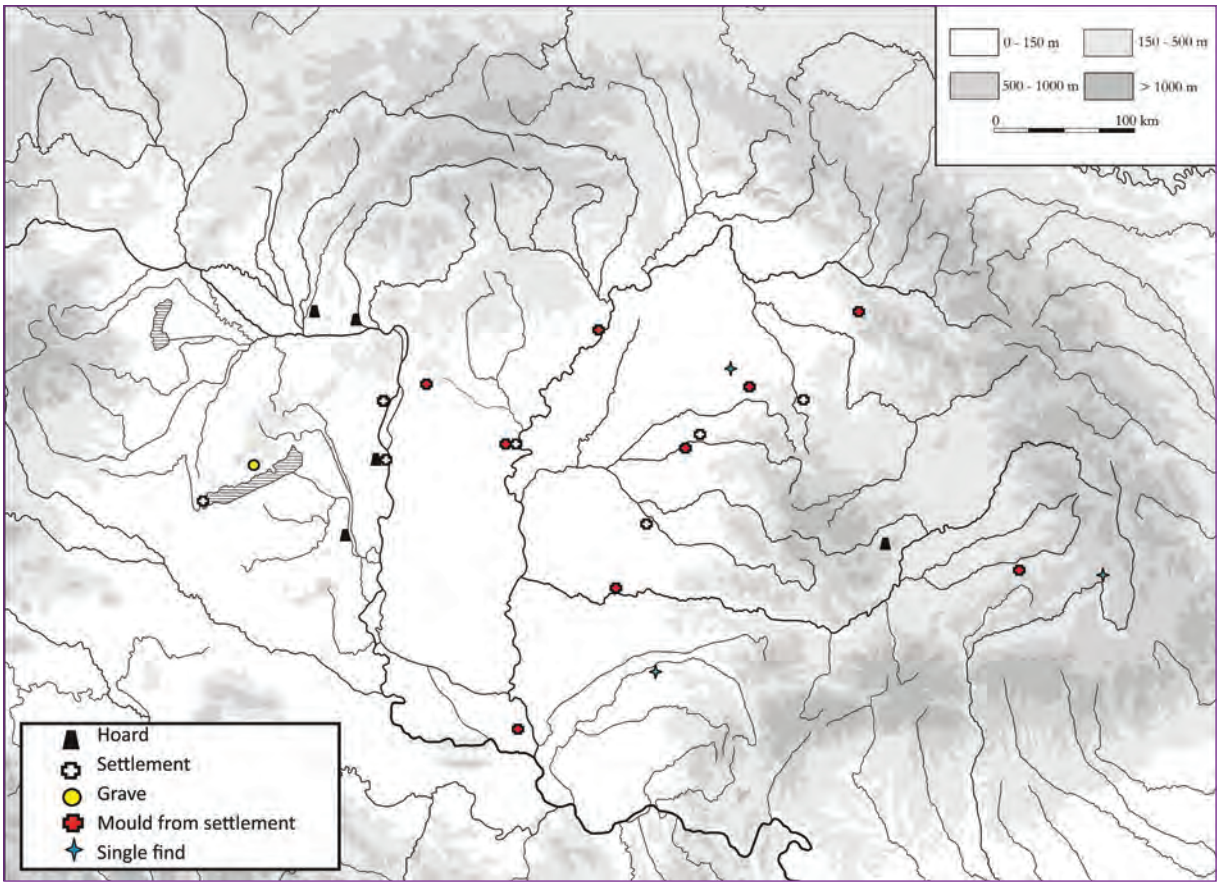

Fig. 5. Distribution and find context of socketed chisels in the Carpathian Basin during the EBA and MBA.

42 Novotná 1970, 69, no. 434, pl. 25/434.
43 Gogâltan, Marinescu 2018, 71, fig. 84.
44 Benkovsky-Pivovarová 2019, 9, fig. 2/5.
45 Novotná 1970, 69, no. 431, pl. 25/431.
46 Mayer 1977, 220, 220, no. 1294, 221, no. 1323, pl. 88/1294; 89/1323.
47 Petrescu-Dîmboviţa 1977, 60, pl. 48/1.
48 Žeravica 1993, 110, no. 614–617, pl. 42/614–17.
49 Gedl 2004, 89, no. 324–325, 90, no. 334, pl. 21/324–325; 22/334.
50 Laux 2005, 84, no. 419–422, pl. 29/419–422.
51 Kibbert 1984, 190, no. 948, 952, pl. 69/948, 952.
52 Fregni 2014, 78.
53 Gedl 2004, 86.
54 Philip 2006, 126.

Although there is a wide variety in terms of overall shape, blade width and length, as well as morphology of the socket among the socketed chisels (both finished products and matrices)[55] discussed in the paragraphs above, they can all be attributed to the type with a straight blade classified as *Tüllengeradmeissel*, in order to differentiate between specimens belonging to this type and socketed gouges or *Tüllenhohlmeissel*[56]. Their lengths usually range from 8 to 12 cm and their blades generally taper towards the cutting edge[57]. This distinction between socketed chisels and gouges can already be found in Childe's analysis of metal implements from the Bronze Age[58]. A first overview of socketed chisels uncovered in the Carpathian Basin was provided by J. Hampel[59]. Later, S. Foltiny made a clear distinction between flat chisels and socketed ones in the region[60]. Socketed chisels with a straight blade appear to have been used for a long period of time in this region, beginning with the EBA until the end of the Bronze Age and the beginning of the Iron Age. They were usually deposited in hoards or found in settlements, with only a couple of specimens uncovered within burials[61] (Fig. 5). However, considering the long life-span of this type of artefact and their widespread distribution, the number of known specimens is quite low compared to other types of artefacts[62], a fact that might be due to 'filters' in their deposition.

The origins of the socketed chisels are still unclear[63]. The earliest finds in Europe so far seem to be the two abovementioned moulds from Üllő in Hungary that were dated to the second half of the 3rd millennium BC[64]. Outside Europe, early socketed chisels are known from Susa (one specimen, dating to mid–3rd millennium BC) and Anatolia (with a couple of finds dating from the 3rd millennium BC)[65]. However, these are more or less the exceptions, socketed chisels becoming more widespread in those regions starting with the second half of the 2nd millennium BC, and especially during the LBA, when these artefacts can also be encountered in Cyprus, Crete, Egypt and parts of the Near East[66].

Beginning with the LBA, a large number of socketed chisels are deposited within hoards all over Europe, from France and Ireland in the West to the Ukraine and the Black Sea region in the East[67]. These artefacts are not restricted to the European continent however, with certain types, especially socketed gouges, being distributed across Eurasia from the northern part of the Black Sea region all the way to southern Siberia[68]. Socketed gouges are also encountered in the Caucasus during the LBA[69].

Socketed chisels appeared during the Bronze Age and have a very wide distribution (Fig. 6). The widespread adoption of these tools hints at their utility. It is generally thought that socketed chisels were primarily tools for woodworking and thus part of the basic carpentry equipment[70]. Their use for antler-, bone-, fur-, leather- and metalworking has also been suggested[71]. Some authors doubt that socketed chisels were employed in metalworking, while completely excluding their employment in masonry work[72]. E. Fregni has argued that thinner chisels in particular, as is the case of the negative and finished chisel from Toboliu, were unsuitable for metalworking, and were more likely to have been used for other crafts such as leather or woodworking[73]. Wood remains still preserved within the

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55 As rightfully pointed out by F. Laux (2005, 83), there are hardly even two examples that perfectly match, with each specimen being more or less unique.
56 Kibbert 1984, 189–195; Pászthory, Mayer 1998, 165–167.
57 Schalk 2005, 98.
58 Childe 1930, 70.
59 Hampel 1896, 42–43, pl. 9.
60 Foltiny 1955, 102–104.
61 see also Novotná 1970, 70–71; Mayer 1977, 222; Říhovský 1992, 269–271; Schalk 2005, 97–99.
62 Novotná 1970, 69–71; Schalk 2005, 98; Bălan 2009, 11.
63 Schalk 2005, 98.
64 Kővári, Patay 2005, 124–126.
65 Müller-Karpe 1994, 172–173.
66 Petrie 1917, 21; Deshayes 1960, 134–135, 140–141; Evely 1993, 14; Müller-Karpe 1994, 172; Yahalom-Mack 2009, 572.
67 Eogan 1964, 298; Chardenoux, Courtois 1979, 140–141; Bočkarev, Leskov 1980, 56–57; Kibbert 1984, 194; Hansen 1994, 150–151; Kobal' 2000, 47–48; Kytlicová 2007, 141; Uşurelu 2010, 17–21; Tarbay 2014, 191–192.
68 Kuz'mina 2007, 259; Grigoriev 2015, 87, 286.
69 Reinhold 2007, 112, pl. 161/13–21.
70 Žeravica 1993, 112; Pászthory, Mayer 1998, 166; Jockenhövel 2019, 451.
71 Kibbert 1984, 192; Tarbay 2014, 191.
72 See for example Müller-Karpe 1994, 171–172.
73 Fregni 2014, 70–71.

sockets of some socketed chisels indicate that their shaft was made of wood; it is also thought that these wooden shafts were relatively short[74].

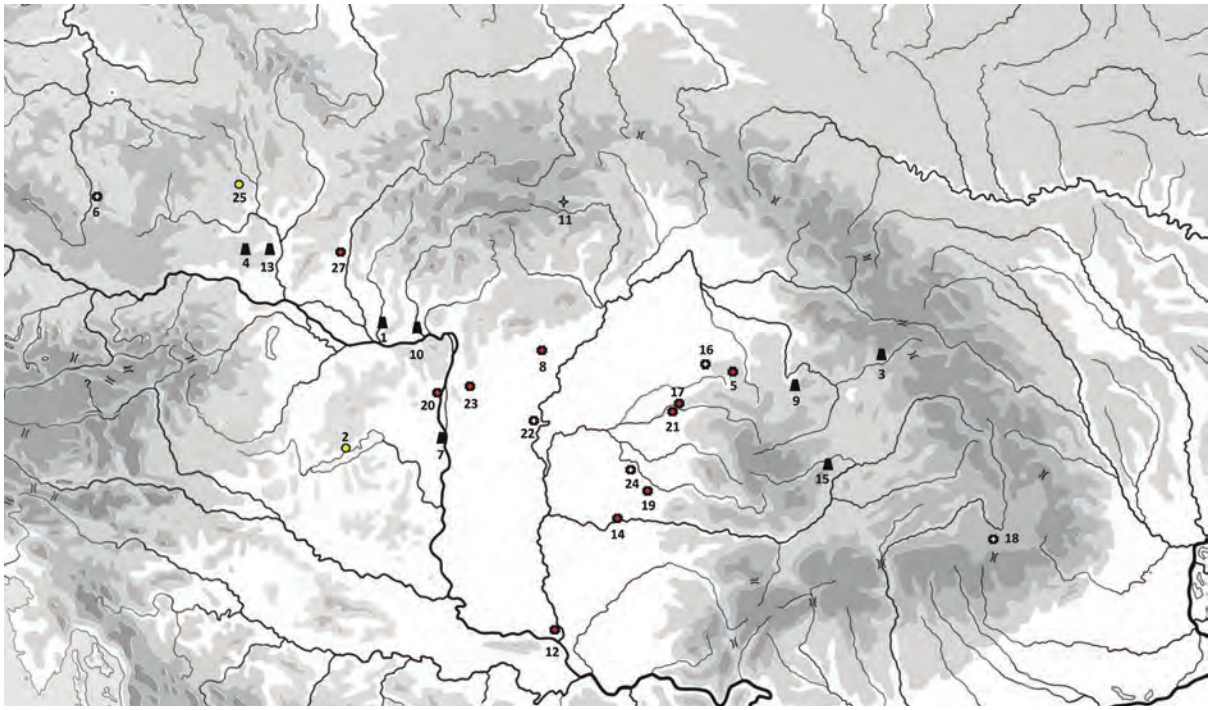

Fig. 6. Map of sites mentioned in the text: 1. Bajč; 2. Balatonakali; 3. Bistrița; 4. Bullendorf; 5. Derșida; 6. Dobřejovice; 7. Dunaújváros; 8. Füzesabony; 9. Gârbou; 10. Kamenín; 11. Levoča; 12. Mošorin; 13. Neusiedl an der Zaya; 14. Pecica; 15. Rimetea; 16. Sălacea; 17. Sântion; 18. Schneckenberg; 19. Socodor; 20. Százhalombatta; 21. Toboliu; 22. Tószeg; 23. Üllő; 24. Vărșand; 25. Vedrovice; 26. Veselé.

Concluding remarks

Socketed chisels were widespread among the Bronze Age tells beginning with the end of the Hungarian EBA, being found at Sălacea – *Dealul Vida*[75], Százhalombatta – *Földvár* [76], Tószeg – *Laposhalom*[77], and Vărșand – *Movila dintre vii*[78], with two further socketed chisels being part of the hoards uncovered within the tell sites of Dunaújváros and Kamenín (see above). Moulds for casting such artefacts were uncovered within nine tell settlements: Derșida – *Dealul lui Balotă*, Dunaújváros – *Koziderpadlás*, Pecica – *Șanțul Mare*, Sântion – *Dealul Mănăstirii*, Socodor – *Căvăjdia*, Százhalombatta – *Földvár*, Tószeg – *Laposhalom*[79] and, more recently, Füzesabony – *Öregdomb*[80], and Toboliu – *Dâmbu Zănăcanului*. It is possible that two casting moulds unearthed within another two tells, Mošorin – *Feudvár*[81] and Veselé – *Hradisko*[82] were also used for producing this type of implements. Thus, the mould and finished product uncovered at Toboliu can be seen as further proof of the popularity and use of these tools within the Bronze Age tells. They are also indirect proofs for the craft of wood-working, likely in high demand within these sites, as wood served as an important construction material for the houses on the tells and it is highly probable that the inner fittings of the houses were also made of wood.

The discovery of the casting mould within the tell settlement from Toboliu, alongside two clay tuyères uncovered here during previous investigations[83], are proofs that melting and casting activities

74 Jockenhövel 2019, 450.
75 Ordentlich 1972, 68, pl. 18/11.
76 Poroszlai, Vicze 2004, 292–293.
77 Csányi, Tárnoki 1992, 200, no. 353.
78 Soroceanu 2012, 119, pl. 45/1.
79 Găvan 2015, 108–109.
80 Szathmári 2017, 54, 59, fig. 8/4.
81 Hänsel, Medović 2004, 99, no. 10, fig. 8/5.
82 Bartík 1999, fig. 2/8a-b.
83 Dumitrașcu 1989, 119–120, pl. 1,1–2; Găvan 2015, 192193.

were undertaken on the mound. However, these activities seem to have played a secondary role in the economy of the site, given the relative scarcity of the metalworking debris unearthed here so far.

Alexandra Găvan
University of Cologne, Department of Prehistoric Archaeology
Köln, DE
agavan1@uni-koeln.de

Marian Adrian Lie
Romanian Academy – Iași Branch, Institute of Archaeology
Iași, ROU
quirinus_lie@yahoo.com

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Abbreaviations

ActaArchHung	Acta Archaeologica Academiae Scentiarum Hungaricae.
AAC	Acta Archaeologica Carpathica, Cracow.
ActaMN	Acta Musei Napocensis, Cluj-Napoca.
ActaMP	Acta Musei Porolissensis, Zalău
AnArchRessoviensia	Analecta Archaeologica Ressoviensia, Rzeszów.
AAS at CEU	Annual of Medieval Studies at CEU, Budapest.
Apulum	Acta Musei Apulensis – Apulum, Alba-Iulia.
Alba Regia	Alba Regia, Székesfehérvár.
Antaeus	Antaeus, Budapest.
Arrabona	Arrabona, Győr.
ArhMed	Arheologia Medievală, Cluj-Napoca, Brăila, Reșița.
ArchBaltica	Archaeologia Baltica, Vilnius.
Arch.Inf	Archäologische Informationen.
ATS	Acta Terrae Septemcastrensis, Sibiu.
ArchÉrt	Archaeologiai Értesítö, Budapest.
Banatica	Banatica, Reșița.
BBMÉ	A Béri Balogh Ádám Múzeum Évkönyve, Szekszárd.
BUFM	Beiträge zur Ur- und Frühgeschichte Mitteleuropas.
BCMI	Buletinul Comisiei Naționale a Monumentelor, ansambluri situri istorice. București.
CommArchHung	Communicationes Archaeologicae Hungaricae, Budapest.
CCA	Cronica Cercetărilor Arheologice, Comisia Națională de Arheologie, București.
CIL	Corpus Inscriptionum Latinarum, Berlin.
CMA	Complexul Muzeal Arad.
Dolgozatok	Dolgozatok az Erdélyi Múzeum érem- és régiségtárából, Cluj.
Dolg.	Dolgozatok a Magyar Királyi Ferencz József Tudományegyetem Archaeologiai Intézetéből, Szeged.
Dolg. ÚS	Dolgozatok az Erdélyi Múzeum Érem- és Régiségtárából, Új Sorozat. Cluj-Napoca / Kolozsvár.
EphNap	Ephemeris Napocensis, Cluj-Napoca.
HOMÉ	A Hermann Ottó Múzeum Évkönyve. Miskolc.
JAHA	Journal of Ancient History and Archaeology, Cluj-Napoca.
JAM	Jósa András Museum, Nyíregyháza.
JPMÉ	Janus Pannonius Múzeum Évkönyve.
JRGZM	Jahrbuch des Romisch-Germanischen Zentralmuseums, Mainz.
KRRMK	Kaposvári Rippl Rónai Múzeum Közleményei, Kaposvár.
LMI	Lista monumentelor istorice, updated in 2015.
MittArchInst	Mitteilungen des Archäologischen Instituts der Ungarischen Akademie der Wissenschaften.
MOL	Magyar Olaj- és Gázipari Részvénytársaság / Hungarian Oil and Gas Public Limited Company
Marisia	Marisia, Târgu Mureș.
NyJAMÉ	A nyíregyházi Jósa András Múzeum Évkönyve, Nyíregyháza.
PBF	Praehistorische Bronzefunde. Berlin.
Przegląd Archeologiczny	Przegląd Archeologiczny, Wrocław.
Rad	Jósa András Museum, Archaeological Archive
RégFüz	Régészeti Füzetek, Budapest.

RKM	Régészeti Kutatások Magyarországon/Archaeological Investigations in Hungary, Budapest.
RAJ Arad	Repertoriul Arheologic al Mureșului Inferior. Județul Arad. Timișoara 1999.
RAN	Repertoriul Arheologic Național.
Sargetia	Sargetia. Acta Musei Devensis, Deva.
SCIV(A)	Studii și Cercetări de Istorie Veche și Arheologie, București.
SGB	Studii de Geografie a Banatului, Timișoara.
SIB	Studii de Istorie a Banatului, Timișoara.
Slavia Antiqua	Slavia Antiqua, Poznań.
SlovArch	Slovenská Archeolóogia, Nitra.
SMK	Somogyi Múzeumok Közleményei, Kaposvár.
SovArh	Sovetskaja Arheologija, Moskva.
SRTM	Shuttle Radar Topography Mission.
StudiaUBB Historia	Studia UBB Historia, Cluj-Napoca.
SzKMÉ	A Szántó Kovács Múzeum Évkönyve, Pécs.
Századok	Századok, Budapest.
Terra Sebus	Terra Sebus. Acta Musei Sabesiensis, Sebeș.
Tibiscum S. N.	Tibiscum S. N., Caransebeș.
TransRev	Transylvanian Review, Cluj-Napoca.
ZalaiMúz	Zalai Múzeum, Zalaegerszeg.
ZSA	Ziridava. Studia Archaeologica. Arad.
Živa Antika	Živa Antika, Skopje.