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ex Instituto Archaeologico Universitatis de Rolando Eötvös nominatae



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Melted Swords and Broken Metal Vessels

A Late Bronze Age Assemblage from Tatabánya-Bánhida and the Selection of Melted Bronzes

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Abstract

This study discusses finds acquired by the Hungarian National Museum in 1880 from Tatabánya-Bánhida. We presume that they have belonged to two assemblages. Assemblage 'A' consists of fragments of a burnt flange-hilted sword, an arm spiral, fragments of a Type B1 cauldron and two metal sheets of uncertain function that might have belonged to a Hajdúböszörmény-style metal vessel and a miniature greave. Assemblage 'B' contains only two fragments of a melted sword. Macroscopic characterization of the finds revealed that all objects were finished products which were intentionally manipulated before their deposition. The sword fragments were partially melted and hacked into pieces, the valuable sheet metal products were broken and only small parts of them were buried. Assemblage 'A' is unique from a typological point of view as well as object selection. It can be dated to the Ha B1 based on the metal vessels. It has a unique combination lacking parallels among Ha B1 burials, however known among hoards from this territory and especially from the Northeast Carpathian Basin. These finds from Tatabánya-Bánhida were previously interpreted as burials because of the presence of melted objects. Within this study, several examples are also introduced for the selection of melted bronzes and human remains to hoards. The combination of finds in the Tatabánya-Bánhida assemblage and the above examples suggest that Assemblage 'A' could have been a rare type of hoard (funeral hoard), which is known from the only excavated context from Pázmándfalu.

1. Introduction

The starting point of this essay is the area of Tatabánya-Bánhida (Komárom-Esztergom County), a present-day town situated in northern Transdanubia. To our best knowledge, the first Late Bronze Age metal find from this region was a Type Gmuden winged axe (Br C, donated to the Hungarian National Museum (HNM) by János Marossy in 1879 (*Fig. 1*).¹ During the Late Bronze Age, the surroundings of Tatabánya was inhabited by the Tumulus culture,² followed later by the settlements of the Urnfield culture.³ On the sites such as Dózsakert, a mould and some metal finds were found, suggesting that a local metallurgy existed on the site around the Br D–Ha A1.⁴ In addition to a complex settlement pattern, about which data still needs to be expanded, a handful of metal stray finds,⁵ four metal hoards⁶ and some smaller

1 GYULAI 1887, 2; INVENTORY BOOK OF THE HNM 1879, 175; MAYER 1977, 128, 130, Pl. 32.465, Pl. 32.469; KIBBERT 1984, 43, Pl. 4.50; KŐSZEGI 1988, 189, No. 1183.

2 JUHÁSZ 2007, 295; LÁSZLÓ 2008, 289–290.

3 VÉKONY 1970, 18; KEMENCZEI 1983, 61; VÉKONY 1988a, 75; VÉKONY 1988b, 283–284; KŐSZEGI 1988, 189, No. 1182; KISNÉ CSEH 1999, 16–17; LÁSZLÓ 2001, 167; LÁSZLÓ 2002, 253; LÁSZLÓ 2004, 281; MÉSZÁROS 2010.

4 MÉSZÁROS 2010.

5 HAMPEL 1901, 382; MOZSOLICS 1985, 94; KŐSZEGI 1988, 189, No. 1183.

6 HAMPEL 1880, 140–141; HAMPEL 1886a, 63, Pl. 125; HAMPEL 1886b, Pl. 125; HAMPEL 1892, 8; KEMENCZEI 1983, 61; MOZSOLICS 1985, 94, 201–202, 207; JUNGBERT 1986, 17, 24; KŐSZEGI 1988, 189, No. 1183; KISNÉ CSEH 1999, *Fig. 9–10*.

bronze assemblages were found⁷ which indicate the importance of this area in the Late Bronze Age ritual activities.

The study focuses on bronze finds from this rich prehistoric landscape, acquired by the HNM from Tatabánya-Bánhida in 1880 (Figs 19–21). Some of the objects were donated by János Marossy and were inventoried on 4th October 1880. According to a note in the inventory book, the bronze artefacts (eight sword fragments, three ‘ring’ fragments and six ‘sheet metal’ fragments, one with rivet) were acquired along with five potsherds from the Szelim-lyuk cave (Figs 19–20, Fig. 21.3–5). The circumstances of discovery were described as follows: ‘Lh. Bánhida verem ásás alkalmával egy csomóban, úgy látták, tűzben voltak.’ [Bánhida Site. It was found during pit digging, lying in a heap, seemingly, damaged by fire.]⁸ On 29th December 1880, two additional sword fragments were added from the same provenance. They were also donated by János Marossy (Fig. 21.6).⁹ In the 1880 issue of the *Archaeologiai Értesítő*, József Hampel mentioned the finds in his annual reports, emphasizing the fire damages on the objects and also referred to the possibility that the Tatabánya-Bánhida Hoard 1 (Fig. 10) might belong to this find.¹⁰ Despite its early discovery, only a few works discussed these objects. Rudolf Gyulai also commented on the finds in his work entitled as ‘Megyénk a bronzkorban’ [Our County in the Bronze Age].¹¹ Among the first researchers after Hampel, Amália Mozsolics provided a new classification for the objects (a sword, an uncertain cauldron, a metal vessel fragment, two spearheads, two wire fragments and an armspiral fragment) and identified them as grave goods from a burial dated to the Kurd Horizon (Ha A1).¹² In Tibor Kemenczei’s 1988 monograph, except one piece (No. 6.1), all sword fragments were re-published and reconstructed as part of two weapons. However, Kemenczei catalogued them as stray finds.¹³ It should be noted that the finds are missing completely from the 1990 *Prähistorische Bronzefunde* volume on metal vessels from the territory of Hungary.¹⁴

After more than a hundred years, the finds from Tatabánya-Bánhida were restored in 2019, which finally allowed their complete analysis. Their examination suggested that they could belong to either one or two assemblages. The presumed composition of these are much similar to Amália Mozsolics’s reconstruction from 1985.¹⁵ Among the inventoried objects (14th October 1880; Tatabánya-Bánhida ‘A’) we can find a melted flange-hilted sword (Figs 19–20), melted pieces of a Type B1 cauldron (Fig. 21.3) and a Hajdúböszörmény-style metal vessel (Fig. 21.5), as well as one armspiral (Fig. 21.2) and a metal sheet fragment that probably belonged to a miniature greave (Fig. 21.4). Originally, three metal sheet fragments were also inventoried, but these finds have been lost since. The ‘two objects’ acquired in 29th December 1880 were in fact parts of another melted sword (Figs 21.6), which was broken into pieces by the finders.¹⁶

7 HAMPÉL 1902, 85; PATEK 1968, 154, Pl. 43.2, 5; MOZSOLICS 1985, 94, 201, Pl. 122.10–12; KŐSZEGI 1988, 189, No. 1181.

8 INVENTORY BOOK OF THE HNM 1880, 92. The sheet metal fragment with rivet can no longer be found.

9 INVENTORY BOOK OF THE HNM 1880, 140–141.

10 INVENTORY BOOK OF THE HNM 1880, 140–141; HAMPÉL 1880, 341; HAMPÉL 1881, 164.

11 GYULAI 1887, 2.

12 MOZSOLICS 1984, 25, 69, No. 87; MOZSOLICS 1985, 94.

13 KEMENCZEI 1991, Nos. 446–447.

14 See PATAY 1990.

15 MOZSOLICS 1985, 94.

16 INVENTORY BOOK OF THE HNM 1880, 140–141. It should be noted that these were the two finds that Amália Mozsolics misidentified as spearheads (See fn. 12). This incorrect data also appeared in Svend Hansen’s catalogue. See HANSEN 1994, 533, No. 70.

For most researchers, these finds can be identified as grave goods from a Ha B1 burial or burials, which shows a sort of continuity with the ‘warrior burial’ phenomenon of the Bakony Hills and its adjacent areas. However, the interpretation of these finds may not be so evident, as the selection of typologically and technologically similar objects in Transdanubia reflects on a more complex picture. In addition to the analysis of the artefacts, this essay aims to discuss different interpretation scenarios (burial with sword versus funeral hoards) that can be associated with the finds from Tatabánya-Bánhida ‘A–B’.



Fig. 1. A winged axe of Type Gmuden (Br C) from Tatabánya-Bánhida (L. 169.5 mm, W. 32.25 mm, Wt. 356.3 g, HNM, Inv. No. 1879.116, Photo: J. G. Tarbay)

2. The Selection of Objects

The finds were studied before and after restoration, which allowed the identification of all post-deposition damages¹⁷ that were probably caused by the finders (highlighted with red on Fig. 19.1.1,1.4,1.6, Fig. 20.1.7,18, Fig. 21.3.2,5,6, Fig. 27.4,6). Some fragments fitted well together along the modern breakage surfaces (Fig. 20.1.7–1.8, Fig. 21.6.1–6.2), while others had some missing parts (Fig. 19.1.4, Fig. 21.2,5) implying that not all parts of the objects may have been collected from the site.

2.1. Flange-hilted swords

Six fragments belonged to a flange-hilted sword with rhomboid-cross section and straight blade (Tatabánya-Bánhida 'A'). Based on their matching breakage surfaces, identical cross-sections and the correlating dimensions of their cast ribs curved out below the weapon's shoulders (Appx. 1.1.1; Figs 19–20).¹⁸ The lower part of the blade was decorated with a bundle of six lines. Although the broken hilt part did not allow a precise typological classification of this sword, there are some weapons which may be related to it typologically (blade rib, bundle of lines pattern, straight blade). Three swords can be mentioned here as examples without completeness. One was found in a burial from Unterhaching, Bavaria (Germany). It was classified to the Type Hemigkofen (Ha A1).¹⁹ Another fragmented specimen was in the Bruch a.d. Mur hoard from Styria (Austria) (Br D). This piece was associated with Type Reutlingen.²⁰ It should be noted that a small number of similar swords are also known from later periods. A fine example is a Type F sword from the Hajdúböszörmény-Csege halom hoard (Hungary) (Ha B1).²¹

The second sword (Tatabánya-Bánhida 'B') is a triangle-sectioned tip fragment, decorated with six cast bundle of lines (Appx. 1.6.1–6.2; Fig. 21.6). It is heavily melted and amorphous, thus unsuitable for precise typo-chronological evaluation.

The morphological elements and certain dimensions (weight, balance point) are essential in order to discuss these weapons' functionality.²² In case of the Bánhida swords, the information on these elements is insufficient, only the blade construction of the No. 1 flange-hilted sword (Tatabánya-Bánhida 'A') can be reconstructed. It was narrow with a somewhat emphasized midrib and an edge with parallel faces. Such swords are more fit for thrusting actions, but they were probably also suitable for cutting movements, as the shape of the blade did not restrict a weapons' fighting style entirely.²³ In the territory of Transdanubia, this weapon design is known since the Br C period, but it became characteristic between the Br D and Ha A1 periods.²⁴ The combination of the Tatabánya-Bánhida sword with younger Ha B1 finds (Type B1 cauldron) could mean that it is either an 'old' weapon or it represents older workshop and combat traditions.²⁵

17 TARBAY 2017a, 79–80; BELL 2019, Tab. 10.2.

18 KEMENCZEI 1991, Pl. 70.446.

19 SCHAUER 1971, 158, Pl. 68.466.

20 SCHAUER 1971, 143, Pl. 62.427.

21 KEMENCZEI 1988, Pl. 42.376.

22 KRISTIANSEN 2002, 320; MOLLOY 2007, 105, 109; MATTHEWS 2011, 102; MOLLOY 2011, 69, 74; KRISTIANSEN 2013, 201; GENE 2018, 140–147.

23 MOLLOY 2007, 100–101; MOLLOY 2008, 124, 126; CRELLIN et al. 2018, 286; GENE 2018, 141–142.

24 See KEMENCZEI 1988; KEMENCZEI 1991.

25 The combination of 'old swords' with younger ones is not unique at all. The best examples can be found in

From a technological point of view, swords found in hoards and burials could fall into different categories.²⁶ Most fragments of sword No. 1 show intense damages caused by fire. Thus, the identification of all steps related to the weapon's chaîne opératoire (forming, usage, damages and deposition)²⁷ cannot be observed. Such are for instance, the traces left by cold hammering and annealing along the cutting edges, or fine striations, which can be associated with surface treatment or edge sharpening.²⁸

Among the studied fragments only No. 1.7 was suitable for the identification of traces related to manufacture and usage. On this fragment fine grinding marks are visible (*Fig. 26.1*).²⁹ At one part, it is also possible to observe the sharpened cutting edge by touching (*Fig. 25.1*). Use-wear traces, that is small worn blade impacts were only detected on the preserved parts (for example *Fig. 25.2, 5*). Some of the traces are similar to V-notches (*Fig. 25.2*).³⁰ Shallow dents in clusters were also present on some parts (*Fig. 25.3–4*), which might be the result of rippling, based on the experimental study of Valerio Gentile and Annelou van Gijn.³¹ All traces were most likely results of blade-on-blade impacts³² caused by another weapon. On the basis of the observations described, sword No. 1 can be sorted to the category of finished products with traces of use.

The overall macroscopic character of sword No. 6 (Tatabánya-Bánhida 'B') supports that it may also have been a finished product. On the surface of fragment No. 6.2 it was also possible to observe shallow and worn notches and dents (*Fig. 28.3–4*).

Tobias Mörtz suggested that the treatment of swords in burials and hoards seems to be individual.³³ According to the study of Mariann Novák and Gábor Váczi, regularities and groups can be observed in the treatment of these weapons between the Br D–Ha A1 in the eastern Urnfield territory. On sword No 1. of Tatabánya-Bánhida 'A', all deliberate destruction traces mentioned (edge damages, impact marks, hacking, bending, heat damage) could be observed simultaneously.³⁴

- The first category includes several different marks caused by at least two bladed tools, possibly a chisel with narrow cutting edge and a larger axe. A deep and wide U-shaped notch was documented on fragment No. 1.5, which is a characteristic pre-deposition-

pure sword hoards from the Northeast Carpathians. Such 'old' weapons could have a complex and long use-life before they were selected to burials, hoards or wetland areas. PEARCE 2013, 56; TARBAY 2018b, 315–319.

26 1. as-casts, 2a. unfinished products, 2b. unused finished products, 3. finished products with some traces of use, 4. finished product, which use-wear traces were removed (re-sharpened before deposition), 5. finished products with intense traces of use (repairs, hilt and blade abrasion etc.). KRISTIANSEN 1984, 198, Fig. 6–7; FONTIJN 2005, 151; MOLLOY 2011, 72–73.

27 QUILLIEC 2007, 408–411, Fig. 3, Fig. 17; QUILLIEC 2008, 68.

28 Ó FAOLÁIN – NORTHOVER 1998, 74–76, 84–85, Pl. 6–9; TRNKA et al. 2009, 221–223; MÖDLINGER – NTAFLÖS – SALABERGER 2010, 51–52, Fig. 7; MOLLOY 2011, 70–71, 75; MÖDLINGER 2011, 163; SIEDLACZEK 2011, 116; HORN 2014, 33–34, Fig. 5d; TARBAY 2015a, Fig. 2.1; TARBAY 2015b, Pl. 9.3; SAPIRO – WEBLER 2016, 3181–3183; TARBAY 2016a, Fig. 5.2–4, Fig. 6.8; TARBAY 2017a, Fig. 19.5; CAO 2018, 232–236; MOLLOY 2018b, 213–214.

29 HORN 2014, 33.

30 BRIDGFORD 2000, 105–107; BUNNEFELD – SCHWENZER 2011, Tab. 3; MOLLOY 2011, 75, fn. 21; BELL 2019, 153, Fig. 10.1.a.

31 BELL 2019, 153, Fig. 10.1.c; GENTILE – VAN GIJN 2019, 137, Fig. 5D.

32 MOLLOY 2018b, 216; BELL 2019, 153; GENTILE – VAN GIJN 2019.

33 MÖRTZ 2018, 180.

34 NOVÁK – VÁCZI 2012, 101–105, Fig. 4.

al trace (*edge notching*) (Fig. 22.4).³⁵ On fragment No. 1.6 two deep V-shaped indentations with material displacement can be observed that were the results of impacts from oblique direction.³⁶ Based on their depth they can similarly be interpreted (Fig. 23.2).³⁷ Two pieces showed long blade impact marks (Fig. 22.3, Fig. 24.2).

- There is a connection between some of the blade impact marks and the hacking of the sword. On some fragments, impacts appear in clusters,³⁸ usually near to the breakage surface (Fig. 22.2, Fig. 23.1) or where the fragment was bent (Fig. 22.1, Fig. 23.3, Fig. 24.3–4). There are even slant cut-like marks in connection with the blade hacking (Fig. 23.4).
- Macroscopic observations suggest that the intensity of heat damage varied between the fragments, and there was also a correlation between the heat treatment and fragmentation. On some fragments the breakage surfaces are sharp (Fig. 27.2) and the impacts are shallow (Fig. 23.3), while other pieces show amorphous (Fig. 27.1) or even completely melted surfaces (Fig. 27.3) combined with deep impacts (for example Fig. 22.2, Fig. 23.1). These macroscopic traits suggest that these fragments were exposed to different temperature during manipulation.³⁹
- Bending, accompanied by cracks in certain parts were also present on some fragments.⁴⁰ Experimental studies indicate that bending can occur during combat. Since bronze swords were made of a ‘soft material’ they could easily be bent back by their user.⁴¹ Kristian Kristiansen also suggested that warriors themselves could have slightly bent the swords similarly to modern practice.⁴² The different bending marks on the Tatabánya-Bánhida swords are extreme, some parts were even bent to 90 degrees (Fig. 20.1.7–1.8). Consequently, they do clearly not belong to the category above. The manipulation of swords by bending is a ritual practice without boundaries that was observed in several European territories.⁴³ Experiments of Claudio Giardino, Georges Verley and recently Matthew Giuseppe Knight pointed out that even U-shaped bending can be done by hand, without heat treatment, if the tip’s end and the hilt is simultaneously pressed. The other method is plastic deformation.⁴⁴ The bending marks of the Tatabánya-Bánhida ‘A’ sword correlated with blade impacts and fire damages supporting the idea that these served to help the hacking of the weapon.⁴⁵ Intentional bending without breakage was only detected on one fragment (No. 1.7–1.8). In sum, the damage traces on the Tatabánya-Bánhida sword No. 1 suggest that the weapon

35 RAU 2016, 176, Fig. 2; MÖRTZ 2018, 170, Fig. 11.3; BELL 2019, 153, 155, Fig. 10.1.b.

36 HORN 2014, 22.

37 Comparable traces on a sword without melted damages were interpreted as use-wear marks by Kristiansen. KRISTIANSEN 2002, Fig. 4a–b.

38 BELL 2019, 155.

39 This hypothesis should be verified by future metallographic sampling or Time-of-flight Neutron Diffraction analysis.

40 NOVÁK – VÁCZI 2012, 99.

41 MOLLOY 2011, 75; KNIGHT 2018, 118, 120–121, Fig. 4.45, Fig. 4.48–4.49; GENTILE – VAN GIJN 2019, 137, Fig. 6E.

42 KRISTIANSEN 2002, 320.

43 BIETTI SESTIERI et al. 2013, 167; LLOYD 2015, 18.

44 BIETTI SESTIERI et al. 2013, 167–169; KNIGHT 2018, 128–134.

45 COLQUHOUN 2011, 57.

was bent and broken to pieces in a pre-heated, even half-melted state by bladed tools (chisel and axe). Its treatment was violent and clearly reflects on a deliberate destruction that mutilated this sword to an almost unrecognizable state (Fig. 2.1–2).⁴⁶

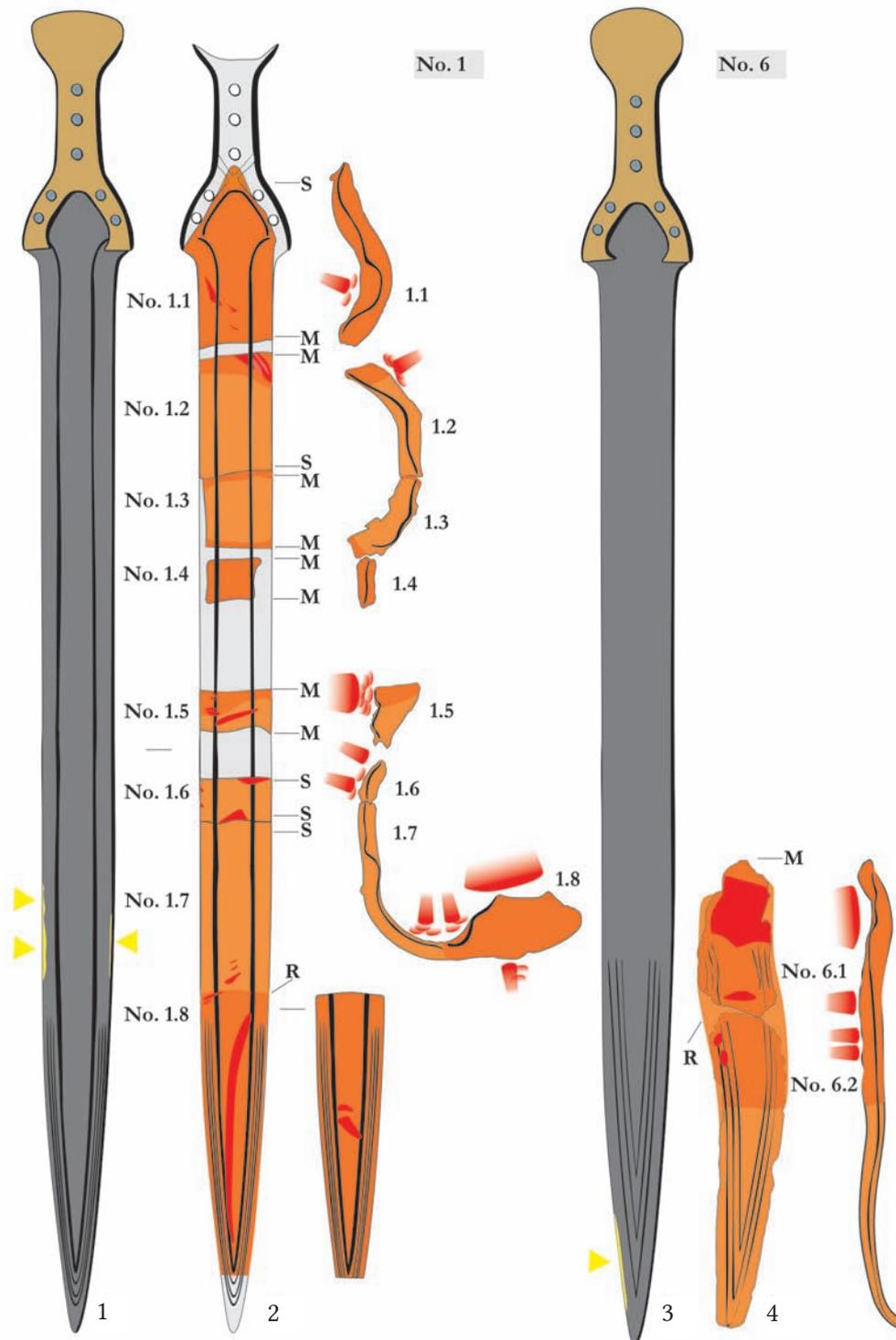


Fig. 2. Manipulation and use marks of the swords from Tatabánya-Bánhida 'A-B'. 1-2 – Tatabánya-Bánhida 'A', 3-4 – Tatabánya-Bánhida 'B' (yellow – use-wear traces, dark orange – intensely melted parts, red – tool impacts, M – melted breakage surface, R – recent breakage surface, S – breakage surface) (Graphics: J. G. Tarbay)

46 NEBELSICK 2000.

The treatment of the second sword (Tatabánya-Bánhida 'B', No. 6) is identical to the first. It is a longer tip fragment, which was originally intact during deposition and was broken into two as a result of post-depositional damage. The fragment is slightly bent and its upper part is completely melted (Fig. 28.1). Several damages can be observed on the sword, which was carried out in melted state. A deep blade impact (Fig. 27.8) or other damages on the cutting edge (Fig. 28.2) are visible. On fragment No. 6.1 an axe blade like imprint can be seen (Fig. 28.1). This damage could have occurred when the tool touched the sword blade in a half-melted state.

Both swords from Tatabánya-Bánhida were destroyed completely by methods which served no mundane purpose (for example partitioning for recycling etc.).⁴⁷ This type of weapon manipulation, especially when it was done on a used object, reflects a very symbolic act that can be interpreted in various ways. Either such weapons may have been 'dangerous' or 'tainted' objects which were used to harm or kill other human beings or they symbolize their users who represent continuous threat to the society, let it be a fallen enemy or a warrior, who has the power to overcome social rules.⁴⁸ The 'transformation' or 'purification' of these objects by various methods, like intentional alteration (bending) or physical destruction (fragmentation, fire damages) or their ritual 'containment' to a special topographical context like wetland areas (lakes, bogs, rivers) is essential.⁴⁹ Perhaps the most favoured hypothesis is the ceremonial destruction of the enemy's weapons as 'insult' and also as a sacrifice towards deities, an act that was usually carried out by bending, breakage or even by fire. Analogues of such a treatment has many parallels in the antique and modern world alike.⁵⁰ For the sword No. 1 from Tatabánya-Bánhida this interpretation is less plausible, as its typological design reflects local traditions. Swords are especially complex weapons and for their treatment several different ritual traditions have already emerged in the Bronze Age.⁵¹ As among others, Mark Pearce emphasized that some could have own identities, even names, especially the ones with extended use-life⁵², as it can be assumed in case of the Tatabánya-Bánhida 'A' sword on the basis of typology and usage.

2.2. *Armspiral*

By the typological classification of fragment No. 2 (Appx. 1.1, Fig. 21.2) Amália Mozsolics was correct.⁵³ This object has a triangle cross-section, which is more characteristic to armspirals than rings which, during the Late Bronze Age, tend to have circular or slightly rectangle cross-sections. As fragment No. 2 is quite small, a precise classification of the object is impossible. Armspirals are more characteristic in the Northeast Carpathian Basin. In Transdanubia they are less common and are usually selected to large scrap hoards as fragments.⁵⁴ Triangle cross-sectioned armspirals were distributed in a wider geographical area and as Peter König has pointed out, their chronological position is rather 'timeless'.⁵⁵ Armspirals with triangle

47 COLQUHOUN 2011, 57–58.

48 FONTIJN 2005, 149–151; QUILLIEC 2008, 75; TAGLIAMONTE 2016, 167; MÖRTZ 2018, 180.

49 FONTIJN 2005, 150, 152; TAGLIAMONTE 2016, 166.

50 ALDHOUSE-GREEN 2006, 290–300; DE MARTINO – DEVECCHI 2016, 12–13; TAGLIAMONTE 2016, 165–166.

51 See SOROCEANU 2011a; SOROCEANU 2011b.

52 KRISTIANSEN 2002, 329–330; PEARCE 2013, 64.

53 MOZSOLICS 1985, 94.

54 E.g. Bonyhád, Keszőhidegkút, Pamuk, Pölöske, Velem. MOZSOLICS 1985, 29, Pl. 39.16, Pl. 105.12, Pl. 128.21, Pl. 231B.

55 KÖNIG 2004, 112–113.

cross-section and rolled terminals are known from the Drenov dô hoard, dated to Stufe 4 (Ha B1).⁵⁶ Similar artefacts were found in the East Carpathian Basin between the Br D and Ha B1 (for example Uzhhorod 4 – Ha A1, Malaja Dobron' 1 – Br D, Podmonastyr' 2 – Br D).⁵⁷

2.3. Type B1 Cauldron

The typological identification of Amália Mozsolics⁵⁸ can be verified based on small details such as the thickness and the rim decoration of fragments (Appx. 1.1; Fig. 21.3). This pattern consists of a bundle of five lines and a line of chased arcs. This pattern combination is only known on two vessel types: the Type Egyek cups⁵⁹ and Type B1 cauldrons.⁶⁰ However, completely identical parallels to the Tatabánya-Bánhida finds are exclusively known among cauldrons and fragments that may have belonged to these vessels (Cornești,⁶¹ Hajdúsámson 2,⁶² Krásna nad Hornádom,⁶³ Nyírtelek,⁶⁴ Tärpiu-Valea Lungă).⁶⁵ Several parallels decorated with a similar pattern can be mentioned from Transdanubia (Budapest-Nagytétény),⁶⁶ the Northern Balkans (Bokavić)⁶⁷ and the East Carpathian Basin (Kántorjánosi,⁶⁸ Mezőkövesd,⁶⁹ Moigrad 1,⁷⁰ Rohod 3,⁷¹ Tiszakarád-Szárnyaszög tanya 2,⁷² Visuia)⁷³, which also belong to cauldrons. Except for a handful of cases, the deposition of these vessels was predominant during the Ha B1 period.⁷⁴ Type B1 cauldrons are primarily characteristic in the Hungarian Nyírség, where research has hypothesized a possible workshop. The main distribution area of these vessels correlates with the 'territory' of the Gáva pottery style, which covers the regions of the Northeast Carpathian Basin, West Ukraine and Transylvania. Only a few specimens can be mentioned outside this region, from the Northern Balkans, Czech Republic, Germany, Scandinavia and Eastern France (Appx. 2.1; Fig. 3.A).⁷⁵

In addition to the Budapest-Nagytétény cauldron, the Tatabánya-Bánhida 'A' find is the only known piece west of the Danube. It is worth noting in this context that the object combination of the latter find is primary known in the East Carpathian Basin, where cauldrons were selected along with swords, metal vessels and even armspirals (Fig. 3.C–B). They are also frequently combined with swords (C4–C6, C8) and situlae (C3, C6–C9) (Fig. 3.C). These

56 KÖNIG 2004, 112–113, 196–197, Pl. 56.13–15.

57 KOBAL' 2000, Pl. 37A.43, Pl. 39.12, Pl. 40.24, Pl. 70.22.

58 MOZSOLICS 1984, 69; MOZSOLICS 1985, 94.

59 E.g. GANARD – PININGRE 2015, 164–168, Figs 151–152.

60 VON MERHART 1952, 4–5.

61 SOROCEANU 2008, 149, Pl. 31.112.

62 ZOLTAI 1926, 130–131, Fig. 2; PATAY 1990, 22, Pl. 6.9.

63 JAVORSKÝ 1980, 109, Fig. 60.3; NOVOTNÁ 1991, 48, P. 9.49.

64 PATAY 1990, Pl. 15.21.

65 SOROCEANU 2008, 150–151, Pl. 32.118.

66 JELENTÉS 1912, 37; PATAY 1990, 25, Pl. 23.30.

67 KÖNIG 2004, 184–191, Pl. 48.257.

68 JÓSA 1895a; JÓSA 1895b, 355; PATAY 1990, Pl. 10.14.

69 PATAY 1969a, 173, Fig. 6–7, Pl. 44.6–7; PATAY 1990, Pl. 13.20.

70 NESTOR 1935, 26–28, Fig. 1.1–1a, Fig. 2.11; SOROCEANU 2008, 128–130, Pl. 20.93.

71 JÓSA 1910, 116–117, Pl. 7; PATAY 1990, 24, Pl. 16.23; MOZSOLICS 2000, 68–69.

72 MOZSOLICS 1969, 43, Fig. 2.2; PATAY 1990, Pl. 21.28.

73 DÄNILÄ 1976, 69–70, Fig. 1.1–2, Fig. 3.6, Fig. 7; SOROCEANU 2008, 130–132, Pl. 22.96.

74 VON MERHART 1952, 5–6; NOVOTNÁ 1991, 54; THEVENOT 1991, 74, Fig. 72; KOBAL' 2006, 97; SOROCEANU 2008, 132; MARTIN 2009, 93; SCHMIDT – SEGSCHNEIDER 2014, 473; NOVOTNÁ – KVIETOK 2018, 12.

75 VON MERHART 1952, 5–6, Map 1; PATAY 1990, 27–29, Pl. 78; THEVENOT 1991, 72–74, Fig. 73; KOÓS 2004, Fig. 8; SOROCEANU 2008, 132; SCHMIDT – SEGSCHNEIDER 2014, 473; NOVOTNÁ – KVIETOK 2018, 11–12.

object combinations also call attention to the fact that the concept of selection in the Tata-bánya-Bánhida ‘A’ find or at least some of its elements (sword–cauldron–armspiral–‘situla’) reflect to the selection of Ha B1 hoards from the Northeast Carpathian Basin. Most of these closely related assemblages fall into the group of elite hoards that might have belonged to the local elite groups of that area (Appx. 2.1). It should be noted that similar object selections can be found even west of the Danube River, if uncertain fragments are also taken into account. An important example is the Bokavić hoard from Bosnia and Herzegovina, which contains fragments of a situla, cauldron and broken swords.⁷⁶

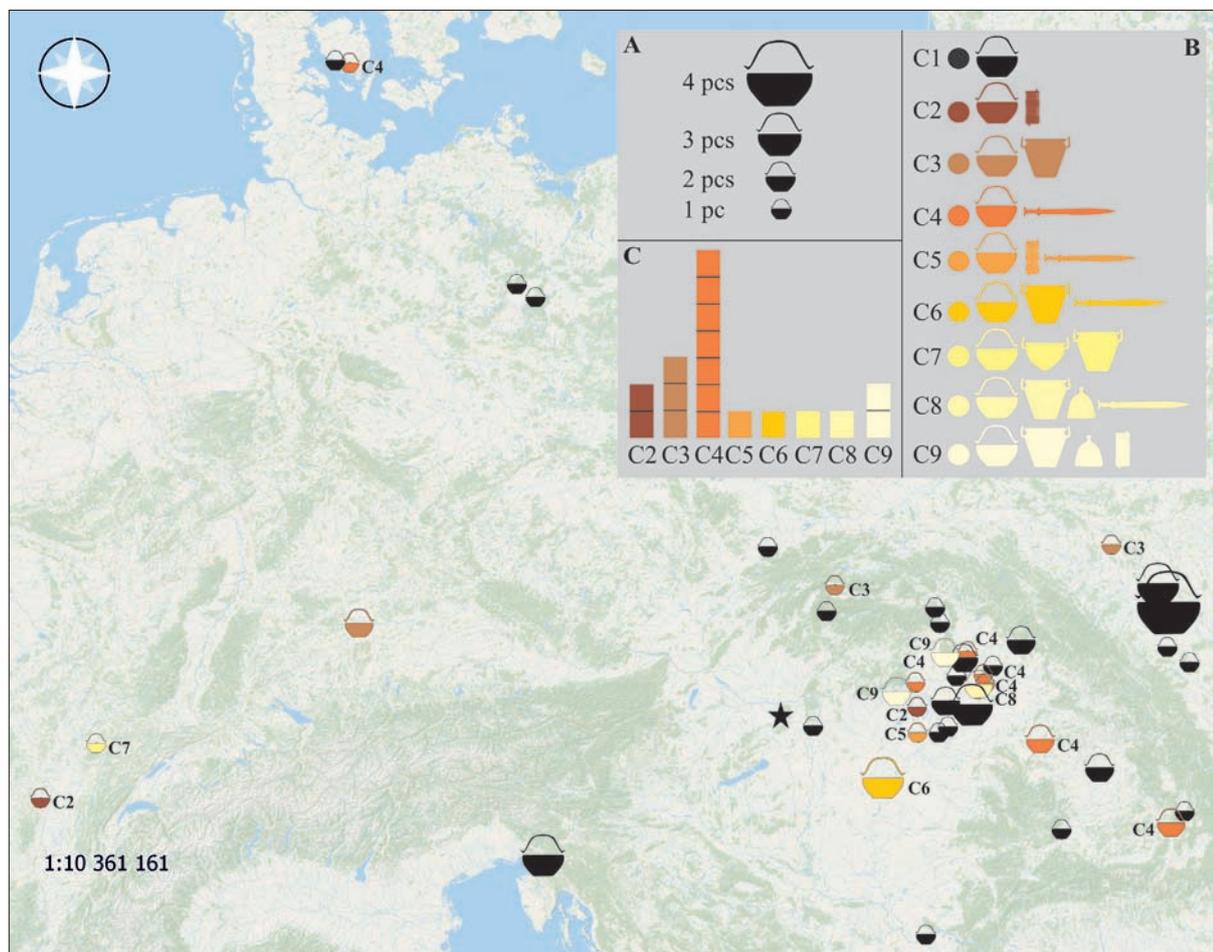


Fig. 3. Distribution of typologically well identifiable Type B1 cauldrons in Europe. A. Number of specimens, B. Object combination groups (1 – only cauldrons or one cauldron, 2 – cauldron–armspiral, 3 – cauldron–situla, 4 – cauldron–sword, 5 – cauldron–armspiral–sword, 6 – cauldron–situla–sword, 7 – cauldron–strainer–situla, 8 – cauldron–situla–helmet–sword, 9 – cauldron–situla–helmet–armspiral), C. Frequency of combination groups (Appx. 2.1) (Graphics: J. G. Tarbay)

The cauldron fragments’ preservation condition did not allow their precise characterisation from the point of manufacturing and use. The body fragments consist of two heavily melted parts, broken by bending. They are also fused with other metal sheet objects (Fig. 21.3–4). The handle shows no visual traces of heat damage and it was broken into more than three parts. Cauldrons are mainly known from metal hoards, some were recovered from wetland areas.

76 KÖNIG 2004, 184–191, Pl. 37.1–4, Pl. 48.253, 256–258, 260, 264.

It is difficult to gain an accurate picture on their breakage and manipulations, since the description of these vessels in the literature is primarily typological. Rarely are there any accurate descriptions of damages or notes on different post-deposition phenomena.⁷⁷ Relying on the currently available data (See Appx. 2.1), an attempt was made at outlining the variety of Type B1 cauldron fragmentation with a remark that future re-examination of the finds is essential to refine our results.

Based on the fine reconstructions in the *Prähistorische Bronzefunde* volumes, it can be assumed that intact deposition was typical for Type B1 cauldrons. In fact, fragmented specimens significantly outnumbered the intact ones. As multi-part objects, cauldrons can be manipulated in various ways on their body, handle attachments or handles. The damages on the body are typically dents or breakages along the wall or on the bottom. Some were in several pieces due to intentional fragmentation or taphonomic damage. Many have a damaged bottom part. Handle attachments can be broken or dismantled. Handles can also be missing, or they were deposited as fragments. Based on the presence of manipulations,⁷⁸ breakage or missing parts we can sort the well-identifiable Type B1 cauldron fragments to seven combination groups by cluster analysis, applying Euclidean distance (*Fig. 4*). In addition to intact vessels (A1B1C1), heavily fragmented specimens (A2B2C2), cauldrons with missing or broken handles (A1B1C2) or bodies (A2B1C1) or bodies and handle attachments (A2B2C1) are the most characteristic. Our preliminary results suggest that breakage, manipulation and dismantling of cauldrons were the typical ways of treatment before the objects were selected to hoards, burials or hidden to wetlands.⁷⁹

The Tatabánya-Bánhida find fits well to this system. It can be sorted into the most damaged combination group (A2B2C2). However, for its evaluation we also need to consider the atypical fragments. As the cluster analysis showed, manipulations with handles are present in four (A2B1C2, A1B1C2, A1B2C2, A2B2C2) of the seven combination groups, suggesting that dismantling and/or breaking of deposited handles was frequent. The selection of broken cauldron handles is known from the territory of Transdanubia, East Hungary and Transylvania between the Ha A1 and Ha B1.⁸⁰ In this respect, we can mention two handle fragments, one from Gyermely-Szomor and another from Sárboigrád-Sárszentmiklós, since both were deposited in the same Ha B1 period as the Tatabánya-Bánhida find.⁸¹ The selection of rim fragments also seems frequent, examples can be cited from East Hungary (Borsodbóta),⁸² Slovakia,⁸³ Transylvania⁸⁴ and Bosnia and Herzegovina.⁸⁵

77 Like damages on the Mezőkövesd cauldrons. See PATAY 1969a, 171–173; PATAY 1990, 23.

78 The identification of finer damages (for example dents, impacts) was not possible in most cases from the data obtained from literature.

79 It is very important to note that damages on cauldrons may not be in all cases results of intentional manipulation. Repair marks are visible on many specimens, suggesting that the breakage of the vessel's handle attachments and body may have been caused by their use. PATAY 1990, 10–11; GEDL 2001, Pl. 73.B4. It also refers to the fact that cauldrons were also valuable objects used for an extended period as it is assumed in case of swords.

80 PATAY 1990, 31–34; SOROCEANU 2008, 149–130.

81 KEMENCZEI 1996, Fig. 9.15; TARBAY 2015b, Pl. 6.77.

82 In light of the hoard's circumstances of discovery as well as personal study of the object, we believe that this find can be interpreted as a recently broken fragment. VON KENNER 1860, 367; PATAY 1990, 32, Pl. 25.35.

83 NOVOTNÁ 1991, Pl. 10.50.

84 SOROCEANU 2008, Pl. 30.107–109, Pl. 31, Pl. 30.110–112, Pl. 32.118–119.

85 KÖNIG 2004, Pl. 48.257–258.

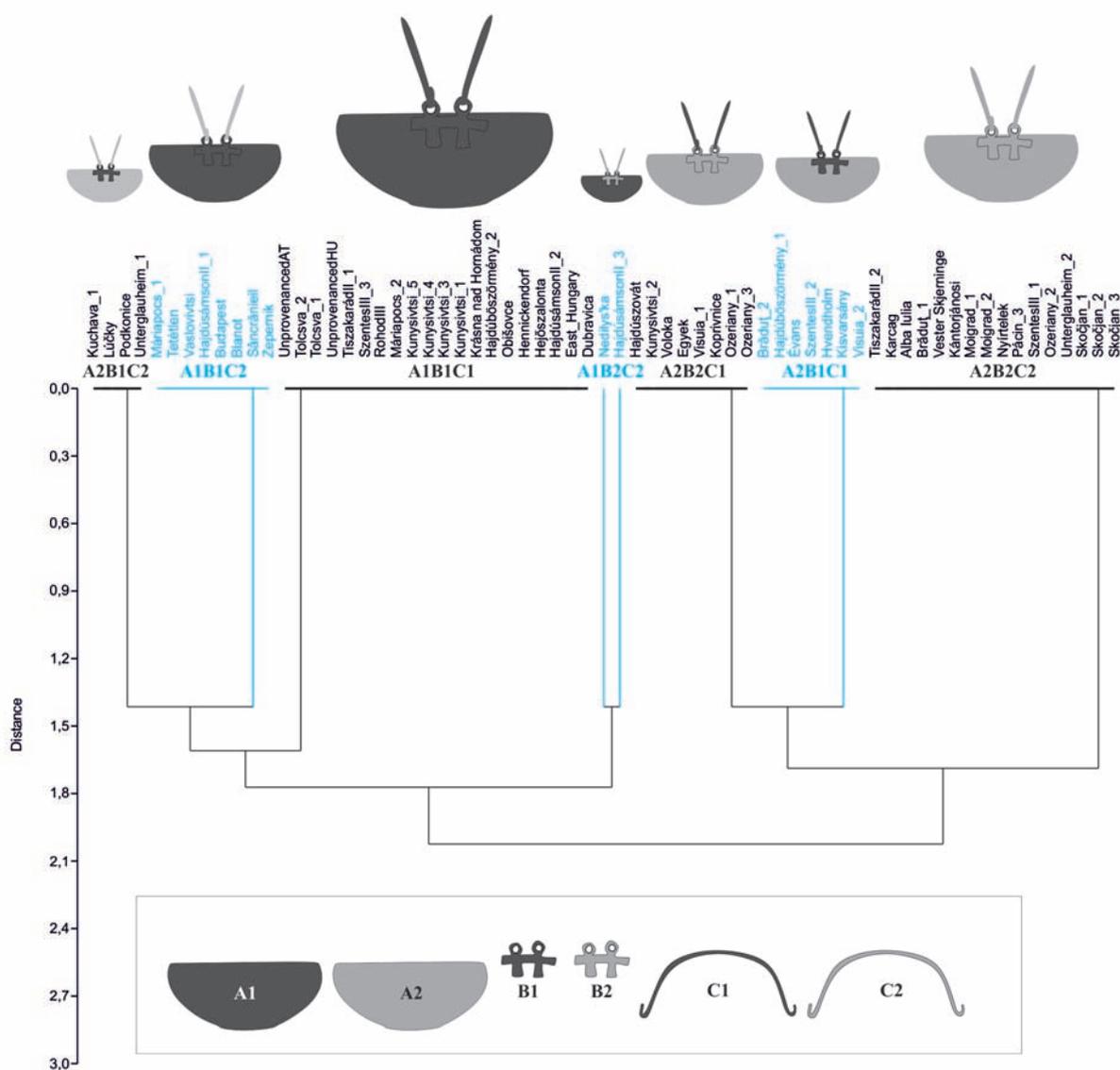


Fig. 4. Cluster analysis of Type B1 cauldron fragmentation, applying Euclidean distance (Appx. 2.1) (Graphics: Past 2.17, J. G. Tarbay)

Not much is known about the frequency of fire damages on Type B1 cauldrons. The fragments from the Škočjan Mušja jama site can be highlighted, which have been bent and some showed traces of fire damage.⁸⁶ In addition to the burial from Vester Skjerninge, which in a way relates to the Bánhida find by the treatment and selection of objects,⁸⁷ the finds from Škočjan Mušja jama are the closest and best parallels for the treatment of the Bánhida cauldron.

2.4. Metal sheet with rolled rim ('miniature greave')

Three thin metal sheet fragments were corroded on the No. 3.1 cauldron piece (Appx. 1.1, Fig. 21.3–4). One of them has a rolled rim according to microscope-camera image (Fig. 6.2, Fig. 21.4, Fig. 27.5). During the Late Bronze Age, rolled rims appear on different metal products like bronze vessels (situlae), armours and defensive weapons. The role of this technological solution was to

86 BORGNA et al. 2016, 586, Pl. 29.1–5, Pl. 30.3; JEREB 2016, 104–105, Pl. 122–123.

87 THRANE 1965, 175–179, Pl. 10a.1–12.

make the edges of sheet metal products more resilient against damages caused by daily use or combat. In case of large objects, rolled rims are often reinforced with a wire. Regarding the typological properties of the local metal sheet products, fragment No. 4 could have been the edge of a miniature greave. As comparative data, an unidentified greave (*Fig. 5.2*),⁸⁸ a miniature greave fragment (*Fig. 5.4.1–4.2*) from the ‘Bonyhád vidéke’ hoard and another greave fragment from the Bodrogkeresztúr 1 hoard (*Fig. 5.1*) will be re-published here.⁸⁹ The thickness of the Tatabánya-Bánhida fragment (rim: 3.11 mm, sheet: 0.80 mm) correlates more with the miniature greave from Bonyhád (rim 1.46 mm, sheet: 0.62 mm). The difference of 1.65 mm may be due to the corroded condition of the object (See Appx. 1.1, 1.3). It is also important to note that the rim of object No. 4 was not folded on a wire, similarly to the miniature greave from ‘Bonyhád vidéke’.

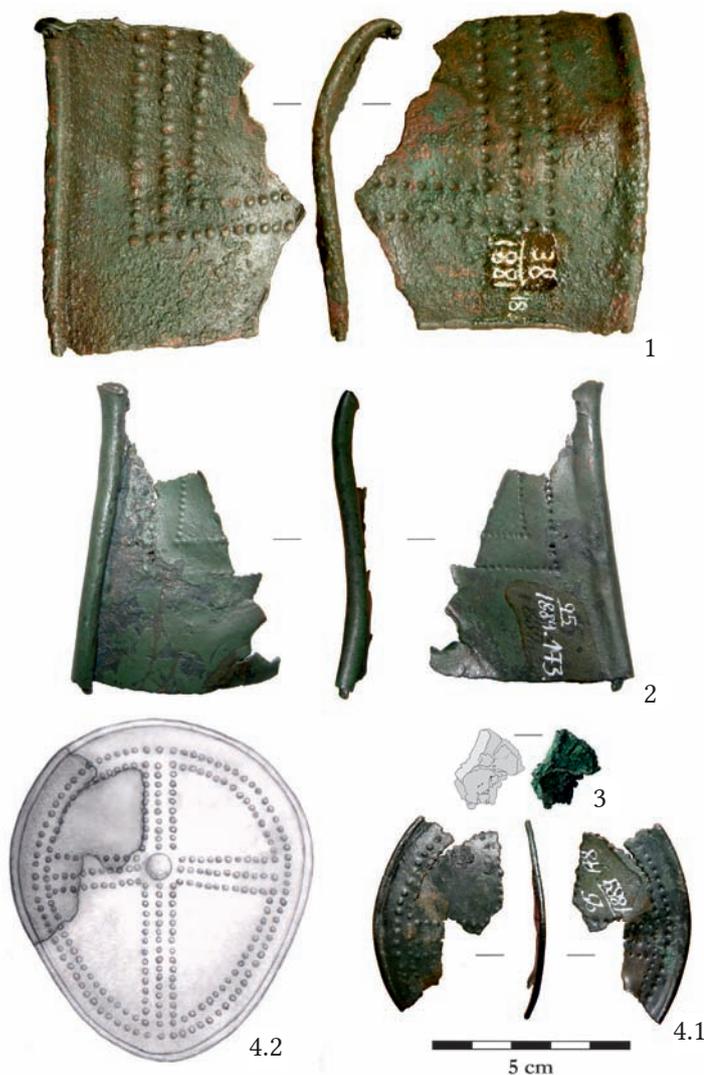


Fig. 5. Late Bronze Age greave and miniature greave fragments: 1 – Greave fragment from the Bodrogkeresztúr 1 hoard, 2 – Greave fragment from the ‘Bonyhád vidéke’ hoard, 3 – Probable miniature greave fragment from Tatabánya-Bánhida A, 4.1 – Miniature greave fragment from the ‘Bonyhád vidéke’ hoard, 4.2 – Reconstruction of the miniature greave from the ‘Bonyhád vidéke’ hoard (HNM, Photos and drawing: J. G. Tarbay) (Appx. 1.3).

88 Related finds, See FOGOLARI 1943, Fig. 1; KEMENCZEI 2003, Pl. 7.19; WINDHOLZ-KONRAD 2008, Fig. 53; TARBAY 2015a, Fig. 16–17; MÖDLINGER 2017, 222–227.

89 KEMENCZEI 2003, 26, Pl. 7.19.

The research of miniature greaves in Eastern Europe started with the study of Mirko Bulat, who was the first to recognise this type and to point out the similarities between the metal sheet object from the 2nd Poljanci hoard and the Rinyaszentkirály greave.⁹⁰ Miniature greaves have been discussed in details by Amália Mozsolics and Katalin Jankovits and recently by Marianne Mödlinger.⁹¹ Parallel Italian finds were also published from burial context (for example Pratica di Mare – Tomba XXI).⁹² In addition to the miniature greave from Bonyhád, an identical specimen can be mentioned from Esztergom-Szentgyörgymező,⁹³ and other related finds from the Gyöngyössolymos-Kishegy 4,⁹⁴ Debrecen-Fancsika 1⁹⁵ and Poljanci 2⁹⁶ hoards. From a typo-chronological point of view Hungarian specimens were classified to the Kurd Horizon (Ha A1), while the Poljanci 2 find was associated with Phase II (Br D–Ha A1).

In case of the Carpathian Basin and the Northern Balkans, miniature greaves were only found in hoards. Due to their small number, it is not possible to draw representative conclusions on their treatment. The specimens from Esztergom-Szentgyörgymező and Gyöngyössolymos-Kishegy 4 were deposited as complete objects, and breakage was only visible on the former.⁹⁷ The miniature greaves from Debrecen-Fancsika are fragments (half and ca. quarter fragment), just like the specimen from ‘Bonyhád vidéke’.⁹⁸ It is important to highlight the miniature greave from Poljanci 2, which was broken and folded just like some of the real-sized greaves (for example Lengyeltóti 5).⁹⁹

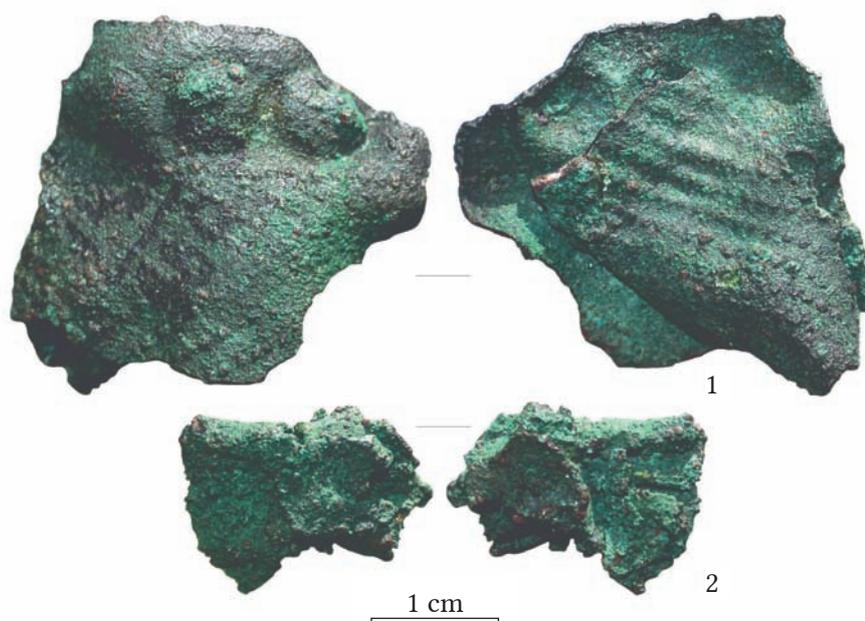


Fig. 6. Sheet metal fragments from the Tatabánya-Bánhida A find: 1. – Hajdúböszörmény-style metal vessel, 2 – ‘Miniature greave’ (Photos: J. G. Tarbay) (Appx. 1.1).

90 BULAT 1975, 16, Pl. 15.9.

91 MOZSOLICS 1985, 74; JANKOVITS 1997, 9, Fig. 6. 1–5; MÖDLINGER 2017, 237–240.

92 SOMMELLA 1976, 294–295, Pl. 75A; BIETTI SESTIERI 2011, 410, Fig. 5; MÖDLINGER 2017, Tab. 4.5.

93 HORVÁTH et al. 1979, 212, Pl. 20.13; MÖDLINGER 2017, Fig. 4.8.

94 KEMENCZEI 1980, 138, Fig. 2, Pl. 5.1.

95 PATAY 1966, 76, Pl. 1.23–24, Pl. 2.8; MOZSOLICS 1985, 110, Pl. 216. 22–23.

96 BULAT 1975, 16, Pl. 15.9.

97 HORVÁTH et al. 1979, Pl. 20.13; KEMENCZEI 1980, Fig. 2, Pl. 5.1; MÖDLINGER 2017, Fig. 4.8.

98 PATAY 1966, Pl. 1.23–24, Pl. 2.8; MOZSOLICS 1985, Pl. 40.9, Pl. 216.22–23.

99 BULAT 1975, 16, Pl. 15.9; HONTI – JANKOVITS 2016, Fig. 2.

2.5. Hajdúböszörmény-style metal vessel

The most puzzling fragment from Tatabánya-Bánhida 'A' is a thin metal sheet decorated with a row of embossed dots framed by lines of *repoussé* patterns and a fishbone-like decoration made by the same technique (Appx. 1.1, Fig. 6.1, Fig. 7.3, Fig. 21.5). Amália Mozsolics has already determined this find as part of a metal vessel,¹⁰⁰ but at the time of her publication, the objects' complete pattern was not possible to observe due to the intense corrosion on its surface (Fig. 7.3, Fig. 21.5).

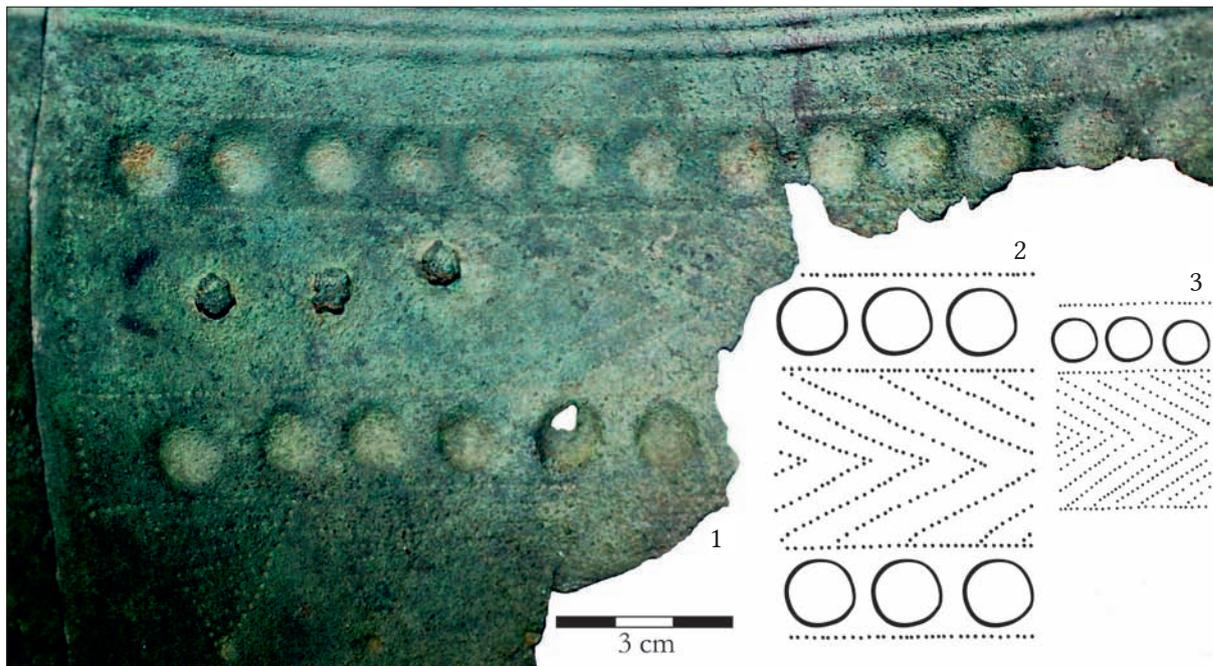


Fig. 7. 1 – Patterns of the Tiszanagyfalu situla viewed from inside (HNM, Budapest, Photo: J. G. Tarbay), 2 – Sketch of the Tiszanagyfalu situla's pattern, 3 – Sketch of the No. 5. Tatabánya-Bánhida A metal sheet object's pattern.

Identical or similar pattern combinations are known from armours and metal vessels. First, a certain group of the Hajdúböszörmény type situlae can be mentioned which have been discussed by Pál Patay.¹⁰¹ Three of these situlae (Tiszanagyfalu 1,¹⁰² Nedilys'ka,¹⁰³ Unprovenanced¹⁰⁴) have similar patterns on their shoulder lines. It should be noted that the size of the Bánhida fragment is smaller than the Tiszanagyfalu (Fig. 7) and Nedilys'ka situlae. This does not exclude the possibility that it belonged to a Hajdúböszörmény type situla since this vessel type has no standard size. The combination of fishbone-like patterns with embossed dots is also visible on an unprovenanced conical-shaped strainer,¹⁰⁵ on the sheet metal arm guards from Hajdúsámson-Kistelek 3¹⁰⁶ and on a small fragment from the Bokavić hoard.¹⁰⁷ Among the

100 MOZSOLICS 1985, 94.

101 PATAY 1969b; PATAY 1970.

102 PATAY 1969b, 11–14, Fig. 1–2; PATAY 1990, 42, Pl. 34.64.

103 SULIMIRSKI 1937, 254, 277, Pl. 3.7; PATAY 1969b, 14, Fig. 3; PATAY 1970; GEDL 2001, 63–64, Pl. 77.C6.

104 See TARBAY 2018a, 332, Fig. 11.

105 VELLAČIK 2015, 160–161, Fig. 4–5.

106 JANKOVITS 1999, 129–130, Fig. 1–4; MOZSOLICS 2000, 48, Pl. 37.1 2.

107 KÖNIG 2004, 184–191, Pl. 48.256.

loosely related parallels, two additional Hajdúböszörmény type metal vessels from Biernacie¹⁰⁸ and Lúčky¹⁰⁹ can be mentioned, both of which are decorated with a line of embossed dots and a bundle of slant *repoussé* lines instead of a fishbone pattern. It is worth noting that this style is also present on the cuirasses from Fillinges and on an unprovenanced specimen.¹¹⁰ By the above listed parallels, it can be presumed that fragment No. 5 from Tatabánya-Bánhida could have been part of a Hajdúböszörmény type situla or a smaller metal vessel, which followed the style of these enigmatic objects. One could argue against this typological determination, but it is beyond doubt that the chronological position of the object was the Ha B1 period.

The studied fragment is amorphous and slightly melt in the middle part due to fire. If we accept that it was part of a Hajdúböszörmény type situla, then it belongs to the group of heavily fragmented specimens within the deposition pattern of this vessel type.¹¹¹ In this respect, the fragments from the scrap hoards of Bokavić and Keszőhidegkút should be emphasized. Specimens from the former are similar regarding their size, and one even shares typological relations. It is also worth noting that in this hoard too the combination of situla fragments with small cauldron pieces can be detected.¹¹² The fragment from the Keszőhidegkút hoard shows no traces of fire damage.¹¹³

2.6. Pattern of Selection

Six objects were identified in the Tatabánya-Bánhida find material, of which five (A) could have belonged together: a sword, an armspiral, a cauldron, a 'situla/Hajdúböszörmény-style metal vessel', and a 'miniature greave'. Two fragments of a sword were probably part of a separate find (B). The relative chronological position of the objects cannot be precisely determined in all cases. The parallels of the cauldron and the Hajdúböszörmény-style metal vessel fragment supports the idea that 'Tatabánya-Bánhida A' may have been buried around the Ha B1 period. In terms of manufacturing, all objects were finished products. Use-wear traces were only observable on the two swords. Even if the possibility of post-depositional damage is taken into account, it is clear that the Tatabánya-Bánhida finds show a *pars pro toto* selection, as only small fragments of the original objects were selected. On all objects different prehistoric manipulations can be observed. Valuable sheet metal products were broken, folded (cauldron) and also damaged by fire. The handle of the cauldron was broken into pieces. The most complex manipulation was observed on the swords, which were burnt, bent and broken with the aid of certain bladed tools (chisel and axe) to an almost unrecognisable state (*Fig. 2, Fig. 8*). Only a single piece remained from the presumed miniature greave. The breakage traces on the armspiral were recent. In connection with this observation, it should be added that some of the finds showed recent breakage surfaces, which suggests that probably not all pieces of the objects were delivered to the museum.

As it has been mentioned above, the Tatabánya-Bánhida 'A' assemblage consists of functional objects: a used sword, an East Carpathian metal symposium set (cauldron, 'situla') and ornaments, such as the armspiral or the miniature version of a prestigious greave. All these ele-

108 GEDL 2001, 17, 33, Pl. 11.37.

109 NOVOTNÁ 1991, Pl. 11.54.

110 SCHAUER 1982, 92–112, Fig. 2, Pl. 16–47; MÖDLINGER 2017, 214, Pl. 30–31.

111 See with literature TARBAY 2018b, 334–337, Lists 1.1–1.2.

112 KÖNIG 2004, Pl. 48.253–254, 256–258.

113 PATAY 1990, 84, Pl. 70.166.

ments have a strong symbolic meaning, reflecting on the identity and perhaps even the status of their owner, which is mainly associated with ‘warriorhood’ and the concept of the so called ‘warrior elite’.¹¹⁴ This type of selection during the Ha B1 in Transdanubia is less known from burial contexts. Graves with bronze cups were only excavated in the Budapest-Békásmegyér cemetery (Grave Nos 26, 48),¹¹⁵ but none of them contained weapons. All the known burials with swords from Transdanubia are older (Br C–Ha A1) than the Tatabánya-Bánhida ‘A’ find (see below Cap. 5.1).

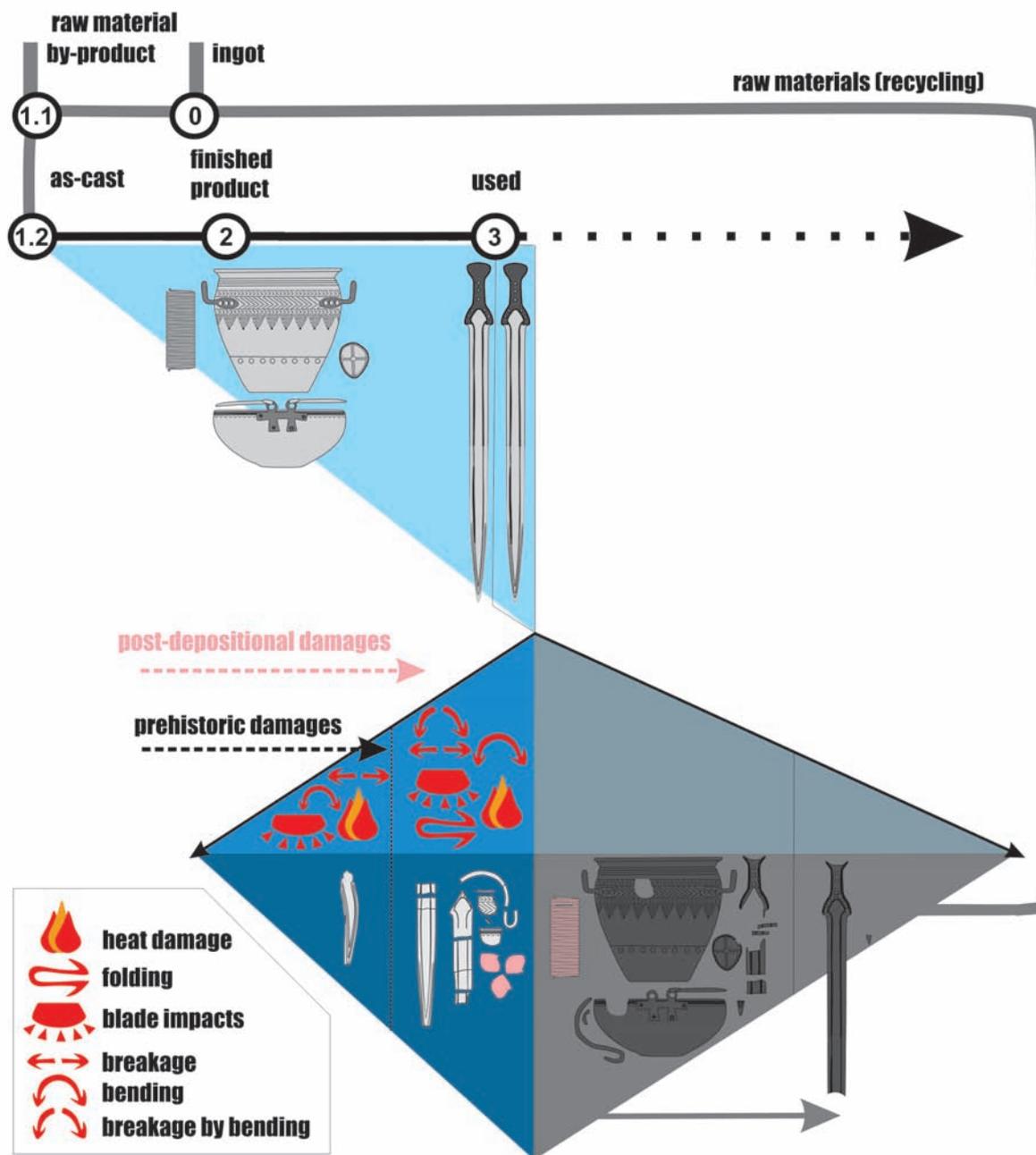


Fig. 8. Selection model of the Tatabánya-Bánhida A–B finds (Graphics: J. G. Tarbay).

114 TREHERNE 1995, 109; KRISTIANSEN 1999, 180–182; WHITLEY 2002, 219–223, 227; JOCKENHÖVEL 2006, 120–123; VANDKILDE 2006, 485; WHITTAKER 2008, 83; COLQUHOUN 2011, 56–57; TARBAY 2015a, 47; GENTILE et al. 2018, 78; GEORGANAS 2018, 190–195.

115 KALICZ-SCHREIBER et al. 2010, 33–34, 45–46, 274–275, Pl. 18.10, Pl. 27.19.

If the Transdanubian stray finds and hoards from the Ha B1 period are taken into account, it is observable that swords, some armspirals and metal vessels are present here (Appx. 2.3–6, *Fig. 9*). These swords are either stray finds or individual hoards. In larger hoards, these weapons are usually selected in fragmented state (Appx. 2.3, 5). Apart from the burials of Békásmegyér and two stray finds (Appx. 2.6), metal vessels (cups, ‘situla’, cauldron and strainer) are mainly known from hoards. They were either selected to pure vessel hoards like Várvölgy or Sümeg 2 or to large hoards containing several objects. These are usually selected in a broken and manipulated form, similarly to swords (for example Gyermely-Szomor, Keszőhidegkút, Sárbogárd, Tatabánya-Ótelep 3, Várvölgy 4) (Appx. 2.3). Armspirals are rare and they are usually broken. In hoards which were deposited in the Ha B1, interesting combinations can be detected, like the co-appearance of broken swords and cauldron handles (Sárbogárd and Gyermely-Szomor hoards) (Appx. 2.3, *Fig. 9*).¹¹⁶ The combination of a sword, metal vessels (situla, cups) and an armspiral can also be found in the Keszőhidegkút hoard. It should be mentioned that this find material contains fragments of real-size defensive weapons and armours (helmets, shields) (Appx. 2.3, *Fig. 9*), too.¹¹⁷ In sum, it seems that the selection of the ‘Tatabánya-Bánhida ‘A’ find’ is more similar to the hoards deposited in the same period.

Moreover, the analysis of the Type B1 cauldrons’ combination groups revealed that this find has not only typological relations towards the Northeast Carpathian Basin, but it is very similar to several hoards from that region regarding their object selection (*Fig. 3B–C*). According to the model of Gábor Váczi, the connection networks re-established in Northeast Transdanubia were deteriorating after the Ha A1 period. This area was under the cultural influence of the Gáva ceramic style and it can be considered as a secondary participant of interaction at the time of the ‘Tatabánya-Bánhida ‘A’ find’ deposition (Ha B1).¹¹⁸ In this context, the appearance of a Type B1 cauldron, a ‘situla’ and an armspiral represent a unique scenario. As it was already mentioned, these finds are strongly related to warrior identity. According to some researchers, such individuals may have played a key role in the distribution of prestige goods, exotic artefacts, technological developments and even ideas.¹¹⁹ The concept of ‘mercenaries’ is one of the most tempting among these possibilities. Such objects could have either belonged to an individual who arrived from another region or they were brought back by someone who has returned with his prestigious ‘foreign’ artefacts.¹²⁰

4. On the 1st Hoard from Tatabánya-Bánhida

It is inevitable to briefly discuss the 1st hoard of Tatabánya-Bánhida (Appx. 1.2, *Fig. 10*) which József Hampel and Rudolf Gyulai believed to belong together with the finds from 1880.¹²¹ This hoard consists of two spearheads, a knife and a flesh hook. According to the Inventory Book of the HNM, they were found together with a few small potsherds during the construction of the stable by house No. 41 in Bánhida.¹²² The topographic location of the findspot is more accurate in this case. The inventory book does not refer to this place as being completely iden-

116 PATAY 1990, Pl. 26.38; KEMENCZEI 1996, Fig. 8.11, Fig. 9.15; TARBAY 2015b, Pl. 1.1–5, Pl. 6.77.

117 MOZSOLICS 1985, Pl. 32.1–10, Pl. 35.30, 32–43. The armspiral is unpublished.

118 VÁCZI 2013b, 216, 219–220.

119 MOLLOY 2018a, 86.

120 KRISTIANSEN 2018, 24–27, 41.

121 INVENTORY BOOK OF THE HNM 1880, 140–141; HAMPEL 1880, 341; HAMPEL 1881, 164; GYULAI 1887, 2.

122 INVENTORY BOOK OF THE HNM 1880, 140–141.

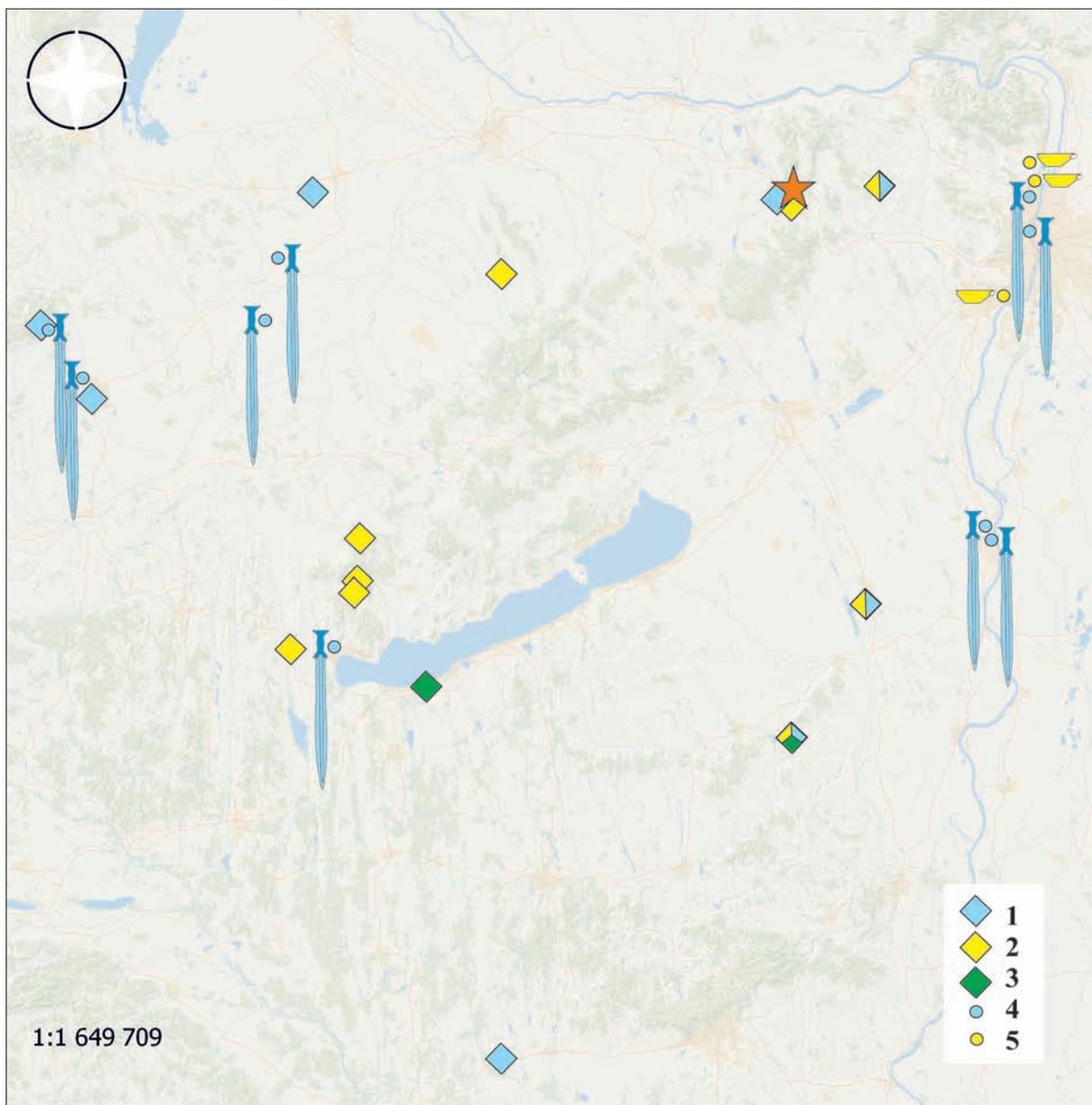


Fig. 9. Distribution of swords, metal vessels and armspirals in Transdanubia during the Ha B1 (Appx. 2.3–6).

tical with the location of the finds acquired in 14th October and 29th December 1880. It is only noted that they are also originally from Bánhida.

The two spearheads had the same style with correlating dimensions, referring to the possibility that they were made in the same mould or after the same model (Fig. 10.1–2). Both are finished products, showing clear traces of manufacturing. Unfortunately, their fragmented edges are not suitable to draw a conclusion about their use. The knife is a finished product, too (Fig. 10.4). In this case, the preservation of the object's edge allowed the identification of wear traces (notches). The hook is a cast and hammered object, which also falls into the category of finished products (Fig. 10.3). Unlike the finds discussed earlier, these four objects showed no visual traces of heat damage, nor intense fragmentation. Except the knife, the tip of which was broken by bending, the selected finds were all intact.

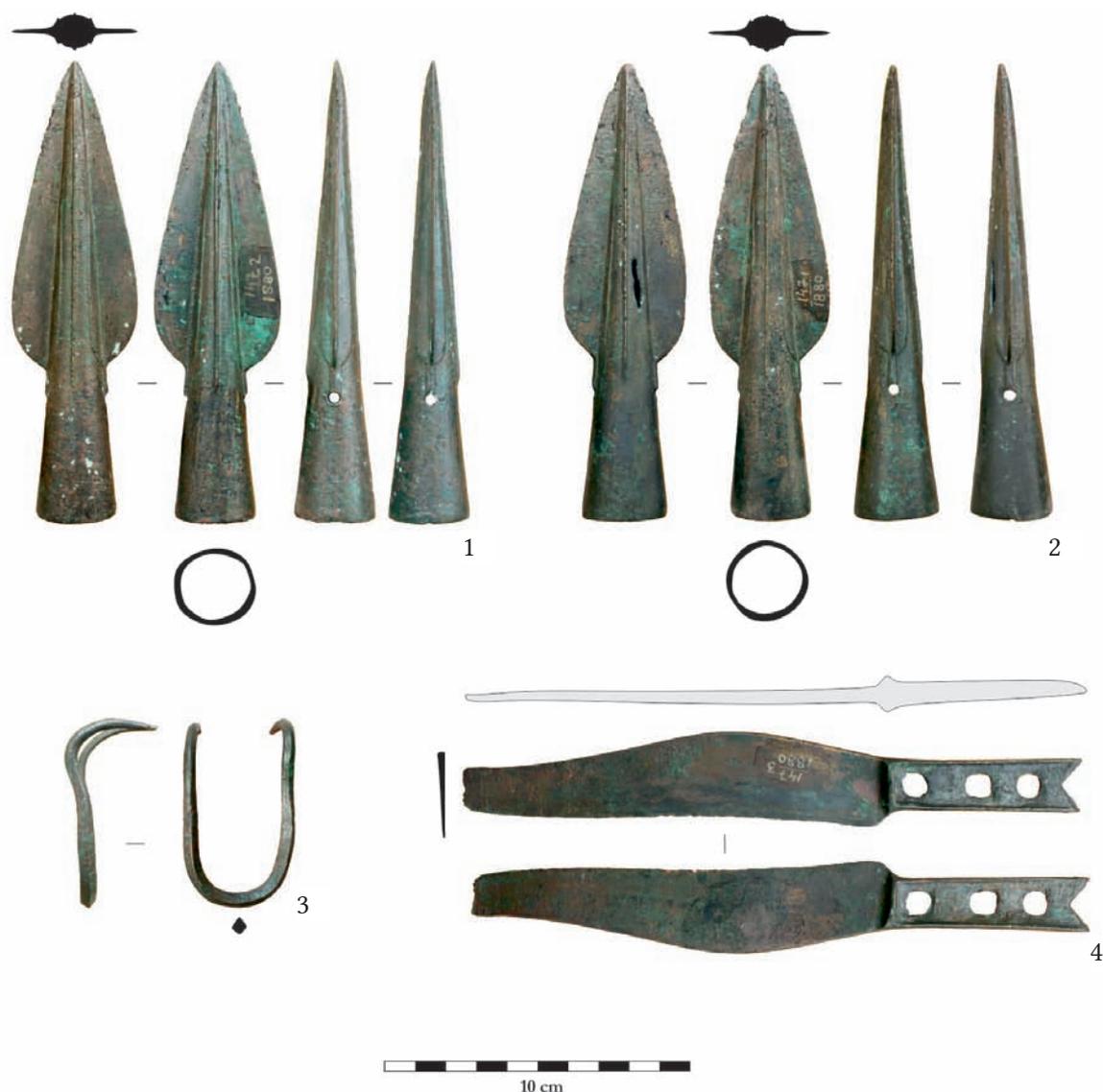


Fig. 10. The 1st Hoard from Tatabánya-Bánhida. 1–2 – Spearheads, 3 – Hook, 4 – Flanged knife (HNM, Photos: J. G. Tarbay) (Appx. 1.2)

Amália Mozsolics dated this hoard to the Kurd Horizon (Ha A1).¹²³ According to the present typological knowledge, the hoard can be re-dated. The profiles of the two spearheads are somewhat unique, but on the whole, these finds belong to Tiberius Bader's Variant C/d. These spearheads were the most characteristic between the Br D–Ha A1 periods, although some specimens deposited later are also known (Ha B2). In addition to Transdanubia, similar spearheads appeared in the Northeast Carpathian Basin, as well as in the territories of the Czech Republic and Slovenia. It is notable that their casting mould was found east of the Danube, in the Pre-Gáva pottery style site of Muhi-3.¹²⁴ The Pustiměř type knife is somewhat younger. Beside some Ha A1 specimens, it is more characteristic to the Ha A2 and Ha B1 periods, mainly in the Carpathian Basin and Moravia.¹²⁵ The last find can be identified as a flesh hook

123 MOZSOLICS 1985, 94.

124 TÁRNOKI 1987, Pl. 7.9; BADER 2015, 385–386, Tab. 51; KOÓS 2015, 143, Pl. 20; TARBAY 2015b, 314–315, List 2, Fig. 4.

125 ŘÍHOVSKÝ 1972, 32–33; GEDL 1984, 31–32; KOBAL' 2000, 48–49; VELIAČIK 2012, 297–299, 339; KACSÓ 2015, 31; TARBAY 2015a, 43.

that was fixed onto an organic shaft¹²⁶ and, based on Middle Eastern analogues and object combinations from the Atlantic Bronze Age,¹²⁷ used together with large metal vessels during feasts. The distribution of these finds covered an enormous area between the British Isles to the Caspian Sea, and they were manufactured for a long time during the Late Bronze Age and Early Iron Age.¹²⁸ The above-mentioned hook is most similar to the finds from the Szombathely hoard (Hungary, Ha B1) and the Szent Vid hillfort in Velem (Hungary). From the Carpathian Basin and its vicinity, the hooks from Škočjan (Slovenia) and Lazy (Ukraine, Ha A1) should be mentioned.¹²⁹ Naturally, an object with supra-regional distribution also has corresponding artefacts present in distant territories. These finds were classified as Class 1 by Stuart Needham and Sheridan Bowman.¹³⁰ From West to East, specimens can be cited from Ireland (Ballinderry; Bishopsland: 1300–1150 cal. BC), France (Langoëlan, Bronze Final III, Le Bourget), Spain (Barrios de Luna) and Germany (Egerdorfer Wald, Fridolfing, Ha B3).¹³¹ The relative chronological position of the finds is rather complex. The spearheads follow a Br D–Ha A1 style. The knife is more characteristic between the Ha A2–Ha B1, while the feasting equipment appeared at the Ha B1 in the territory of Transdanubia. It is likely that these finds were deposited around the Ha A2–Ha B1, later than what A. Mozsolics has suggested (Ha A1).

Even if the objects were roughly deposited around the same time as the Tatabánya-Bánhida ‘A–B’ finds, it is unlikely that they are originating from the same context. The 1st Tatabánya-Bánhida find is clearly an independent hoard, a four-pieced personal set with a symbolic message related to feasting. Spearheads can reflect on the special abilities for hunting, which provided the high prestigious venison. The long knife and the flesh hook are practical and also symbolic elements of feasts, which can be associated with

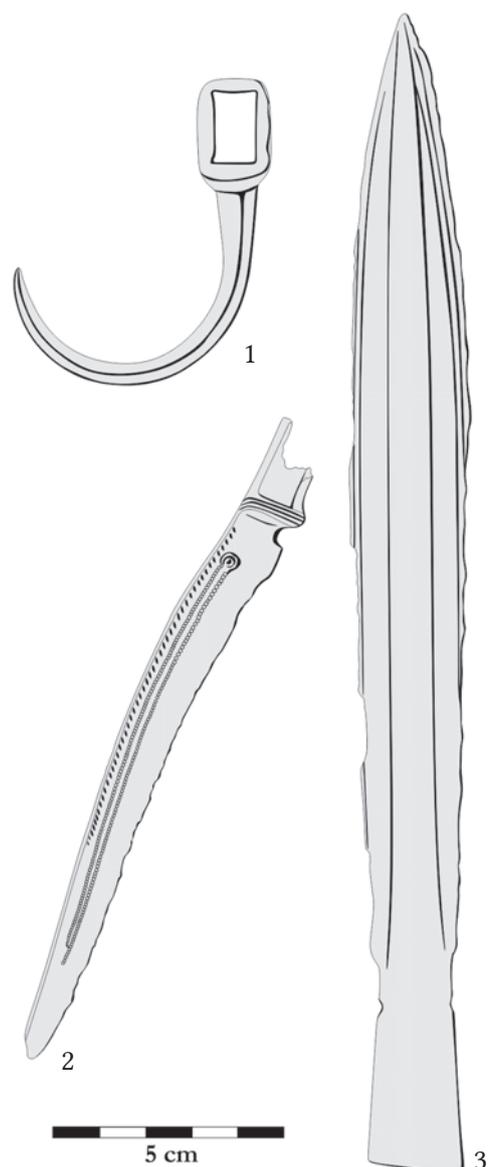


Fig. 11. The Hoard from Paß Luftenstein (Austria): 1 – Hook, 2 – Knife, 3 – Spearhead (Drawings by J. G. Tarbay after HELL 1939, Fig. 1.1a, 2b, 3a).

126 NEEDHAM – BOWMAN 2005, 94, 96–98, Fig. 1.

127 JOCKENHÖVEL 1974, 333, Fig. 3; NEEDHAM – BOWMAN 2005, 93–94; NEUMANN 2015, 80.

128 NEEDHAM – BOWMAN 2005; SCHEFZIK 2009; JAHN 2013, 241–242; NEUMANN 2015, Fig. 59.

129 WOSINSKY 1896, 304, Pl. 72.4; MISKE 1907, Pl. 15.37–38; SZOMBATHY 1937, Fig. 131–132; KOBAL’ 2000, 84–85, Pl. 47.28; ILON 2002, Fig. 7.2.

130 NEEDHAM – BOWMAN 2005, 94, 96–98.

131 CHANTRE 1875, Pl. 63.14; JOCKENHÖVEL 1974, 329, Fig. 1.1, Fig. 2–3; KOSCHIK 1981, 42, Fig. 4.2; DELIBES DE CASTRO et al. 1999, 106, 108–109, Fig. 45.7; ILON 2002, 158; NEEDHAM – BOWMAN 2005, 97; JAHN 2013, Fig. 6.11.1.

the portioning and distribution of the meat. In this regard, it is particularly interesting that this combination (spears–hook–knives) has also appeared in assemblages related to this hoard, for example at Szombathely¹³² and Lazy.¹³³ The Paß Luftenstein hoard (Austria) is also important (Fig. 11), containing only a long spearhead, a flange-hilted knife and a flesh hook, an almost identical combination to the 1st Tatabánya-Bánhida find.¹³⁴ The typological selection of these hoards may refer to certain individuals who own the ability to hunt and the right to distribute the valuable food during ceremonial feasts.

5. Burials and Hoards

There are still some questions about the Tatabánya-Bánhida ‘A–B’ finds found in 1880, which were left unanswered: *What type of an assemblage are we dealing with? Is it a burial, as Amália Mozsolics suggested based on the melted artefacts, or a hoard according to the typological selection of the finds?*¹³⁵ According to the Inventory Book of the HNM, neither human remains, nor potsherds were found together with the metal artefacts, which would suggest a possible burial origin. The Inventory describes that the objects were found together in a heap, which can be characteristic to hoards and burials alike. The facts may hint towards a burial interpretation, as melted objects are generally selected to burials. With respect to Western Hungary, however, this selection pattern is not so evident, at least by considering the new finds, and by revising the older ones. Below, the Tatabánya-Bánhida ‘A–B’ find will be discussed within the context of the so called ‘burials with swords’ and ‘funeral hoards’.

5.1. Burials with Swords from Transdanubia

In Transdanubia and the adjacent areas, burials with weapons can be dated between the Br C and Ha A1 periods. According to local research, the Bakony region is considered to be a prominent area of ‘warrior burials’, where grave assemblages were furnished with different combinations of combat weapons (swords, spears, winged axes, daggers) and specialized tools (chisel) and in rare cases even armour.¹³⁶ This is a selection pattern that reflects well on the general trend of weapon repertoire of contemporary Central Europe.¹³⁷ The presence of ceramic banquet sets is rather characteristic to these burials. Metal vessels rarely appear and only within the most lavish examples, further from this area.¹³⁸ As for the topic, it is worth mentioning that the selection of partly melted, broken bronze weapons was present in these burial assemblages.¹³⁹

This is only a general picture that can be gained from the results of specialized studies, but our knowledge is limited on this phenomenon and it is also questionable whether we are dealing with burials of professional warriors or a certain elite group that was represented by weaponry or perhaps the combination of both? Most burials with weapons were found during old excavations. Anthropological data on the gender and combat injuries of the deceased

132 ILON 2004, Pl. 30.1–2, Pl. 31.1, Pl. 332.2.

133 KOBAL’ 2000, Pl. 47.28, Pl. 48.49–55, Pl. 49.87–92.

134 HELL 1939, 149–152, Fig. 1; SCHAUER 1979, 70, No. 7, Fig. 2.

135 MOZSOLICS 1984, 69; MOZSOLICS 1985, 94.

136 JANKOVITS 2008, 83–91.

137 See JOCKENHÖVEL 2006, 108–109, Fig. 1.

138 JANKOVITS 2008, 83–91.

139 JANKOVITS 2008, 83.

are limited due to cremation, while use-wear analyses on weapons originating from burials do not exist. From an osteological point of view, the situation is even more complex. Weapons could be buried with a person who never took arms (buried as a warrior). They could be placed beside an individual who had well-trained body and healed combat injuries (professional warrior). Lastly, there are those who died from combat injuries but no weapons were put in their grave.¹⁴⁰ The critical overview of this topic would require a separate study and the re-documentation of all finds. At the present stage of research, the descriptive term of ‘burials with weapons’ should be used, since the presence of weapons in graves do not necessarily mean that we are dealing with a full-time specialist.¹⁴¹ Here, the discussion will be limited on those Transdanubian burials which contained swords or metal vessels and showed some connection with the Tatabánya-Bánhida find from the 1800s.

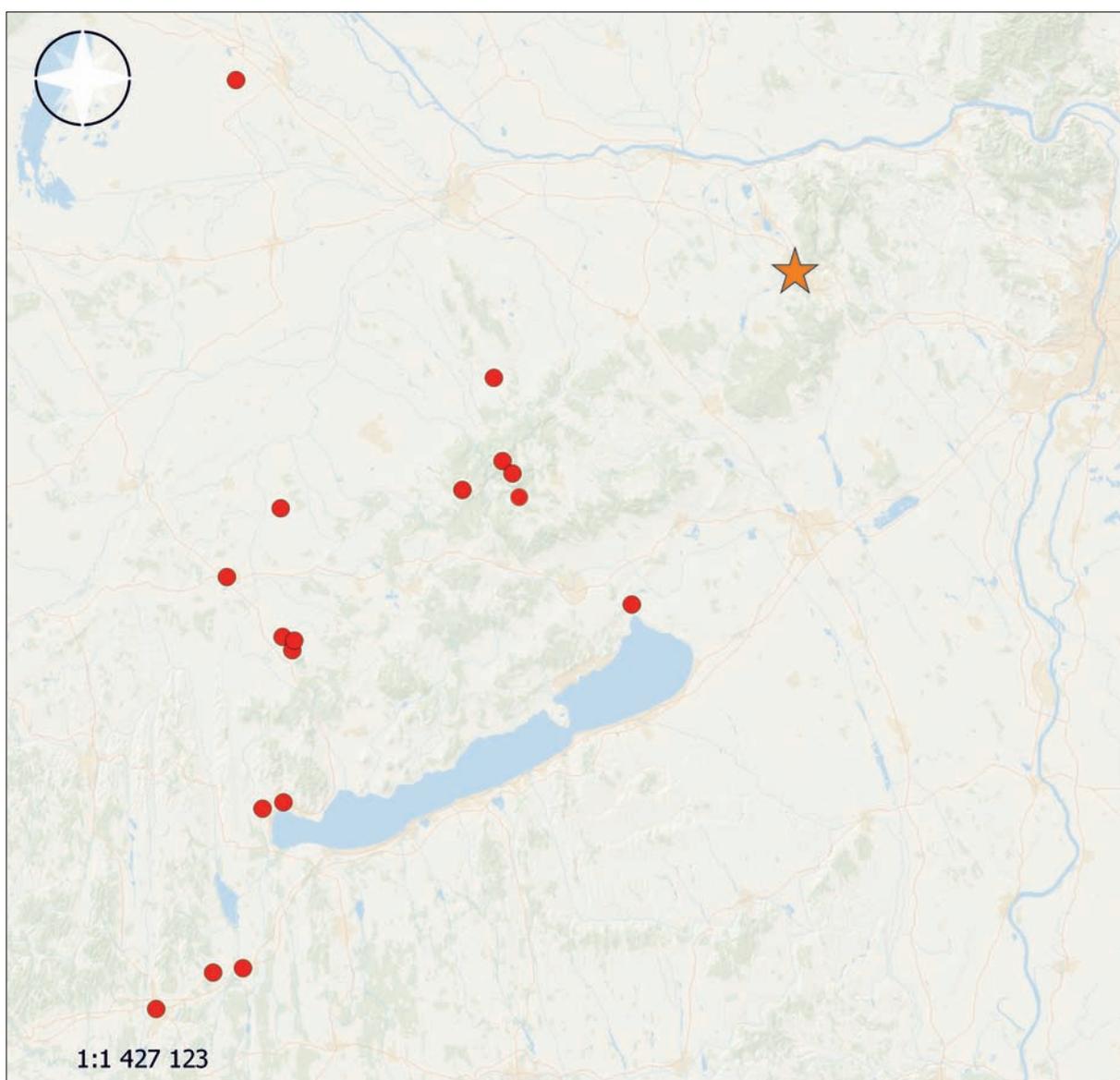


Fig. 12. Distribution of Late Bronze Age burials with swords in Transdanubia (Appx. 2.2)

140 KRISTIANSEN 2002, 232; WHITLEY 2002, 219–223, 227; HEYD 2007, 352–357; VANDKILDE 2008, 11–14; GEORGANAS 2018, 190–195; GENTILE et al. 2018, 67–68, 75–78.

141 WHITLEY 2002, 219–220; GEORGANAS 2018, 189–196. The inaccuracy of this term was discussed by Matthew Lloyd. See LLOYD 2015, 14–16.

In view of the fact that the territory of Transdanubia exceeds 36.000 km², the number of known burials with swords are surprisingly low during the Late Bronze Age. Between the Br C and Ha A1, a total of 16 burials with swords or stray swords are known from cemeteries. The phenomenon of burials with swords in Transdanubia was absent during the Ha A2–Ha B1 and Ha B1. As it was already mentioned, most of these burials are originally from old excavations with poor documentation (*Fig. 12*; Appx. 2.2). Out of the 17 burials, only a few have a sufficient documentation or a better described context (Bakonyjákó-Somhát, Balatonfüzfő, Csabrendek, Csabrendek-Hegyelő, Galambok-Hársas erdő, Jánosháza, Keszthely-Legelő-dűlő, Keszthely-Sömögyei-dűlő). Geographical and chronological differences make it difficult to draw general conclusions on the burials with swords from Transdanubia. Except for the graves from Csabrendek and Keszthely, the cremation rite is more common for these burials. Unlike the Western European LBA burials with weapons,¹⁴² none of them contains metal vessels as grave goods, but examples with ceramic sets are known in many cases (Appx. 2.2.4–5, 10–11). Throughout the Ha B1, only two burials are known with Type Jenišovice-Kirkendrup cups from Budapest-Békásmegyér (Grave No. 26 and No. 48). Weapons were not at all present in these assemblages.¹⁴³ It is important to note that jewellery and different clothing accessories (for example torques, pins, metal sheet belt, beads, pendants, spiral tubes) are common elements in the Br C–Ha A1 burials with swords (Appx. 2.2.4, 6–7, 11, 13, 15). All of them were identified as male-related graves, although concrete anthropological data on these burials is generally missing. Modern analysis is known for burial No. 6 from Balatonfüzfő. According to Gábor Tóth's analysis, the human remains belonged to a 25–30 year old man.¹⁴⁴

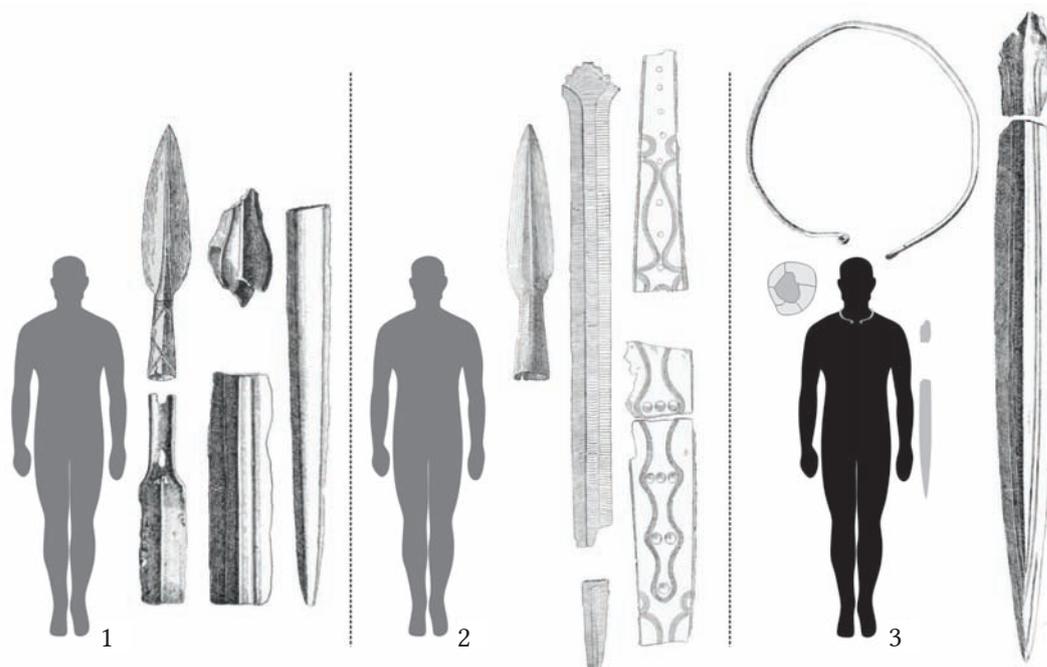


Fig. 13. The three burials with swords from Csabrendek (Veszprém County). 1 – ‘Grave 12’ (DORNER 1884, 231–232, Pl. E.5; DARNAY 1899, Pl. 12.12–14), 2 – Grave acquired by the HNM (DARNAY 1899, Pl. 11.3, 5–9), 3 – The burial found at the edge of the cemetery (reconstruction after DARNAY 1899, 28, Pl. 12.7–8) (Appx. 2.2.6–8).

142 CLAUSING 2005, 80–83.

143 KALICZ-SCHREIBER et al. 2010, 33–34, 45–46, 274–275, Pl. 18.10, Pl. 27.19.

144 ILON 2015, 42.

It would require new research to accurately compare the swords in these burials to the Tatabánya-Bánhida finds. The results of previous studies suggest that swords were usually placed broken into the Transdanubian burials. Surprisingly, fire damage was only noted in a handful of cases (Appx. 2.2.1, 4–5, 9–11, 14). Based on published illustrations and descriptions, some of these weapons could have been manipulated similarly to the Tatabánya-Bánhida swords. Examples can be the swords from Jánosháza or Mosonszolnok.¹⁴⁵ There are also swords from the territory of Slovakia (e.g. Čaka, Chrastavice),¹⁴⁶ Moravia (Spytihněv, Velatice),¹⁴⁷ Austria (e.g. Gleinstätten Mound 17, Ratischhof am Weilhartforst Mound VII),¹⁴⁸ Croatia (Dalj, Velika Gorica),¹⁴⁹ Germany (e.g. Granzin Mound 2, Leupolt-Herfatz, Grünwald No. 58, Unterhaching No. 30),¹⁵⁰ which were all broken into small pieces and in most cases showed traces of fire damage. From the point of manipulation, these specimens could be analogous to the Tatabánya-Bánhida ‘A–B’ finds. It is worth to emphasize the northernmost specimen from Vester Skejninge (DE), an elite burial, which resembles Tatabánya-Bánhida by its broken Type B1 cauldron and two swords. If the Bánhida assemblage was a burial, then the Danish parallel raises another question, that is, are we dealing with a multiple burial with two swords? The latter phenomenon is well known in the Western Urnfield territories. A fine example is the Zuchering-Ost No. 348 burial, where four adults and two children were buried along with two swords treated in a similar manner.¹⁵¹ Another interpretation was suggested by Katherine Harrel on the examples of shaft graves,¹⁵² where the presence of multiple swords were explained by a certain ritual practice when swordsmen gave back their swords to their deceased leader. This phenomenon is less plausible for the Carpathian burials, but it could be a possibility behind the formation of pure sword hoards and lavish assemblages with multiple swords like the one from Hajdúböszörmény-Csege-halom.¹⁵³

In summary, it cannot be excluded that the Tatabánya-Bánhida ‘A–B’ finds were part of a multiple burial with weapons. This is most likely while discussing the assemblages in a larger geographical context. Although there are several facts, which suggest that by following this interpretation it is possible that we are dealing with a quite unique assemblage in the context of Transdanubia.

- 1) The Inventory Book did not mention the presence of human bones, nor pottery finds, which are otherwise characteristic to Transdanubian Urnfield burials.
- 2) The number of burials with swords are extremely low, especially by comparing this number to the swords from hoards or wetland areas.¹⁵⁴
- 3) There is a chronological gap between the dating of the Tatabánya-Bánhida ‘A’ find (Ha B1) and the burials with weapons from Transdanubia (Br C–Ha A1).

145 SÓTÉR 1892, Pl. 2.3; FEKETE 2004, Fig. 4.

146 NOVÁK 1975, 20–21, Pl. 12.77–77A, Pl. 13.84–85.

147 ŘÍHOVSKÝ 2000, 127–128, 132, Pl. 2.6b, Pl. 2.5b.

148 SCHAUER 1971, 121, 191, Pl. 54.371, Pl. 90.591A.

149 HARDING 1995, 62–63, Pl. 26.206–207.

150 WÜSTEMANN 2004, 238, Pl. 99.602; CLAUSING 2005, 163–164, 168, Pl. 35B.1, Pl. 39C.1, Pl. 53B.1.

151 KRAFF – WITTEWERT-BACKOFEN 2011, 89–90, 98–99, Fig. 5.

152 HARREL 2014, 10–15.

153 MOZSOLICS 1985, 11–17; VACHTA 2008, 48–64, Fig. 30.

154 See KEMENCZEI 1988; KEMENCZEI 1991.

- 4) The combination of metal vessels with swords in burials are not known in the territory of Transdanubia. Such groupings can only be mentioned to the North or West from the Carpathian Basin.
- 5) Although, there are some swords which could have been manipulated similarly to the Tatabánya-Bánhida 'A-B' finds, the selection of melted weapons is not exclusive in these Transdanubian burials.

The above mentioned issues made it necessary to discuss alternative interpretations as well, in which the selection of melted objects may play a more important role than we first might expect.

5.2. Melted Bronzes and Human Remains in Transdanubian Hoards

5.2.1. Selection of Melted Bronzes to Hoards

József Hampel has already called attention to the fire damages on the Tatabánya-Bánhida 'A-B' finds.¹⁵⁵ The macroscopic observation of the objects supported his idea. Melted and amorphous surfaces caused by high temperature were detected on the swords (Fig. 19–20, Fig. 21.6) and on some metal vessels (Fig. 21.3, 5). It is notable that even a small charcoal piece was fused on one of the sword fragments (Fig. 27.7).

In her study from 1984, Amália Mozsolics differentiated two scenarios for the selection of such melted objects. She identified the assemblages like *Tatabánya-Bánhida* 'A-B' and *Aszód* as grave goods, which were selected to the burials from the pyre. She also distinguished another group in which she saw evidence for metal recycling. Her examples included broken objects hammered together or partly melted finds from hoards, which were processed for re-casting. An iconic example for this interpretation is the 2nd Bodrogkeresztúr ingot hoard (Borsod-Abaúj-Zemplén County).¹⁵⁶ Although recycling of metals could have played an important role in the economy of Late Bronze Age societies, the archaeologically identifiable traces of this process are extremely rare. It might be surprising at first, but this phenomenon can be well-explained from a technological point of view. First, during crucible melting, after reaching the melting point, the partitioned objects and ingots become liquid, and the objects that are later added to melt are immediately dissolved in it. Second, finds like the Bodrogkeresztúr 2 ingots are special cases. These ingots could have been made as the following. Small, partitioned objects were collected in a mould or in a hole on the workshop's floor (see for example the Lovasberény-Mihályvár MBA workshop).¹⁵⁷ After that hot, melted metal was cast on it, which has melted the bronze fragments together. In modern foundry practice, the hot, melted metal is usually the metal surplus after casting. A fine example is the ingot from the iconic 2nd Bodrogkeresztúr hoard re-published here (Appx. 1.4, Fig. 14). On its regular plano side (Fig. 14.1c, 1d blue), opposite to the direction of casting, a large and 'branching' metallic projection can be seen (Fig. 14.1c, 1d red). In this case, the hot metal broke its way between the partitioned objects, solidified and took the shape of the gaps and cavities in the workshop's ground.

155 INVENTORY BOOK OF THE HNM 1880, 140–141; HAMPEL 1880, 341; HAMPEL 1881, 164; MOZSOLICS 1984, 69; MOZSOLICS 1985, 94.

156 MOZSOLICS 1984, 24–27.

157 F. PETRES – BÁNDI 1969, 174, Fig. 6. These 'improvised molds' were usually prepared in advance and dry loess sand was the most suitable from safety's point of view, because the burning metal splashed from the wet ground and caused burn.

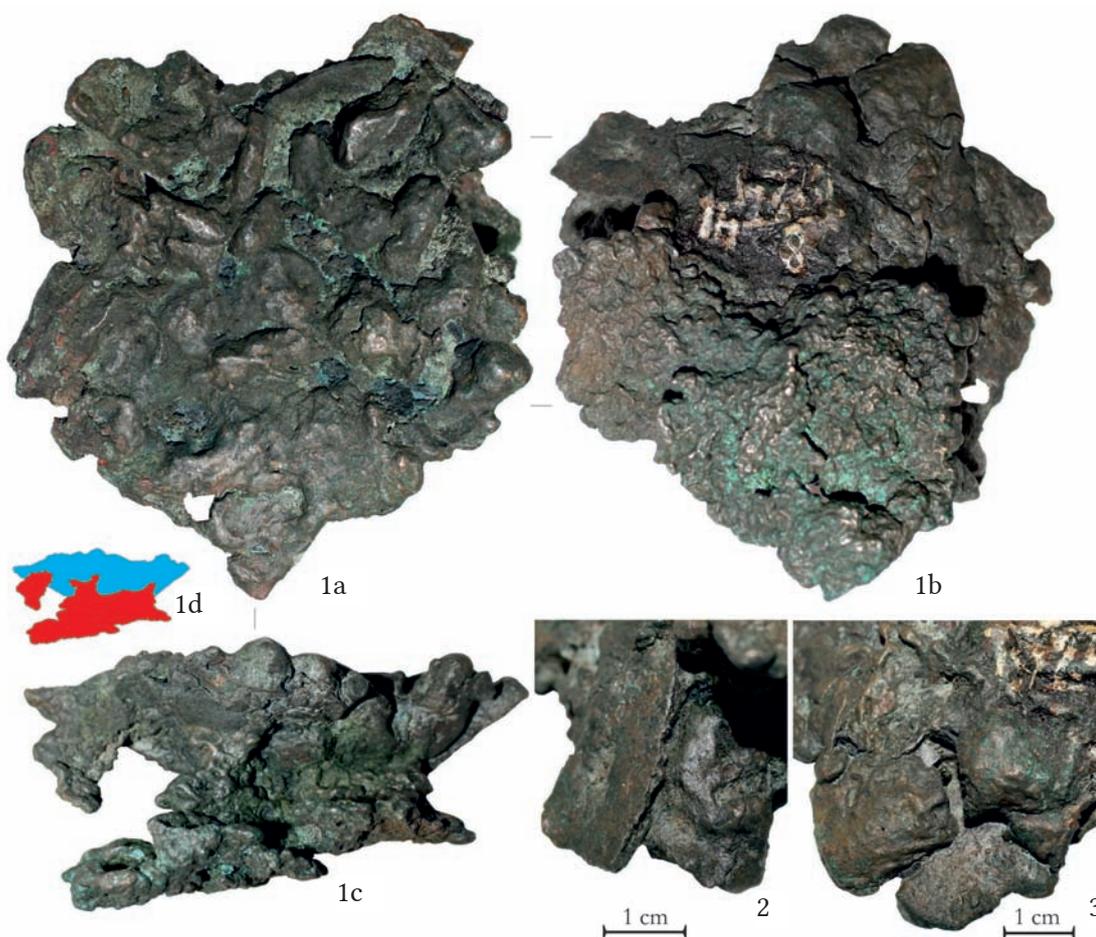


Fig. 14. 1 – A plano-convex ingot with metallic projection from the Bodrogkeresztúr 2 hoard, 2 – Re-melted sickle, 3 – Re-melted objects, probably socketed axe rims (HNM, Photos: J. G. Tarbay) (Appx. 1.4).

The preservation of the objects in these ingots are rare. The larger quantity of liquid metal and the higher the temperature, the more the objects would melt. A fine example is the broken half ingot from the Kesztölc hoard. It weighs 3077 g and only a small imprint of a spiral wire ring was preserved on its convex side.¹⁵⁸ Either crucible melting or melting together the partitioned objects, the survival of the original artefacts is evidently rare. This explains why such a low amount of these finds are known from the Late Bronze Age material of the Carpathian Basin. However, the single half-melted finds are hard to explain from a metallurgical point of view, especially if extra manipulations are present on the object. Consequently, it is very likely, as Mozsolics Amália suggested, that melted objects could have been made in different ways as a result of recycling or manipulation in the Carpathian Basin. However there is no consensus on A. Mozsolics's statement that half-melted and manipulated finds can only be selected to burials as grave goods.

The selection of partly-melted bronze objects or metal artefacts with traces of fire treatment to wetland hoarding areas and dryland hoards is known in several Western European Late Bronze Age sites. For example, such finds were reported from the territories of the United Kingdom, Germany, Switzerland, France, Slovenia and Italy. The object types that suffered fire

158 TARBAY 2014, 247, No. 80, Fig. 68.

treatment can be various from jewellery to weapons, but surprisingly the latter can be considered frequent.¹⁵⁹ One of the geographically closest examples of deposition of melted objects is known from the Mušja jama Cave (Slovenia), where weapons were destroyed nearly to an unrecognisable state and also damaged by fire or partly melted.¹⁶⁰ A ‘systematic’ destruction method – analogous to the Tatabánya-Bánhida ‘A–B’ finds – was analysed in case of the Pila del Brancòn (Italy) hoard. Here, organic materials (hilt plates, shafts) of spears and swords were burnt, while the metal parts of the weapons were damaged by different techniques and also exposed to fire until they became semi-melted.¹⁶¹ Many researchers were dealing with the interpretation of these unique sites and assemblages. It seems that the deposition of metal objects, which suffered intentional fire treatment cannot directly be related to the metallurgical process. This phenomenon can be best explained by the funeral hoard theory (*Totenschätze*), which hypothesizes a close ritual connection between the burial and hoarding practice, mostly based on Western European wetland hoarding sites. Following the main concept of this theory, the possibility can be considered that grave goods – in some cases the deceased or parts of his body – were buried to special wetland areas or in some cases to dryland hoards at a certain stage of the burial ritual or after that as a result of post manipulations.¹⁶² The selection of objects with fire treatment or human body parts to hoards is also known from the Late Bronze Age Carpathian Basin. However, our present view on this phenomenon is incomplete due to the lack of modern documentation on metal objects or fine excavation contexts. Below, some unique examples will be presented from the territory of Hungary with special regard to the region of Transdanubia without the need for completeness.

Our first example is a Typ C flange-hilted sword found during the regulation of the *Rába River* in Northwestern Transdanubia (Győr-Moson-Sopron or Vas County) (Appx. 1.5, Fig. 15.1).¹⁶³ This find was sent to the HNM’s collection by Kálmán Radó *comes* (Hung. főispán), along with two pins (Fig. 15.2), one spearhead and several other objects dated to the Medieval Period.¹⁶⁴ The sword resembles in many ways the swords of Tatabánya-Bánhida ‘A–B’. First, it is also a finished product, showing clear traces of hammering and sharpening along its edges. On one side, between its hilt shoulders, even the imprint of the organic hilt plate can be observed. The object can be interpreted as a used one, based on the several microscopic damages along its cutting edge and its worn rivet holes (Fig. 15.3). It was deposited in a manipulated state. The weapon’s hilt and lower blade part were broken by bending. Creasing traces related to bending are also visible in the middle of the preserved fragment. There is also a small melted piece of bronze fused on the object, right below the hilt’s shoulders. It should also be noted that the surface around the melted bronze piece seems to be slightly blistered, which is a characteristic sign of fire treatment. From the other objects, only a blunt headed pin (*Keulenkopfnadel*) with a bundle of lines pattern was preserved. Its state of deposition showed similarities with the sword.

159 COLES 1960, 29, 38, 117; MOHEN 1977, 118–119, Fig. 361/PARIS 75–42, Fig. 372/ESSONNE 91–187; MÜLLER 1993, 81, Fig. 7; FONTIJN 2005, 151; SPERBER 2006, 201, Fig. 4.4–5, Fig. 5.7, 15–19, Fig. 6.7, 9–11, Fig. 9; FISCHER 2011, 1303; HUTH 2011, 52–53; HUTH 2012, 95–96; HUTH 2016, 34–36; TERŽAN 2016, 463; MÖRTZ 2018, 170, 175, 180.

160 TERŽAN 2016, 440–441, 448–449, 463.

161 BIETTI SESTIERI et al. 2013, 160–162, Figs 3–4, Fig. 6.B.C, Fig. 8.

162 BRADLEY 1990, 102–107; WARMENBOL 1996; FONTIJN 2002, 229–230; FONTIJN 2005, 151; SPERBER 2006, 208–212; HUTH 2016, 36; V. SZABÓ 2019, 66–71.

163 KEMENCZEI 1988, 54, Pl. 28.263.

164 INVENTORY BOOK OF THE HNM 1894, 48–49.



Fig. 15. Melted sword and a blunt-headed pin from the Rába River: 1 – Sword, 2 – Blunt-headed pin, 3 – Burnt traces and fused melted droplet on the sword (HNM, Photos: J. G. Tarbay (Appx. 1.5)).

The pin was bent at two points and its surface showed traces related to fire damage. From a relative chronological point of view, the two objects can roughly be dated around the same period: Br D–Ha A1.¹⁶⁵ Because the other pin and the spearhead is lost, it is unclear whether they were part of the same set. The undocumented context makes the interpretation of these finds hard. However, if these melted objects were indeed originating from the prehistoric bed of the Rába River, they can similarly be defined as the Western European funeral hoards

165 KEMENCZEI 1988, 54–56; TARBAY 2015b, 324, Fig. 13.

from wetland context.¹⁶⁶ In addition to the sword from the Rába River, there is another hoard which may also originate from a wetland context. This is the Fövényes (Veszprém County) assemblage that was allegedly found along the shore of the Lake Balaton. It consists of three socketed axes, a flanged sickle, a plano-convex ingot and a set of jewellery (knobs, rings, annular rings, metal sheet band, funnel-shaped pendants). Except for the knobs and two rings, all objects were deposited in a fragmented state. Three finds are particularly interesting: a knob (Fig. 16.6) and two rings (Appx. 1.5, Fig. 16.7–8), the surfaces of which are blistered and amorphous, hinting to the possibility that they may have undergone fire treatment as well.¹⁶⁷

In addition to the above mentioned examples, there are some large scrap hoards, the content of which fits very well to the Transdanubian deposition trends. However, they contain a few melted objects which differ from the rest of the selected finds. Apart from one hoard, all originate from Western Transdanubia.

The first example is the *Csabdi-Bükkös erdő/Bükkösetető* hoard (Fejér County). This assemblage contains objects which can be stylistically related to metalworks characteristic between the Br D–Ha A1 and Ha A2–Ha B1. More precisely, its time of deposition can be dated to the Ha A2–Ha B1 from a relative chronological point of view. The Csabdi assemblage is a typical Transdanubian scrap hoard, dominated by ingots, metallurgical by-products and some broken, finished and unfinished tools and weapons.¹⁶⁸ Technologically, three finds completely differ from the rest of the broken objects. One of them is a knife tip, which is amorphous due to fire damage and blisters can be detected on its surface (Appx. 1.5, Fig. 16.2). There are also two ring fragments characterised by the same morphological traits (Appx. 1.5, Fig. 16.3–4).

The second example is the *Badacsonytomaj-Korkován hegy* [‘Köbölkút’] (Veszprém County) hoard. This hoard consists of various types of objects which can be dated between the Br D–Ha A1 and Ha B1 periods. Its time of deposition was in the Ha B1, based on late Debrecen type socketed axes. This large assemblage originally weighed 8 kg and was found in a greyish black ‘urn’ of 8 liters in size. The remaining 88 artefacts (3433 g) mostly consist of sickles and axes, along with some knives, weapons, jewellery and two casting jets.¹⁶⁹ Amália Mozsolics has already called attention to one melted object, a Type Morzg razor, which can be characterized by a typical amorphous shape and blistered surface as a result of fire treatment (Appx. 1.5, Fig. 16.1).¹⁷⁰ Like the Csabdi find, no other object with similar treatment was found among the rest of the objects in this hoard.

The *Gyermely-Szomor* hoard (Komárom-Esztergom County), probably found in an Urnfield settlement, is also important to mention. The composition of the assemblage can be characterized by jewellery, tools, weapons and some raw material. Most of them were deposited in a broken state, some showed traces of use or repair. Similarly to the previous examples, the Gyermely-Szomor hoard also has a long relative chronological pattern. Its time of deposition was identical to the Badacsonytomaj assemblage (Ha B1) (Appx. 2.3–4). Again, a single object, a bent and partly melted wire is completely different from the rest of the fragmented objects. It has an amorphous blistered surface (Appx. 1.5, Fig. 16.5).¹⁷¹

166 BRADLEY 1990, 109–110; WARMENBOL 1996; HUTH 2011, 52–53.

167 TARBAY 2015c, 84, Fig. 13.35, 46, 50.

168 MOZSOLICS 1985, 107; VÁCZI 2013a, 265–267; TARBAY 2018a, 494, Pl. 37.3, Pl. 40.34–35.

169 MOZSOLICS 1949, 26–29; DARNAY-DORNAY 1950; MOZSOLICS 1985, 87–88; TARBAY 2018a, 468–474, Pl. 1–6.

170 MOZSOLICS 1949, 27, Pl. 22.9; WEBER 1996, 230, Pl. 49.532; TARBAY 2018a, Pl. 5.62.

171 TARBAY 2018a, Pl. 92.87.



Fig. 16. Melted objects from the Late Bronze Age Transdanubian hoards: 1 - Badacsonytomaj (Balatoni Museum, Photo: TARBAY 2018, Pl. 5.62), 2 - Csabdi-Bükkös erdő/Bükköstető (Szent István Király Museum, Photo: TARBAY 2018, Pl. 37.3, Pl. 40.34–35), 3 - Gyermely-Szomor (HNM, Photo: J. G. Tarbay), 6–8 – Balatonudvari-Fővenyes (HNM, Photo: Károly Kozma), 9–10 – Keszőhidegkút (HNM, Photo: J. G. Tarbay), 11–12 – Pölöske (HNM, Photo: J. G. Tarbay) (Appx. 1.5).

From the hoards found earlier, the last example for objects that underwent fire treatment can be found in the *Keszőhidegkút* scrap hoard from Southern Transdanubia. This hoard is a large, 327-piece assemblage from which the chronologically oldest finds can be dated to the Br B2/C and Br D period (for example Type Chramostek dagger, palstave),¹⁷² among the youngest (Ha B1) a broken Hajdúböszörmény-stylé metal vessel and a late type flanged sickle can be found.¹⁷³ The rest of the finds are correlating with Amália Mozsolics's dating to the Ha A1. This is a typical scarp hoard, which consist of broken and manipulated objects. Most of them are sickles and axes, while some fragmented weapons, jewellery, metal vessels, raw materials, a cheek piece and sheet metal objects represent other categories (Appx. 2.3). Two unique objects can also be found in it. One of them is a torques fragment, the torsion pattern of which became melted due to heat damage (Fig. 16.9a–b). The other is a half fragment of a ring, the breakage surface is also amorphous and blistered (Fig. 16.10a–b, Appx. 1.5).

The latest example of this phenomenon was excavated in *Pázmándfalu* (Győr-Moson-Sopron County). At this site, three hoards were found. Gábor V. Szabó interpreted them as personal sets of a 'military leader' (Hoards 1–2) and a 'warrior' (Hoard 3), which were taken out from the pyre and buried as funeral hoards in the framework of a 'hero cult' related ritual.¹⁷⁴ Regarding the Tatabánya-Bánhida 'A–B' finds, the Pázmándfalu hoards can be considered important.

- 1) One of them show the same weapon-jewellery-metal vessel combination (Hoard 1).
- 2) The hoards were found in 'heaps'.
- 3) No human remains were excavated in their vicinity.
- 4) Intentional manipulations and damages were observed on the metal objects.
- 5) Even melted objects were selected to some hoards (Hoard 1 and 3).¹⁷⁵

The treatment, selection and combination of objects in these excavated assemblages support the idea that melted objects were selected to hoards in parallel with the burials with weapons from the Bakony region. The unprovenanced 'warrior equipment' from the MoD IMMh's collection¹⁷⁶, which consists of intentionally destroyed melted objects: a sword, a helmet, knives, greaves, a bronze cup and an unidentified object, a possible similar interpretation can be considered.¹⁷⁷ In any case, the secure contexts of the Pázmándfalu hoards are strong arguments against interpreting of the Tatabánya-Bánhida 'A–B' as a burial assemblage in the classic sense.

5.2.2. *The Selection of Human Remains to Hoards*

Around the same time when melted objects were selected to these hoards, cremation ritual was predominant in the territory of Transdanubia. As many researchers pointed out, an important aspect of this ritual is the *pars pro toto* selection of human remains, a practice which

172 Amália Mozsolics dated the hoard to the Ha A1. MOZSOLICS 1985, 135–137. I suggested a Ha A–Ha B1 relative chronological pattern for the find, which should be reconsidered based on the presence of an old dagger and a palstave. NOVOTNÁ 1970, 43; MOZSOLICS 1985, Pl. 31.1, 18; KEMENCZEI 1988, 20, Pl. 6.60; NOVÁK 2011, 83–86, Pl. 26.347; TARBAY 2018b, 336, List. 1.2. No. 4.

173 MOZSOLICS 1985, Pl. 33.11, Pl. 35.30; PATAY 1990, 84, Pl. 70.166; TARBAY 2018a, 72, Appx. List 54, Map 88.

174 V. SZABÓ 2019, 61–71, Fig. 47–48.

175 V. SZABÓ 2019, 61–71.

176 Ministry of Defence's Institute and Museum of Military History

177 TARBAY 2015a, 46–47.

is analogous to the fragmentation of objects in hoards.¹⁷⁸ Joanna Brück and Richard Bradley suggested that parts of the deceased ancestors may have been circulated among the living or went through different types of manipulations.¹⁷⁹ From the Late Bronze Age, some examples indicate that the body parts of the deceased may have been manipulated beside the archaeologically visible normative mortuary rite.¹⁸⁰ Body fragments, especially skulls were found in the liminal spaces of settlements or at special topographical sites like wetland areas or caves. In the archaeological record there are even some cases in which metal hoards are accompanied by human bones.¹⁸¹ According to Joanna Brück such hoards cannot be simply interpreted as ‘secondary burials’ but an independent hoard type, where the human remain is a meaningful object that adds a special symbolic aspect to the rest of the selected finds.¹⁸²

An important recent example is the pit (Bef. 29035) found in Oberwünsch (Germany, Saxony-Anhalt State). At the bottom of the pit a Period V hoard was found, consisting of about 150 pieces of jewellery. Approximately 25 cm above the metal hoard a human skull with attached *cervical vertebrae* and an almost complete left hand was excavated. Anthropological analysis suggested that the skull belonged to a man, aged 45–60 who had a violent death as a head fracture and a defense injury on his hand suggest. According to Klaus Powroznik and Torsten Schunke, if the human remains were not accidentally put above the metal hoard, then they may have a connection. After separation, the skull and the left hand were intentionally placed there later as apotropaic defense.¹⁸³ Similar deposition of human remains is known from the literature in East Hungary. In 1930 a hoard was found between Mérk and Tiborszállás (Szabolcs-Szatmár-Bereg County). The hoard was found in a pot approximately 60 cm deep in the peat moss [Csicsor láp].¹⁸⁴ The circumstance of discovery is quite interesting, according to Sőregi: ‘A földmunkások a kb. 3½ literes agyagfazekat szétverték és belőle kiömlő tárgyakat szétkapkodták. A kerek öblöshasú edény falához kívül vashoz hasonló rögök voltak tapadva és az edény mellett emberi kéz-és lábszárcsontok feküdtek, koponya nélkül.’ [The workers crushed the approximately 3½ litres clay pot and brought away the objects spilled from the vessel. Iron-like lumps stuck to the wall of the round bellied pot and human hand and leg bones without the skull lay next to the vessel.] (Fig. 17).¹⁸⁵ Except for one or two bronze finds, almost all the objects were collected from the site. From a typo-chronological point of view, the Mérk-Tiborszállás hoard is not special. It is a common Ha B1 hoard, consisting of tools and some jewellery. Without the description of the discovery it would never be suspected that it is different in any way than the rest of the hoards from this area. In case of the Mérk-Tiborszállás hoard, it can be assumed that it might be analogous to the Oberwünsch hoard, as certain parts of the deceased were selected and placed right beside the hoard. It is unfortunate that the human remains were not collected as they might have had same anthropological marks, similar to the ones found in Oberwünsch.¹⁸⁶ In both cases the hand appeared which were most likely a meaningful part¹⁸⁷ and a ‘universal symbol’ that could represent the special

178 HANSEN 2016, 200; BRADLEY 2017, 132.

179 BRADLEY 2017, 132–133.

180 BRÜCK 2006, 302.

181 BRÜCK 1995, 250; BRÜCK 2006, 302; BRADLEY 1990, 108–109, 113.

182 BRÜCK 1995, 250, 261; BRÜCK 2006.

183 POWROZNIK – SCHUNKE 2017, 162–163, 166–167, Fig. 4, Fig. 8–10.

184 SŐREGI 1931, 72–75.

185 SŐREGI 1931, 74.

186 SŐREGI 1931, 72–76, Fig. 5; MOZSOLICS 2000, 55; TARBAY 2018a, 201, 585–587, Pl. 194–198.

187 BRÜCK 1995, 250, 261; BRÜCK 2006.

skills of the whole body, and act in ritual performances on what the deceased have done in life.¹⁸⁸ It is very likely that hands had special symbolic meanings in the Carpathian Basin. Gábor Ilon has recently examined the Late Bronze Age clay hands from Transdanubia. Based on analogues, he suggested that they are primary votive objects related to healing and the female sphere.¹⁸⁹ A larger clay imitation in damaged state is known in ritual context from Vlaha-Pad, Transylvania (Romania).¹⁹⁰

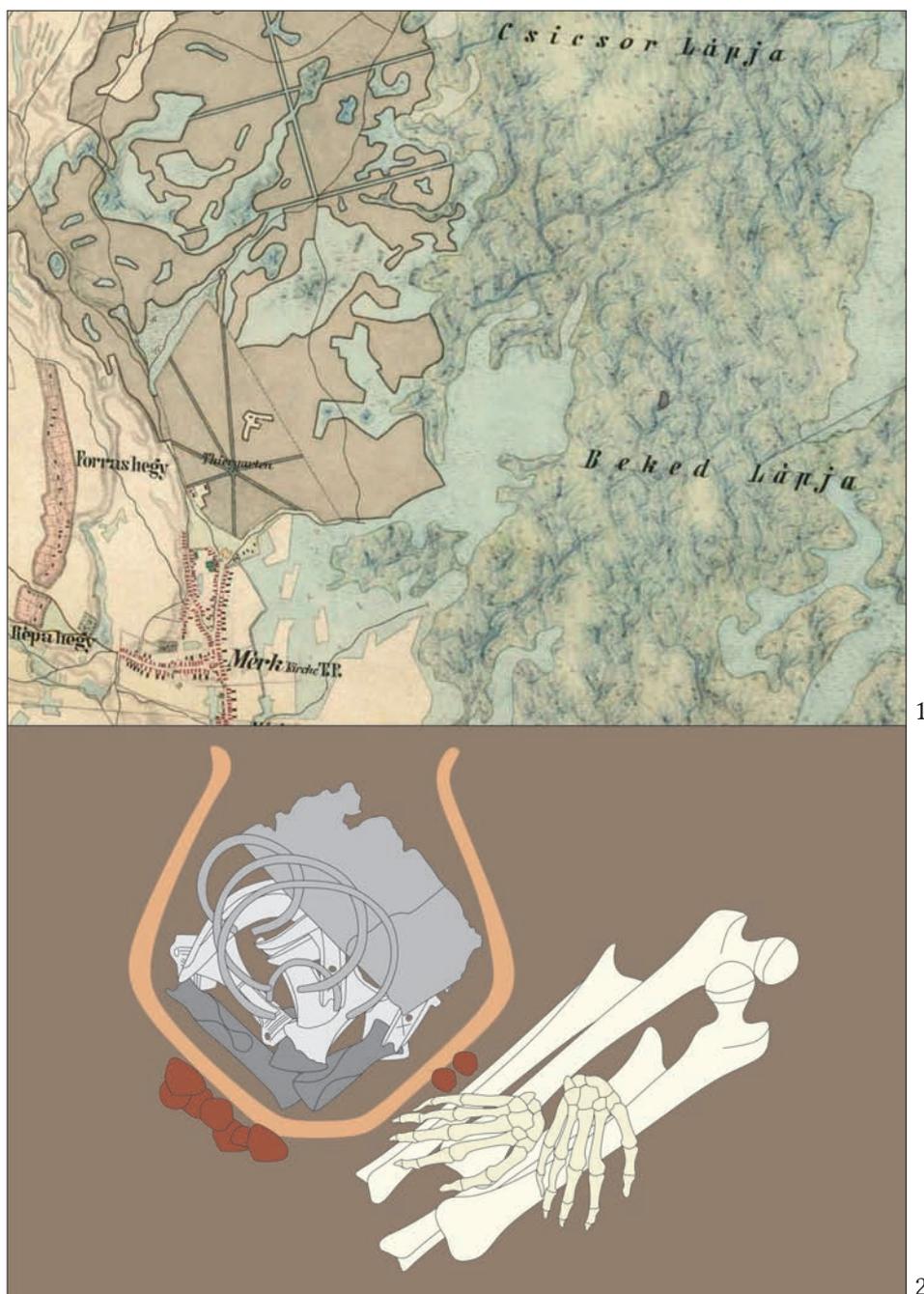


Fig. 17. 1 – The marshland landscape where the hoard was found between Mérc and Tiborszállás on the 2nd Military Survey of the Habsburg Empire, 2 – Schematic reconstruction of the hoard’s context (after SŐREGI 1931, 74).

188 SAVU – GOGÁLTAN 2015, 177–178.

189 ILON 2016.

190 SAVU – GOGÁLTAN 2015, 177–180.

In this respect, two Transdanubian hoards should be mentioned, in which the deposition of human remains can also be observed. A fine example is the hoard from Orci [Orczi] (Somogy County) that consists of eight flanged sickles, a socketed axe, a spiral tube, a blunt head-pin with fishbone pattern and the fragment of another piece, two sheet metal armrings, a decorated ring with tapering terminals and a Passanterie fibula. Among the weapons a broken sword can be mentioned, as well as a worn spearhead and two daggers. It also contained two partitioned plano-convex ingots. All bronzes were deposited in a ceramic pot.¹⁹¹ The composition of the Orci hoard is average within the deposition pattern of the Br D–Ha A1 Transdanubian material, what is less common is its original context. The studies on this hoard from the 1800s suggest the presence of human remains. According to Ingvald Undset: ‘*A bronztárgyakat egy agyagedényben lelték, állítólag égetett csontokkal együtt*’ [The bronze objects were found in a ceramic vessel, allegedly together with burnt bones].¹⁹² In 1886, Gyula Melhárd also noted similar phenomena: ‘*A nagy, két fülű fazekat, melybe a régiségek rejtve voltak, a beleütközött ekevas összezúzta; az edény fenekén különben összetörött csontokra akadtak. A találók az edény-darabokat és csont-maradvány tartalmát, mint szerintök értékteleneket szétszórták...*’ [The large pot with handles, in which the antiquities were hidden, was crushed by the coulter; however broken bones were found at the bottom of the pot. The finders discarded the potsherds and bone fragments worthless to them,...].¹⁹³ József Hampel referred to cremation rite: ‘*...a bronzok alatt apró elhamvasztott csontrészek voltak.*’ [small cremated bone parts were below the bronzes].¹⁹⁴ All reports on the context suggest that some bone parts were selected to the hoard.

Perhaps the most important example in this regard is the Pölöske hoard (Zala County). The context of the find was described by Count Béla Széchenyi and Vilmos Lipp. They were also the ones who collected the objects from the workers and sent it to the HNM. As stated by Count Széchenyi, the hoard was found during the channel deepening of the Szévíz River. In a depth of approximately 2 meters a large ceramic pot was found (75 cm), which was broken by the finders. The map drawn by the Count to his letter, was dated 1st February 1887 (HNM Archive Document No. 1887.26a). According to him, the hoard was found approximately 0.5 km north from Pölöske. It is possible that this wetland area can be identified as the south-eastern part of the Hamuházi dűlő based on the Cadastral Maps of the Habsburg Empire (19th century).¹⁹⁵ On the plates which depicted the finds selectively, a typical hoard belonging to the Kurd Horizon (Ha A1) can be seen.¹⁹⁶ It consists of 38 pieces of intact and broken sickles, most of them showing intense traces of use. The second largest object group are axes, three winged-axes, four socketed axes, which also shows traces of wear. A broken and worn cast ring and a sheet metal bracelet, a conical-headed pin and a metal sheet tube was also found. Among the weapons three winged axes, a hilt fragment of a Type D sword¹⁹⁷, a decorated metal hilt plate and a large Group B Variant B2 spearhead can be noted.¹⁹⁸ A metal vessel

191 UNDSET 1884, 200–208, Pl. 1–2; HAMPEL 1886b, Pl. 117.1–3, 5–12, 18–30; MELHÁRD 1891, 96; HAMPEL 1892, 108; MOZSOLICS 1985, 165–166, Pl. 120; KEMENCZEI 1988, 30, 49, Pl. 10.123, Pl. 23.226.

192 UNDSET 1884, 200.

193 MELHÁRD 1886, 231.

194 HAMPEL 1886b, Pl. 117.

195 GRÓF SZÉCHENYI 1887, 57–58; LIPP 1887a, 56–57; HAMPEL 1892; MOZSOLICS 1985, 171–178; PATAY 1990, 83–84.

196 GRÓF SZÉCHENYI 1887, Pl. 2; LIPP 1887a, Pl. 1; HAMPEL 1892, Pl. 154–155; MOZSOLICS 1985, Pl. 124–128.

197 KEMENCZEI 1988, 65, Pl. 38.349.

198 BADER 2015, 383–384.

fragment, most likely a folded bottom of a situla was also placed in this hoard.¹⁹⁹ It is also notable that objects related to metallurgy in the guise of 8 plano-convex ingots and two drop-lets were included.²⁰⁰ By studying the entire content of the hoard, not only the typologically important pieces, some objects can be observed, which are quite different compared to the rest of the finds. These finds are a partly melted ring (Appx. 1.5, *Fig. 16.11*) and other melted objects which seem to be an amorphous ‘lump’ of burnt ‘bones’ (Appx. 1.5, *Fig. 16.12a–b*). This observation should be verified in the future, but if it indeed contains human bones, it would mean that the Pölöske hoard is the first case from Transdanubia where cremated remains from hoards were preserved.

5.2.3. Selection of Melted Objects and Human Remains

The examples listed above support the concept that objects manipulated by fire and even human body parts could have been selected to some Transdanubian hoards. The reason why only a few of these cases are known is most likely the result of the scarcely described find circumstances and the lack of modern documentation on the assemblages found later. Various scenarios were introduced where the crucial elements of a prehistoric identity (weapon, jewellery, body parts) were selected. In addition to the burials (*Fig. 18.1*), half-melted objects are also present in hoards, which are no more special than others (for example Badaacsonytomaj, Csabdi etc.) (*Fig. 18.5*). Usually, only a few pieces (one to three) were selected to these assemblages. Such finds may also have been deposited to wetland sites (for example the Rába River, Fövényes) similarly to their Western European counterparts (*Fig. 18.6*). We can observe their presence in unique hoards that show set-like combinations, like the Pázmándfalu assemblages, which were interpreted as ‘funeral hoards’ (*Fig. 18.7*). Beside the multiple burial interpretation, this hypothesis is best suited for the Tatabánya-Bánhida ‘A–B’ finds. There are several possibilities how human remains could have been selected to metal hoards (*Fig. 18.2, 3, 4*). In the territory of Transdanubia in the Late Bronze Age, we are aware of two examples that may represent the selection of cremated human remains. These remains from the Orci hoard were lost before the acquisition of the assemblage and in case of the Pölöske hoard, further analysis of the melted lump is required to support this hypothesis. Metal recycling was not discussed, but this process must have been a natural part of object selection in prehistory, and beside the obvious ritual and symbolic reasons it may have stood behind the *pars pro toto* selection of artefacts, which is present in all other scenarios (*Fig. 18.1–7*).

The selection scenarios described above suggest that there is a close connection between the different archaeologically tangible phenomena (hoarding, burial rite, wetland hoard etc.). A fine example is the link between the burial practices and metal hoards, which can be further supported by the ‘asymmetric’ nature of selection. To illustrate this connection, swords can be highlighted, which only appeared in a handful of Transdanubian burials (Appx. 2.2), while hundreds of these weapons were selected to large scrap hoards or to wetland areas like the Danube and Rába Rivers or Lake Balaton.²⁰¹ Such an ‘asymmetry’ is not unique from a European perspective, since it has been observed in the Late Bronze Age territories of Italy and the Netherlands, too.²⁰²

199 MOZSOLICS 1985, Pl. 127.9; PATAY 1990, 83–84, Pl. 70.160.

200 GRÓF SZÉCHENYI 1887, 57–58.

201 MOZSOLICS 1975b; SZATHMÁRI 2005.

202 ROYMANS – KORTLANG 1999, 53–56; FONTIJN 2005, 51; FISCHER 2011, 1303; BIETTI SESTIERI et al. 2013, 157.

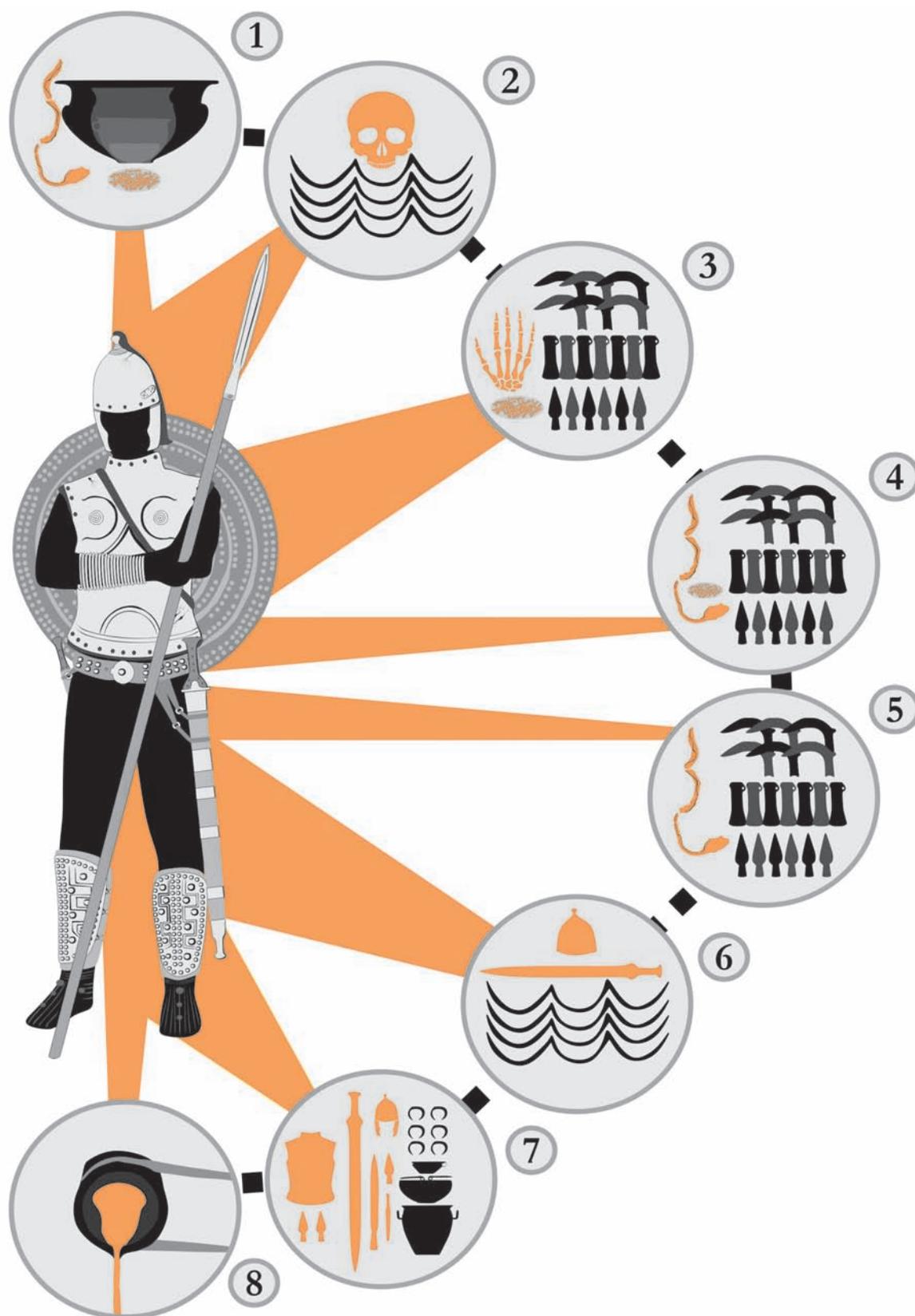


Fig. 18. 'Fragmentation' of Warrior Identity: 1 – Burial with melted objects and human remains, 2 – Deposition of human remains to wetland context, 3 – Selection of human parts and cremated remains to metal hoards, 4 – Selection of melted objects and human remains to metal hoards, 5 – Selection of melted objects to metal hoards, 6 – Deposition of weapons to wetland areas, 7 – Warrior equipment hoards, sometimes with melted objects, 8 – Recycling (Graphics: J. G. Tarbay).

There are two important questions related to the selection of melted objects, which need to be clarified by the finds with better context and experimental archaeological methods: formulation (1) and time (1).

- 1) Were the bronze objects placed on a funeral pyre and burnt along with the rest of the grave goods, or were they separately manipulated, perhaps by the contribution of a specialist, and then selected to the burial or hoards?²⁰³ Were there any special ritual places similar to the burnt offering sites (*Brandopferplatzen*) that served only for this type of manipulation?²⁰⁴ When the fire damages visible on the objects are random, their destruction on a funeral pyre seems more plausible, while the objects the destruction of which shows a deliberate concept (for example the warrior equipment from the MoD IMM^H)²⁰⁵ may have been done by a specialist under controlled conditions.
- 2) Time is the second essential question. Were these finds deposited within a relatively short time interval as a result of one ritual act or were they manipulated and deposited for a long period of time as a result of different motivations? The latter scenario may be true for those hoards which contain objects from several periods (for example Keszőhidegkút). Such assemblages can be interpreted as votive offerings towards a prominent member of the community. Another possibility is that the body parts and the possessions (melted objects) of the deceased represent that the person is still part of the community and they have a continuous and important place in the communal rituals.

Conclusions

In this study the bronze finds from Tatabánya-Bánhida were discussed, which were inventoried to the collection of the HNM on 4th October and 29th December 1880. Some contradictions have been clarified from the literature about the composition of these finds. Tatabánya-Bánhida 'A' (acquisition: 4th October) can be interpreted as an assemblage consisting of a flange-hilted sword, a 'miniature greave', a Hajdúböszörmény-style metal vessel (probably situla), a Type B1 cauldron and an armspiral. Although it consists of some older fragments ('miniature greave', sword), its time of deposition was in the Ha B1 period based on the relative chronological position of the metal vessels. It is more plausible that these assemblages were two separate units, but other possibilities cannot be excluded (multiple burial or a funeral hoard). The idea that the 1st Tatabánya-Bánhida hoard – two spears, a hook and a knife – belonged together with these finds must be excluded. These finds' time of deposition was the Ha A2–Ha B1 and they are more intact, showing no such extreme manipulation traces as the 'A–B' finds.

Special attention was given to the manipulations and selection of the Tatabánya-Bánhida 'A–B' finds. The applied macroscopic analysis allowed to draw a more accurate picture on the original deposition condition of the objects. It can be concluded that finished products in manipulated state were selected to these finds. The Tatabánya-Bánhida 'A' assemblage consisted

203 LLOYD 2015, 18.

204 DELLA CASA – BALLMER 2016, 134–136.

205 See TARBAY 2015a.

of a sword with worn blade-on-blade damages. This used weapon was intentionally destroyed nearly to an unrecognisable state by different methods. On the surface edge notching, impact marks of hacking tools (chisel, axe), bending and melting were observed at once. The alternation of shallow and quite deep marks on the object's amorphous surface suggested that the fragments were at different temperature during manipulation. The treatment of sword No. 2 is identical to the first. This used sword was also melted and showed traces of hacking tools. In these cases, it can be observed that the complete physical destruction of weapons were carried out by methods which are unnecessary from a metallurgical point of view (for example partitioning, recycling etc.). Since both of them were used, they may have been 'dangerous' or 'tainted' objects that were used in combat to harm or kill other human beings, thus their physical and symbolic manipulation was essential. The armspiral showed modern breakage surfaces, thus its selection as a fragment is less certain. The valuable sheet metal products like the cauldron and the Hajdúböszörmény-style metal vessel were broken, folded and damaged by fire. Based on literature data, the fragmentation of Type B1 cauldrons are more common. The above mentioned piece belongs to the A2B2C2 combination group, which includes small fragments. Its treatment has fine parallels among the Transdanubian Ha B1 hoards like Sárbogárd and Gyermely-Szomor. The Bokavić hoard from Bosnia and Herzegovina can also be highlighted. If the vessels from this Bosnian hoard belong to a situla, then it should be mentioned as a close parallel, just as the fragment from Keszőhidegkút. The broken 'miniature greave' was identified based on its fine dimensions and comparison to analogues, which also has a characteristic way of treatment among some of the Carpathian specimens of this type. If the modern breakages are taken into account, it is evident that the selection of the Tatabánya A-B finds represent a *pars pro toto* concept.

The Tatabánya-Bánhida 'A' find shows strong Northeast Carpathian features: 1. The Type B1 cauldron and the Hajdúböszörmény-style metal vessel has several close parallels from this area. 2. The typological selection of the finds, the combination of weaponry with metal feasting set and armspiral, strongly reflects on the Ha B1 Hajdúböszörmény hoards from the Upper Tisza region. Both phenomena fit well into the interaction model of Northeast Transdanubia,²⁰⁶ in which the Tatabánya-Bánhida 'A' was the result of an individual occurrence (for example mobility of a prominent person or mercenary with his or her belongings) or rather possibilities, the explanation of which would require better documented contexts.

The second question was the type of the Tatabánya-Bánhida 'A' assemblage. There was no notice if any human remains or ceramic pots were found along this find. The only information available was that they were found in one heap. There was a hypothesis based on the selection of melted objects that this assemblage was a burial or a multiple burial, if A and B originally belonged together. However, in Transdanubia so far all known burials with swords are chronologically older (Br C–Ha A1) than the Tatabánya-Bánhida 'A'. Moreover, the metal grave goods in these burials are nowhere near to this assemblage. In the Ha B1 period, except for two burials from Békásmegyér, bronze cups were not selected to these finds. In contrast, swords, metal vessels and even armspirals are present as stray finds or in different hoard types during the Ha B1 Transdanubia. Merely on a typological basis, the Tatabánya-Bánhida 'A' find is more related to local hoards than burials from the same period. There are some arguments that suggest that the Tatabánya-Bánhida 'A' may have been a special hoard type.

206 VÁCZI 2013a.

For this interpretation, several examples were introduced from Transdanubia and from Europe about the selection of melted bronzes and human remains in hoards. These support the idea that beside the archaeologically perceptible burial context, the melted objects and human parts can be symbolic elements in hoards. Within the several different options, the Tatabánya-Bánhida 'A' find is more similar to the funeral hoard from Pázmándfalu, which also showed a set-like combination of personal equipment. It is hard to authentically reconstruct a person who could have owned the metal finds from Tatabánya-Bánhida 'A'. It is a fact that it contained the elements of a prestigious feasting set, which followed a new Northeast Carpathian design. These appeared in prominent assemblages related to the elite across Europe. This find also reflects on a warrior identity, by a used sword and a symbolic miniature greave.

Acknowledgement

I am most grateful to Eszter Tóth for the restoration of the Tatabánya-Bánhida 'A–B' finds. It was made possible to analyse the objects in depth with a microscope-camera. I would also like to thank Péter Prohászka for providing me the 8/15th issue of the Komáromi Lapok and to Béla Debreczeni-Droppán and László Szende for helping my research in the archives of the Hungarian National Museum. The writing of this study was supported by the NKFI PD_20 Research Fund grant No. 134910 (The Technology, Use and Manipulation of Weapons from the Late Bronze Age Transdanubia).

Appendix 1²⁰⁷

1. Tatabánya-Bánhida 'A–B' (1880)

Tatabánya-Bánhida 'A' (objects inventoried in 14 October 1880; Inv. Nos. HNM 1880.145.1–3)²⁰⁸

1.1. Sword (HNM, 145.1880.1.d): Melted fragment of a flange-hilted sword, decorated with two parallel lines, which curved before the hilt. The object is bent, broken, and impacts of bladed tools are visible on its surface. Modern breakage was also observed along its blade. 76.51×42.21 mm, Th. 10.96 mm, Wt. 107.3 g (*Fig. 19.1.1, Fig. 22.1, Fig. 26.2–3*).

1.2. Sword (HNM, 145.1880.1.e): Bent and broken blade fragment of a sword, decorated with two parallel lines. The object's surface is amorphous and blistered due to heat damage. A vertical impact is visible on the fragment's body. Cracks are visible on its surface. One of the breakage surfaces is sharp, the other is rounded. It belongs to No. 1.3 fragment. 54.41×33.87 mm, Th. 9.13 mm, Wt. 62.4 g (*Fig. 19.1.2, Fig. 22.1.2, Fig. 27.2*).

1.3. Sword (HNM, 145.1880.1.f): Bent and broken blade fragment of a sword, decorated with two parallel lines. Cracks are visible on its surface. The sword's breakage surface is rounded. A small droplet is fused on the blade. It belongs to No. 1.2 fragment. 41.41×31.68 mm, Th. 9.01–9.45 mm, Wt. 50.9 g (*Fig. 19.1.3*).

1.4. Sword (HNM, 145.1880.1.g): Blade fragment of a sword, decorated with two parallel lines. Modern breakage is visible on the object. A charcoal piece was corroded to the object's surface. 29.82×30.88 mm, Th. 10.22 mm, Wt. 28.7 g (*Fig. 19.1.4, Fig. 27.3, 6–7*).

1.5. Sword (HNM, 145.1880.1.h): Bent and broken blade fragment of a sword, decorated with two parallel lines. Tool impacts are visible on the object. The sword piece is partly melted. 41.21×36.81 mm, Th. 9.21 mm, Wt. 45.3 g (*Fig. 19.1.5, Fig. 22.3 – 4, Fig. 23.1*).

207 Abbreviations: L. length, Th. thickness, Th. (b) thickness of the blade, W. width, W (r.) width of the rim, W. (b/mr) width of the blade and midrib, H. height, Wt. weight.

208 3 metal sheet fragments were lost in the collection of the HNM (Inv. No. 145.1880.3).

1.6. Sword (HNM, 145.1880.1.c): Bent and broken, melted blade fragment of a sword, decorated with two parallel lines. Modern breakages are visible along its cutting edge. A small fragment belongs to this object, which was recently broken. Impacts are visible along its cutting edge. 37.22×26.49 mm, Th. 9.26 mm, Wt. 26.9 g (Fig. 19.1.6, Fig. 23.2, 4).

1.7. Sword (HNM, 145.1880.1.b): Bent sword blade fragment, decorated with two cast parallel ribs. Its breakage is recent and originally it belonged together with No. 1.8. Small impacts are visible on one end of the fragment, while its surface is blistered due to fire on the other end. Micro-sized notches are observable along its cutting edge. 103.26×39.04 mm, Th. 9.82 mm, Wt. 160 g (Fig. 20.1.7, Fig. 24.1, Fig. 25, Fig. 26.1).

1.8. Sword (HNM, 145.1880.1.a): Melted and bent tip fragment of a sword. It is decorated with two parallel cast ribs, and a bundle of six lines near to the tip. The breakage of the object is recent and it was originally joint with sword No. 1.7. Large and small impacts of bladed tools are visible on its surface. 79.31×37.96 mm, Th. 10 mm, Wt. 88 g (Fig. 20.1.8, Fig. 24.2–4, Fig. 27.4).

2. Armspiral (HNM, 145.1880.2): Bent armspiral fragment with triangle cross-section. Its breakage is recent. L. 76.65 cm, Th. 6.32×3.73 mm, Wt. 9.1 g (Fig. 21.2).

3.1. Cauldron (HNM, 145.1880.3): Rim fragment of a cauldron. It is decorated with a bundle of five lines and a row of semi-circle dots. Inner part of the fragment is amorphous due to heat damage and another metal sheet object is fused to its surface (No. 4). 40.99×30.73 mm, Th. 2.47 mm, Wt. 13.8 g (Fig. 21.3.1).

3.2. Cauldron (HNM, 145.1880.3): Folded rim fragment of a cauldron. It belonged to object No. 3.1. The fragment is bent and melted. A bundle of five lines can be observed below its rim. 33.89×48.05 mm, Th. 1.74 mm, Wt. 23 g (Fig. 21.3.2).

3.3. Cauldron (HNM, 145.1880.2): Large handle fragment with cracks. It belongs together with No. 3.4. 85.53×24.74 mm, Th. 7.69×7.51 mm, Wt. 32.7 g (Fig. 21.3.3).

3.4. Cauldron (HNM, 145.1880.2): Handle fragment, it belongs to No. 3.3. 41.87×8.26 mm, Th. 7.01×6.99 mm, Wt. 11.1 g (Fig. 21.3.4).

3.5. Cauldron (HNM, 145.1880.2): Terminal of a cauldron handle, it probably belonged to objects No. 3.3 and 3.4. 23.47×28.50 mm, Th. 5.45×5.42 mm, Wt. 11.5 g (Fig. 21.3.5).

4. 'Miniature greave' (HNM, 145.1880.3): Small amorphous metal sheet fragments. One of them has a folded rim. Modern fragmentation is visible on the object. 21.35×15.23 mm, Th. 1.68–8.47 mm, Th. (metal sheet with rim) 3.11mm, 0.80 mm, Wt. 3.5 g (Fig. 6.2, Fig. 21.4, Fig. 27.5).

5. 'Situla' (HNM, 145.1880.3): Folded metal sheet fragment, decorated with a line of embossed dots that is framed by repoussé lines. Triangle-shaped repoussé pattern is visible below the previously mentioned pattern. The object is partly melted. Another metal sheet fragment of the same object is fused to its reverse. On this metal sheet parallel bundles of repoussé lines can be seen. 35.43×34.65 mm, Th. 0.92 mm, Wt. 6.0 g (Fig. 6.1, Fig. 21.5).

Tatabánya-Bánhida 'B' (objects inventoried on 29th December 1880; Inv. No HNM 1880.180.1–2)

6.1. Sword (HNM, 1880.201.2): Blade fragment of a sword, decorated with a bundle of six lines. The object is the upper part of the object No. 6.2. Its breakage is recent. The object is melted and impacts of bladed tools can be observed in its surface. 69.82×34.51 mm, Th. 8.32 mm, Wt. 48.6 g (Fig. 21.6.1, Fig. 27.8, Fig. 28.1).

6.2. Sword (HNM, 1880.201.1): Tip fragment of a sword. It belonged together with No. 6.1. The object is amorphous, bent and melted. Its breakage is recent. Worn notches and dents are visible along its surface. Impacts are noticeable near the cutting edge. L. 134.47×31.84 mm, Th. 8.93 mm, Wt. 91 g (Fig. 21.6.2, Fig. 28.2–4).

2. Tatabánya-Bánhida-House No. 41, Hoard 1

Spearhead (HNM, 147.1880.2): Spearhead with leaf-shaped blade, two peg holes and conical socket. A cast vertical rib is visible on its profiled midrib. The profilation terminates in the line of the peg hole.

The blade of the object is hammered and sharpened. L. 152 mm, W. (r) 25×22 mm, W. (b/mr) 42×13 mm, Th. (b) 1 cm, Wt. 114 g (*Fig. 10.1*).

Spearhead (HNM, 147.1880.1): Spearhead with leaf-shaped blade, two peg holes and a conical socket. A cast vertical rib is visible on its profiled midrib. A misrun defect is visible on its midrib. The object's surface is grinded, its cutting edge is sharpened. L. 150 mm, W. (r) 24×22 mm, W. (b/mr) 39×12 mm, Th. (b) 1 cm, Wt. 109 g (*Fig. 10.2*).

Hook (HNM, 147.1880.4): Bronze hook with rhomboid cross-section and tapering terminals. It is hammered near to its terminals. 62×35 mm, Th. 5×5 cm, Wt. 16 g (*Fig. 10.3*).

Knife (HNM, 147.1880.3): Flanged knife with broken tip. Its flange base is V-shaped and has three rivet holes. The blade is curved and shows micro-sized nicks. L. 202 mm, W. 27–18 mm, Th. 7–1 mm, Wt. 73 g (*Fig. 10.4*).

3. Greaves and miniature greave fragments

Bodrogeresztúr 1 (Borsod-Abaúj-Zemplén County)

Greave (HNM, 38.1881.18): Bent edge fragment of a greave, its rim is folded on a wire. The object is decorated with quadrant repoussé patterns. One of its breakage surfaces is probably recent. 85.32×69.93 mm, Th. (rim) 5.13 mm, Th. (sheet) 0.77 mm, Wt. 46.9 g (*Fig. 5.1*).

'Bonyhád vidéke' (Tolna County)

Greave (HNM, 95.1889.173): Bent edge fragment of a greave with rolled-over rim, which comprises a wire. It is decorated with quadrant repoussé patterns. 79.97×53.45 mm, Th. (rim) 5.93 mm, Th. (sheet) 0.55 mm, Wt. 18.5 g (*Fig. 5.2*).

Miniature greave (HNM, 95.1889.178): Fragment of a miniature greave with a rolled over rim. The object is decorated with repoussé patterns along the rim and on the broken parts. 44.19×27.04 mm, Th. (rim) 1.46 mm, Th. (sheet) 0.62 mm, Wt. 3.1 g (*Fig. 4.1–4.2*).

4. Plano-convex ingot from Bodrogeresztúr 2 (Borsod-Abaúj-Zemplén County)

Plano-convex ingot (HNM, 8.1924.41): Small amorphous plano-convex ingot with metallic projection on the convex side. Melted fragments of different objects (for example sickle blades) are visible on its convex side. 103.89×94.46 mm, H. 35.03 mm and 50.45 mm (total), Wt. 610.2 g (*Fig. 14*).

5. Partly melted objects from different sites

Melted sword and a pin from the Rába River (Győr-Moson-Sopron County)²⁰⁹

Sword (HNM, 15.1894.1): Flange-hilted sword with five rivet holes, straight blade. Its hilt is broken, the lower blade part is broken and bent. The cutting edge is hammered and shows notches. A melted bronze piece can be seen on the upper part of the blade. Heat damage is visible around this section. L. 297 mm, W. (hilt) 50.61 mm, W. (b) 41.54 mm, Th. 8.35 mm, Wt. 419 g (*Fig. 15.1, 3*).

Pin (HNM, 15.1894.3): Thick blunt-headed pin with bundle-of-lines pattern. The object shows no traces of heat damage. L. 138.16 mm, Th. 6.39×5.87 mm, Wt. 18.2 g (*Fig. 15.2*).

Badacsonytomaj-Korkován hegy (Veszprém County) hoard

Razor (Balatoni Museum, 43.50.65): Double-edged razor with a hole in the middle. The breakage of its handle is recent. 56×55 mm, Th. (blade) 1 mm, Th. (handle) 8.2 mm, Wt. 21 g (*Fig. 16.1*).

209 The Rába sword was acquired along with 2 pins and one spearhead and several Medieval objects. These finds were found during the regulation of the Rába River. Only the sword and one pin are still preserved. INVENTORY BOOK OF THE HNM 1894, 48–49.

Csabdi-Bükkös erdő/Bükköstető (Fejér County) hoard

Knife (Szent István Király Museum, 11236): Melted knife tip. L. 41 mm, Th. 3 mm, Wt. 7 g (Fig. 16.2).

Ring (Szent István Király Museum, 11236): Partly melted ring terminal. 24×6 mm, Th. 5×5 mm, Wt. 1 g (Fig. 16.3).

Ring (Szent István Király Museum, 11236): Partly melted ring terminal. 22×7 mm, Th. 4×4 mm, Wt. 3 g (Fig. 16.4).

Gyermely-Szomor (Komárom-Esztergom County) hoard

Wire (HNM, Budapest, –): Amorphous melted wire broken into two recent fragments. 31.24×22.88 mm, Th. 6.08×2.74 mm, 2.13×1.87 mm, Wt. 4.4 g (Fig. 16.5).

Balatonudvari-Fövenyes (Veszprém County) hoard

Knob (Private Collection of Zoltán Repkényi): A round and convex knob with one loop on the reverse. It is amorphous due to heat damage. 19×20 mm, Th. 2 mm, H. 5 mm, Wt. 4 g (Fig. 16.6).

Ring (Private Collection of Zoltán Repkényi): Bent fragment of a quadrangular-sectioned ring, its end is slightly melted. 47×7 mm, Th. 5 mm, Wt. 6 g (Fig. 16.7).

Ring (Private Collection of Zoltán Repkényi): Deformed fragment of a round-sectioned ring, its end is amorphous due to fire damage. 30×20 mm, Th. 5 mm, Wt. 5 g (Fig. 16.8).

Keszőhidegkút (Tolna County) hoard

Torques (HNM, 66.1926.62): Bent, partly melted torques fragment decorated with torsion. The melted part is amorphous and slightly blistered. L. 73.50 mm, Th. 7.20×7.31 mm, Wt. 17.1 g (Fig. 16.9a–b).

Ring (HNM, 66.1926.61): Half fragment of an armring with cast rib patterns. It is twisted near to its breakage surface. This part is also blistered and amorphous. L. 55.28 mm, Th. 7.63×6.92 mm, Wt. 5.6 g (Fig. 16.10a–b).

Pölöske (Zala County), hoard

Annular ring (HNM, 2.1887.8): Small melted annular ring with melted bronze. The object is amorphous due to heat damage. 32.28×25.04 mm, Th. 2.84×3.72 mm – 3.13×2.35 mm, Wt. 5.8 g (Fig. 16.11).

Melted lump (HNM, 2.1887.14): Melted lump of unknown material. Two ‘bone-like’ pieces are fused to the object. It is in two fragments due to a recent breakage. 95.52 mm, 39.83×24.58 mm, Wt. 122.4 g. ‘Bone’ 1: 21.24×18.74 mm, ‘Bone’ 2: 13.12×11.35 mm (Fig. 16.12a–b).

Appendix 2²¹⁰

List 1: Type B1 cauldrons (VON MERHART 1952, 5–6; PATAY 1969a, 175, Tab. 1; PATAY 1990, 21–29; NOVOTNÁ 1991, 47–48; THEVENOT 1991, 107–108; KOÓS 2004, 95, Fig. 8; КОБАЛЬ 2006; SCHMIDT – SEGSCHNEIDER 2014, 473, fn. 11–12)²¹¹

1. Alba Iulia (RO) s., 1 pc (C1): PÁRVAN 1982, 179–180, Fig. 198; SOROCEANU 2008, 126–127, Pl. 16.90.
2. Blanot (FR) h., 1 pc (Ha A–Ha B1, Ha B1) (C2): THEVENOT 1991, 39–41, Fig. 29.2.
3. Budapest-Nagytétény (HU) s., 1 pc (C1): JELENTÉS 1912, 37; PATAY 1990, 25, Pl. 23.30.
4. Brăduț (RO) u. h., 2 pcs (Ha B1) (C4): SOROCEANU 2008, 127–128, Pl. 17.91, Pl. 18.92.

210 Abbreviations: AT Austria, CZ Czech Republic, DE Germany, DK Denmark, FR France, HU Hungary, SK Slovakia, SI Slovenia, RO Romania, RS Serbia, UA Ukraine, h. hoard, u. h. uncertain hoard, s. stray find, m. marshland find, gr. grave, se. settlement, C. combination group, ‘C’ uncertain combination group, X. uncertain dating.

211 The list includes only the typologically well-identifiable Type B1 cauldrons.

5. Dubravica (RS) r. (Morava), 1 pc (C1): КОСОРИЋ 1966, 191–192, Fig. 1–2; JACANOVIĆ 1995, 101, Fig. 2.
6. Évans (FR) h., 1 pc (Ha B1) (C7): GANARD – PININGRE 2015, 175–176, Fig. 162; PININGRE – GANARD 2015, 59–62, Fig. 49–52.
7. Egyek-Kendertag (HU) h., 1 pc (Ha B1) (C2): SÓTÉR 1936, 57–58, Fig. 18.1; PATAY 1990, 21, Pl. 3.6; MOZSOLICS 2000, 43.
8. East Hungary s., 1. pc (C1): KOÓS 2004, 83, Fig. 1.
9. Hajdúböszörmény-Csege halom (HU) h., 2 pcs (C8): PATAY 1969a, Pl. 46.2; PATAY 1990, 21–22, Pl. 4.7, Pl. 5.8.
10. Hajdúsámson 2 (HU) h., 3 pcs (C1): PATAY 1990, 22, Pl. 6.9, Pl. 7.10, Pl. 8.11; MOZSOLICS 2000, 47.
11. Hajdúszovát (HU) h., 1 pc (C1): SÓREGI 1942, 52, Fig. 14; PATAY 1990, 22, Pl. 9.12; MOZSOLICS 2000, 49.
12. Hejőszalonta (HU) h., 1 pc (Ha B1) (C4): PATAY 1990, 22–23, Pl. 9.13; MOZSOLICS 2000, 49–50.
13. Hennickendorf (DE) se., 1 pc (C1): MARTIN 2009, 91, Pl. 32.126.
14. Hvedholm (DK) m., s. or h., 1 pc (C1): THRANE 1965, 180–181, Fig. 14.
15. ‘Obišovce’ (SK) u. h., 1 pc (‘C3’): BARTÍK 2007, 15–17, 19–21, Fig. 3.
16. Ozeriany [Jezierny] (UA) h., 3 pcs (Ha B1) (C1): GEDL 2001, 62, Pl. 66.A1, Pl. 67.A2–A3,
17. Karcag (HU) h., 1 pc (Ha B1) (C5): PATAY 1990, 23, Pl. 10.15; MOZSOLICS 2000, 51–52.
18. Kántorjánosi (HU) u. h., 1 pc (undatable/Ha B1) (C4): JÓSA 1895a, 249; JÓSA 1895b, 355; PATAY 1990, 23, Pl. 10.14.
19. Kisvarsány (HU) s., 1 pc (C1): MOZSOLICS 1967, U19; PATAY 1990, 23, Pl. 11.16.
20. Kopřivnice (CZ) h., 1 pc (Ha B1) (C1): NEKVASIL – PODBORSKÝ 1991, 12–13, Pl. 4.29; SALAŠ 2005, 431–433.
21. Krásna nad Hornádom (SK) h., 1 pc (C1): NOVOTNÁ 1991, 48, Pl. 9.49.
22. Kuchava (UA) h., 2 pcs (C1): KOBAL’ 2000, 83–84, Pl. 84D.2.
23. Kunysivtsi [Kunisowce] (UA) h., 4 pcs (Ha B1–Ha B2 or Periode V) (C1): GEDL 2001, 62–63, Pl. 70–74.
24. ‘Lúčky’ (SK) u. h., 1 pc (C1): NOVOTNÁ 1991, 47, Pl. 9.48.
25. Máriapócs (HU) h., 2 pcs (C1): PATAY 1990, 23, Pl. 12.17, Pl. 13.18.
26. Mezőkövesd (HU) h., 2 pcs (C9): PATAY 1969a, 171–173; PATAY 1990, 23, Pl. 13.20, Taf. 14.19.
27. Moigrad 1 (RO) h., 2 pcs (Ha B1) (C4): SOROCEANU 2008, 128–130, Pl. 20.93–94.
28. Nyírtelek (HU) s., 1 pc (C1): PATAY 1990, 24, Pl. 15.21.
29. Nedilys’ka [Niedzieliska] (UA) h. 1 pc (Period III–Period IV/V) (C3): GEDL 2001, 63–64, Pl. 75.
30. Pácin 3 (HU) u. h., 1 pc (X/Ha B1) (C4): PATAY 1990, 24, Pl. 15.22; MOZSOLICS 2000, 64.
31. Podkonice (SK) h., 1 pc (Ha B1) (C1): NOVOTNÁ – KVIETOK 2018, 4, 9–14, Abb. 5–6, Pl. I.2.
32. Rohod 3 (HU) h., 1 pc (Ha B1) (C4): PATAY 1990, 24, Pl. 16.23; MOZSOLICS 2000, 68–69.
33. Sâncrăieni 1 (RO) h., 1 pc (Ha B1) (C1): PETRESCU-DÎMBOVIȚA 1978, 144; SOROCEANU 2008, 130, Pl. 21.95.
34. Skočjan (SI) cave, at least 3 pcs (‘C1’): JEREB 2016, 104, Pl. 122.261–263.
35. Szentés-Nagyhegy 3 (HU) h., 3 pcs (Ha B1) (C6): PATAY 1990, 24–25, Pl. 17.24, Pl. 18.25, Pl. 19.26; MOZSOLICS 2000, 77–78.
36. ‘Tetétlen’ (HU) u. h., 1 pc (C1): PATAY 1990, 2; SOROCEANU 2008, 259–261, Pl. 19.
37. Tiszakarád-Szárnyasszög tanya 2 (HU) h., 2 pcs (Ha B1) (C1): MOZSOLICS 1969, 62; PATAY 1990, 25, Pl. 20.27, Pl. 21.28.
38. ‘Tolcsva-Várhegy’ (HU) h., 2 pcs (X/Ha B1) (C9): V. SZABÓ 2013, 798–801, Fig. 4.5–6, Fig. 5.3, 8.
39. Zepernick (DE) s./u. h., 1 pc (C1): MARTIN 2009, 91, Pl. 33.125.
40. Vaslovivtsi (UA) s., 1 pc (C1): КЛОЧКО – КОЗЫМЕНКО 2017, 234, Fig. 12.
41. Vester Skjerninge (DK) gr., 1 pc (Period IV/Ha A2–Ha B1) (C4): THRANE 1965, 175–179, Pl. 10a.1–12.
42. Visuia (RO) h., 2 pcs (Ha B1) (C1): DĂNILĂ 1976, 69–70, Fig. 1.1–2, Fig. 3.6, Fig. 7; SOROCEANU 2008, 130–132, Pl. 21.97, Pl. 22.96.
43. Voloka (UA) h. from the edge of a Gáva-Holihrad settlement, 1 pc (Ha B1) (C1): ВОЙНАРОВСКИЙ – СМЕРНОВА 1993, 183–184, Fig. 1.1; КОБАЛЬ 2006, 92, 94, Fig. 1.1.
44. Unterglauheim (DE) gr., 2 pcs (Ha B1) (C3): JACOB 1995, 83, Pl. 31.222, Pl. 32.223.
45. Unprovenanced (HU) s., 1. pc: PATAY 1990, 25, Pl. 22.29.
46. Unprovenanced (AT) s., 1 pc: PRÜSSING 1991, 72, 74, Pl. 66.254.

List 2: Burials with swords from Transdanubia (after KEMENCZEI 1988; KEMENCZEI 1990; KEMENCZEI 1991; NOVÁK – VÁCZI 2012, 106, Appendix 1, Fig. 5)²¹²

1. Bakonyszűcs-Százhalom, Mound 8, 'grave goods',²¹³ dating (Br D–Ha A1), MS: INVENTORY BOOK OF THE HNM 1875, 190; INVENTORY BOOK OF THE HNM 1876, 465; DAX et al. 1972, 58; KEMENCZEI 1991, 77, Pl. 64.291; JANKOVITS 1992a, 6–10, Fig. 3.1.
2. Bakonyszűcs-Százhalom, Mound 10, grave goods (spearhead, sword fragments, bronze fragments), dating (Br D–Ha A1): INVENTORY BOOK OF THE HNM 1875, 190; JANKOVITS 1992a, 10, Fig. 4.3.
3. Bakonytamási-Hathalom, Mound 7, stray find sword from burial: INVENTORY BOOK OF THE HNM 1875.175.5; KEMENCZEI 1988, 226, Pl. 26.246; KŐSZEGI 1988, 121, No. 93; KEMENCZEI 1990, 222, Fig. 4.3.
4. Bakonyjákó-Somhát, Mound 6, Grave 2, rite (cremation), grave goods (ceramic vessel set, 1 sword, 1 spearhead, 1 pin), dating (Br D), MS: DAX et al. 1972, 29; KEMENCZEI 1988, 47, Pl. 20.205; KŐSZEGI 1988, 120; KEMENCZEI 1990, 222, Fig. 3.A8; JANKOVITS 1992b, 318–319, Fig. 62.4.
5. Balatonfűzfő, Grave 6, rite (cremation, scattered), grave goods (ceramic vessel set, 1 sword, 1 winged-axe, 1 knife, 9 arrowheads, 1 pin, bronze rivets), gender (male, aged 25–35 years), dating (Br D–Ha A1), MS: ILON 2012; ILON 2015, 34–38, 42, Fig. 8.3.
6. Csabrendek, Grave, rite (inhumation),²¹⁴ grave goods (1 pot, 1 torques, 1 sword), dating (Ha A1): DARNAY 1899, 28, 30, 37, Pl. 12.7–8; PATEK 1968, Pl. 59.13; KEMENCZEI 1988, 75, Pl. 46.402 (Fig. 13.3).
7. Csabrendek-Hegyelő, Grave 'B', rite (inhumation), grave goods (1 belt, 1 spearhead, 1 sword), dating (Br D): HAMPEL 1886a, 4; HAMPEL 1887, 174–175, Pl. 1.8–9; HAMPEL 1892, 20, Pl. 132.8–9; DARNAY 1899, 29, Pl. 11.8–9; PATEK 1968, 28–29, Pl. 58; BAKAY et al. 1970, 45, Fig. 8.3; KEMENCZEI 1988, 59, Pl. 33.304; KEMENCZEI 1990, Fig. 2.6 (Fig. 13.2).
8. Csabrendek, Grave 12, rite (inhumation), grave goods (1 dagger, 2 spearheads, 2 swords), dating (Br D–Ha A1): DORNER 1884, 231–232, Pl. E.1–2; DARNAY 1899, 30, Pl. 12.12, 14; BAKAY et al. 1970, 46; KEMENCZEI 1991, 79, Pl. 65.313–314 (Fig. 13.1).
9. Csögle-Kispáskom, Mound 15, stray finds from burials (3 swords), MS: PATEK 1968, 30, 124, Pl. 62.14–15; BAKAY et al. 1970, 64, Pl. 4.1, 5–6; KEMENCZEI 1988, 46–47, Pl. 19.196, Pl. 20.206; KEMENCZEI 1990, 226, Fig. 9.6, 12.
10. Galambok-Hársas-erdő, Object 412, Grave, rite (cremation, urn), grave goods (ceramic vessel set, 1 sword), dating (Ha A1), MS: SZÁRAZ 2008, 69–70, Fig. 8.1a–c, 3.
11. Jánosháza, Mound, Grave 1983/2, grave goods (ceramic vessel set, 1 sword, 1 pin, 1 funnel-shaped pendants, knobs, rings, spiral tubes, 'stone'/glass/amber beads), dating (Br C/D), MS: FEKETE 2004, 161–163, Fig. 4.
12. Keszthely-Legelő-dűlő 1. parcella, Mound 1, feature I, tomb, rite (inhumation), grave goods (1 sword,

212 MS = melted sword. Flóris Rómer also notes that sword fragments were found in burials from the Bakonybél-Vall cemetery. RÓMER 1878, 121–122, Fig. 47; JANKOVITS 1992a, 5.

213 The content of the 8th and 10th mounds is hard to reconstruct due to the contradict data in literature, the lack of context and the loss of finds. See INVENTORY BOOK OF THE HNM 1875, 191; HAMPEL 1886a, 40; HAMPEL 1892, 6–7; HOLSTE 1951, 13, Pl. 23.12–18; DAX et al. 1972, 58; MOZSOLICS 1985, 90; JANKOVITS 1992a, 6–10, Fig. 3. According to Katalin Jankovits, the 8th tumulus contained 1 chisel, 1 'palstave' [winged-axe], 2 spearheads, 3 sword fragments, 1 dagger, 1 pin, 1 melted bronze lump, 1 ribbed armring, 'horseshoe-shaped' bronze lump [casting jet] (JANKOVITS 1992a, 6–10, Fig. 3). These are finds from two acquisitions (1875, 1876). The inventory book also noted that teeth, bone fragments, a bronze fragment, 'clay' fragments, bone and metal fragment mixed with dirt were part of the second acquisition. See INVENTORY BOOK OF THE HNM 1876, 465 (1876.326.1–7). It is worth to note that Vall and Gáthegey-Tuskós was also suggested as possible find-spot for the dagger of the 8th tumulus. See DAX et al. 1972, 21–22, No. 2/7, 23–24, No. 2/16, 58. We assume that one spearhead might belong to the Bakonybél site based on the description of the Inventory Book. INVENTORY BOOK OF THE HNM 1875, 190 (1875.175.3); JANKOVITS 1992a, 6, Fig. 3.3.

214 This sword was described as a stray find by Tibor Kemenczei. See KEMENCZEI 1988, 75. We believe that it may have been identical with a burial discussed by Kálmán Darnay. According to his description, this inhumation grave was found ca. 50–60 steps from the cemetery during pit digging, ca. 80 cm depth. On the right side of the 160 cm long skeleton a ceramic pot was placed. The broken sword was laid beside the left arm of the deceased. Also, a circular sectioned torques with rolled terminals was on its neck. See DARNAY 1899, 28, 30, 37, Pl. 12.7–8 (Fig. 13.3). K. Darnay also noted a 3rd grave that contained 2 sword blade fragments (a narrow and a wide) and a spearhead (DARNAY 1899, 28).

- 1 pin, 1 urn-shaped pot²¹⁵), gender ('male'), combat injury (half of the occiput was cut off), dating (*mittlere Hügelgräberzeit*, Br C1; Br B2-C1/2): LIPP 1885, 370–373; LIPP 1887a, 53–54; LIPP 1887b, 11–14; HAMPEL 1892, 63–64, Pl. 134; KUZSINSZKY 1920, 87–88; BAKAY et al. 1966, 95, Pl. 10.15; KEMENCZEI 1988, 38, Pl. 13.156, Pl. 59A; NEUMANN 2009, 104–105; GODIŠ – STYK 2019, 215–216, 221–227, Pl. I, Pl. IIA.
13. Keszthely-Sömögyei-dűlő, Grave 7, feature IX, tomb, rite (inhumation), grave goods (1 sword in wooden sheath, 1 pin), gender ('male'), dating (*mittlere-jüngere Hügelgräberzeit*, Br C): LIPP 1886, 352–353; LIPP 1887a, 53–54; LIPP 1887b, 11–14; KUZSINSZKY 1920, 88; BAKAY et al. 1966, 95; KEMENCZEI 1988, 37, Pl. 59B; GODIŠ – STYK 2019, 216–227, Pl. II.B, Pl. II.1–2.²¹⁶
 14. Mosonszolnok-Jessehofi puszta [Mosony-Szolnok], stray finds from a cemetery (2 swords), MS: SÓTÉR 1892, 209–210, Pl. 2.1.3; HAMPEL 1896, Pl. 187.1.3; PATEK 1968, 132, Pl. 46.6–11; KEMENCZEI 1988, 54, 59, Pl. 27.258, Pl. 34.307.
 15. Nagykanizsa-Alsóerdő, Grave/stray finds from cemetery (1 sword, 3 cone-headed pins), dating (*jüngere-späten Hügelgräberzeit*, Br C2/Br D): PATEK 1968, 60, 132, Pl. 93.1; KEMENCZEI 1988, 44–45, Pl. 17.188.
 16. Péntesgyőr-Gyulaberki tábla, stray finds from mounds (sword, spearhead, pots, bones), dating ('Br D–Ha A1'): DAX et al. 1972, 216, No. 66/4; KÖSZEGI 1988, 172, No. 910.
 17. Zalakomár-Alsó-Csalit, Grave, rite (cremation), grave goods (1 sword, 1 spearhead, 1 bronze object, 1 dagger fragment): KREITER 2007, 324, No. 441.

List 3: Transdanubian hoards deposited in the Ha B1, containing swords, metal vessels or armspirals (after KEMENCZEI 1996; VÁCZI 2013a, 348–350, Fig. 46)²¹⁷

1. Balatonfenyves, incomplete hoard, *Ha B1*: MOZSOLICS 1975a, 9, Pl. 8; KEMENCZEI 1996, 53, Fig. 1; MOZSOLICS 2000, 34, Pl. 3; VÁCZI 2013a, Fig. 46.
2. Gyermely-Szomor, hoard, Br D/Ha A1–*Ha B1*: VÁSÁRHELYI 1899; HAMPEL 1892, 48, Pl. 159; MOZSOLICS 1985, 121–122, Pl. 240–242; KEMENCZEI 1988, 75, Pl. 46.404; PATAY 1990, 32, Pl. 26.38; TARBAY 2015b; TARBAY 2018a, 522–527, Pl. 86–92.
3. Nagydém 1a–1b, mixed hoards, Br D/Ha A1–*Ha B1*: ARCHAEOLOGIAI ÉRTESÍTŐ 1892, 383–384; HAMPEL 1892, 383–384; HAMPEL 1896, Pl. 195; MOZSOLICS 1985, 152; KEMENCZEI 1991, 37, 40, 49, Pl. 28.119–120, Pl. 29.119–120, Pl. 33.139, Pl. 34.139, Pl. 43.192; TARBAY 2018a, 590–594, Pl. 201–223.
4. Jobaháza, hoard, *Ha B1*: KUGLER 1903, 14–15; HOLSTE 1962, 21, Taf. 26.1; KILIAN-DIRLMEIER 1975, 96–97, Pl. 32.391; KEMENCZEI 1996, 55, Fig. 4–5; MOZSOLICS 2000, 50, Pl. 41; VÁCZI 2013a, 349.
5. Keszőhidegkút, hoard, Br B2/C–*Ha B1*: TOMPA 1937, 108; PATAY 1968, 242–243, Fig. 1.2–3; MOZSOLICS 1985, 135–137, Pl. 31–35; KEMENCZEI 1988, 20, 48, 60, 71, Pl. 6.60, Pl. 21.210, Pl. 35.318, Pl. 46.405, Pl. 72–74; PATAY 1990, 36–37, 39, 69, 84, Pl. 27.48, Pl. 45.113–114, Pl. 70.166; UCKELMANN 2012, 16–17, Pl. 1.2.
6. Sümeg-Újhegy 2, metal vessel hoard, *Ha B1*: SZENTMÁRTONI DARNAY 1889, 258–263; DARNAY 1899, 20–23, Pl. 8–9; GERLOFF 1986, 103, Fig. 11; PATAY 1990, 80, Pl. 64.144, Pl. 65.145; MOZSOLICS 2000, 75, Pl. 90.2–3; GERLOFF 2010, 390.
7. Sárbogárd-Sárszentmiklós, hoard, *Ha B1*: KEMENCZEI 1996, 55, 84, Fig. 7–9; VÁCZI 2013a, 289–290, 350, Pl. 54.
8. Szentgyörgyvár-Felsőmánd B, hoard, Ha A–*Ha B1*: TARBAY – HAVASI 2019.
9. Szombathely-Jáki út, hoard, Br D/Ha A1–*Ha B1*: ILON 2002; ILON 2004, 52–57, Pl. 28–50; TARBAY 2018a, 652–665, Pl. 320–348.

215 According to the Intentry Book of the HNM, 14 potsherds were acquired. Based on a sketch, one of them was decorated with cross-hatched triangles. INVENTORY BOOK OF THE HNM 1885, 156.

216 According to Jakub Godiš and Matej Styk, the lost sword (Boiu Ia, variant 1b, Br B2–C1) published by T. Kemenczei after J. D. Cowen and F. Holste may not be identical with the one described by V. Lipp. The original sword was undecorated and it had six peg holes. LIPP 1886, 352–353; COWEN 1966, 303, No. 1, Pl. 18.7, Fig. 1; KEMENCZEI 1988, 37, Pl. 12.149, Pl. 59B.1; NEUMANN 2009, 104–105; GODIŠ – STYK 2019, 225.

217 According to the authors, the time of deposition is highlighted in *italic*. Hoards in case of which relative time of deposition cannot be described more precisely than Ha A2–Ha B1 or its assignment to Ha B1 is insecure were not included in the List. See TARBAY 2018a, Fig. 127. For other relative dating, suggested by different researchers, see Appx. 2.4.

10. Tatabánya-Bánhida 2, hoard, Br D/Ha A1–Ha B1: KEMENCZEI 1983; MOZSOLICS 1985, 201–202; KEMENCZEI 1991, 83–85, Pl. 68.404; TARBAY 2018a, 670–676, Pl. 354–367.
11. Tatabánya-Ótelep 3, hoard, Br D/Ha A1–Ha B1: MOZSOLICS 1985, 202; JUNGBERT 1986; PATAY 1990, 59, Pl. 40.88A; TARBAY 2018a, 677–678, Pls 368–370.
12. Nagydobsza, hoard, Ha A1–Ha B1: TARBAY 2016b; TARBAY 2017b; TARBAY 2018a, 595.
13. Várvölgy, metal vessel hoard, Ha B1: LÁSZLÓ 1982, 27, No. 61; GERLOFF 1986, 103; PATAY 1990, 33, 36, 47, 80, No. 42A, No. 46A–B, No. 69, No. 145A, Pl. 27.46A–B, Pl. 36.69A, Pl. 66.145A; MOZSOLICS 2000, 88–89, Pl. 113; GERLOFF 2010, 390.
14. Várvölgy-Nagyláz hegy 4, hoard, Ha B1: MÜLLER 2006, 234–235, Fig. 3; MÜLLER 2007, 15, Pl. 8.
15. Velem 1a–1b, mixed hoards, Br D–Ha A1–Ha B1: HAMPEL 1896, Pl. 225–240; KÁRPÁTI 1896, 295–304; MISKE 1896; KÁRPÁTI 1897; MOZSOLICS 1985, 211–213, Pl. 228–231; TARBAY 2018a, 696–714.

Table 4: Different dating of hoards from List 3

<i>Hoard</i>	<i>Time of deposition</i>	<i>References</i>
Balatonfenyves	Ha B1	KILIAN-DIRLMEIER 1975; HANSEN 1996; KEMENCZEI 1996; VÁCZI 2013a
	Ha B2	MOZSOLICS 2000
Gyermely-Szomor	Ha A2	MOZSOLICS 1985; KEMENCZEI 1996; VÁCZI 2013a
	Ha B1	HANSEN 1996; TARBAY 2015b; TARBAY 2018
Nagydém 1a–1b	Ha A2	MOZSOLICS 1985; KEMENCZEI 1996
	Ha B1	HANSEN 1996; TARBAY 2018
Jobaháza	Ha B1	KILIAN-DIRLMEIER 1975; HANSEN 1996; VÁCZI 2013a
	Ha B2	MOZSOLICS 2000
Keszőhidegkút	Ha A1	MOZSOLICS 1985; KEMENCZEI 1988; VÁCZI 2013a
	Ha A1–Ha A2	UCKELMANN 2012
	Ha A1–Ha B1	PATAY 1990
Sümeg 2	Ha B1	GERLOFF 1986
	Ha B2	MOZSOLICS 2000
Szentgyörgyvár	Ha B1	TARBAY – HAVASI 2019
Szombathely	Ha A2	VÁCZI 2013a
	Ha B1/2	ILON 2002
	Ha B1	TARBAY 2018
Tatabánya 2	Ha A2	MOZSOLICS 1985; KEMENCZEI 1996; VÁCZI 2013a
	Ha B1	HANSEN 1996; TARBAY 2018
Tatabánya 3	Ha A2	MOZSOLICS 1985; KEMENCZEI 1996
	Ha A2–Ha B1	JUNGBERT 1986
	Ha B1	JUNGBERT 1986; HANSEN 1996; VÁCZI 2013a; TARBAY 2018
Nagydobsza	Ha B1	TARBAY 2016b; TARBAY 2018a
Várvölgy (vessel hoard)	Ha B1	GERLOFF 1986
	Ha B1–Ha B2/3	PATAY 1990
	Ha B3	MOZSOLICS 2000
Várvölgy 4	Ha A2–Ha B1	MÜLLER 2007
Velem 1a–1b	Ha A2	MOZSOLICS 1985; KEMENCZEI 1996; VÁCZI 2013a
	Ha B1	HANSEN 1996 (Ib); TARBAY 2018

5. List: Stray find swords from Transdanubia (around the Ha B1)²¹⁸

1. Beled-Téglagyár, s.: KEMENCZEI 1988, 70–71, Pl. 42.373.
2. Budapest-Óbuda, s.: KEMENCZEI 1991, 50, Pl. 44.199, Pl. 45.199.
3. Budapest-Danube River, w.: TOMPA 1942, 108, Pl. 20.12; MOZSOLICS 1975b, 19–21, Fig. 9.2; KEMENCZEI 1991, 60, Pl. 59.250.
4. Csöngé-Magaspart, i.: ILON 1992, 19, Fig. 2.
5. Dunaújváros, s.: KEMENCZEI 1988, 70–71, Pl. 42.375.
6. Dunaújváros-Danube River, w.: VÁCZI 2013a, 269, Pl. 53.1.
7. Fejér County-Danube River, w.: KEMENCZEI 1991, 60, Pl. 59.252.
8. Keszthely, s.: HAMPEL 1886b, Pl. 25.2; KEMENCZEI 1991, 50, Pl. 44.201, Pl. 45.201.
9. Szombathely, s.: KEMENCZEI 1991, 55.
10. Velem, s.: MISKE 1907, Pl. 30.5; KEMENCZEI 1991, 60, Pl. 59.254.

6. List: Transdanubian Ha B1 metal vessels (stray finds and burials)

1. Budapest-Békásmegyér (HU) Grave Nos. 26, 48, Ha B1, Type Jenišovice cups: PATAY 1990, 60, Pl. 40.89; KALICZ-SCHREIBER et al. 2010, 33–34, 45–46, 274–275, Pl. 18.10, Pl. 27.19.
2. Budapest-Nagytétény Quarter XXII (HU) stray find, Type B1 cauldron ('Ha B1'): PATAY 1990, 25, Pl. 23.30.
3. Between Budakalász and Pomáz (HU) stray find, 'Ha B1', Type Seddin amphora-shaped vessel: PATAY 1990, 46, Pl. 35.68.

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218 Abbreviations: s. stray find, w. wetland, i. individual find.

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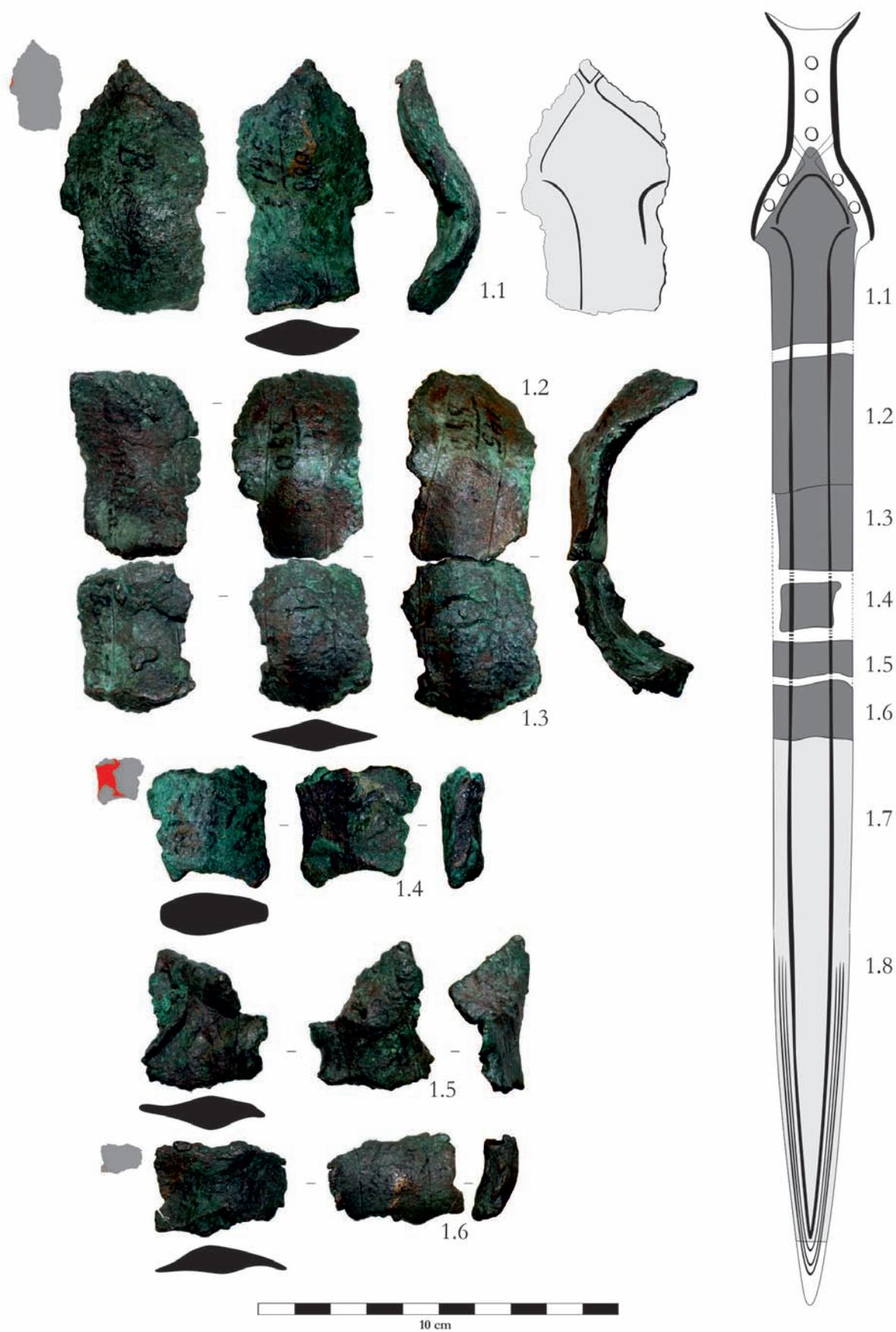


Fig. 19. The sword from Tatabánya-Bánhida A (recent damages highlighted in red) (HNM, Photos: J. G. Tarbay) (No. 1, Appx. 1.1).



Fig. 20. The sword from Tatabánya-Bánhida A (recent damages highlighted in red) (HNM, Photos: J. G. Tarbay) (No. 1, Appx. 1.1).

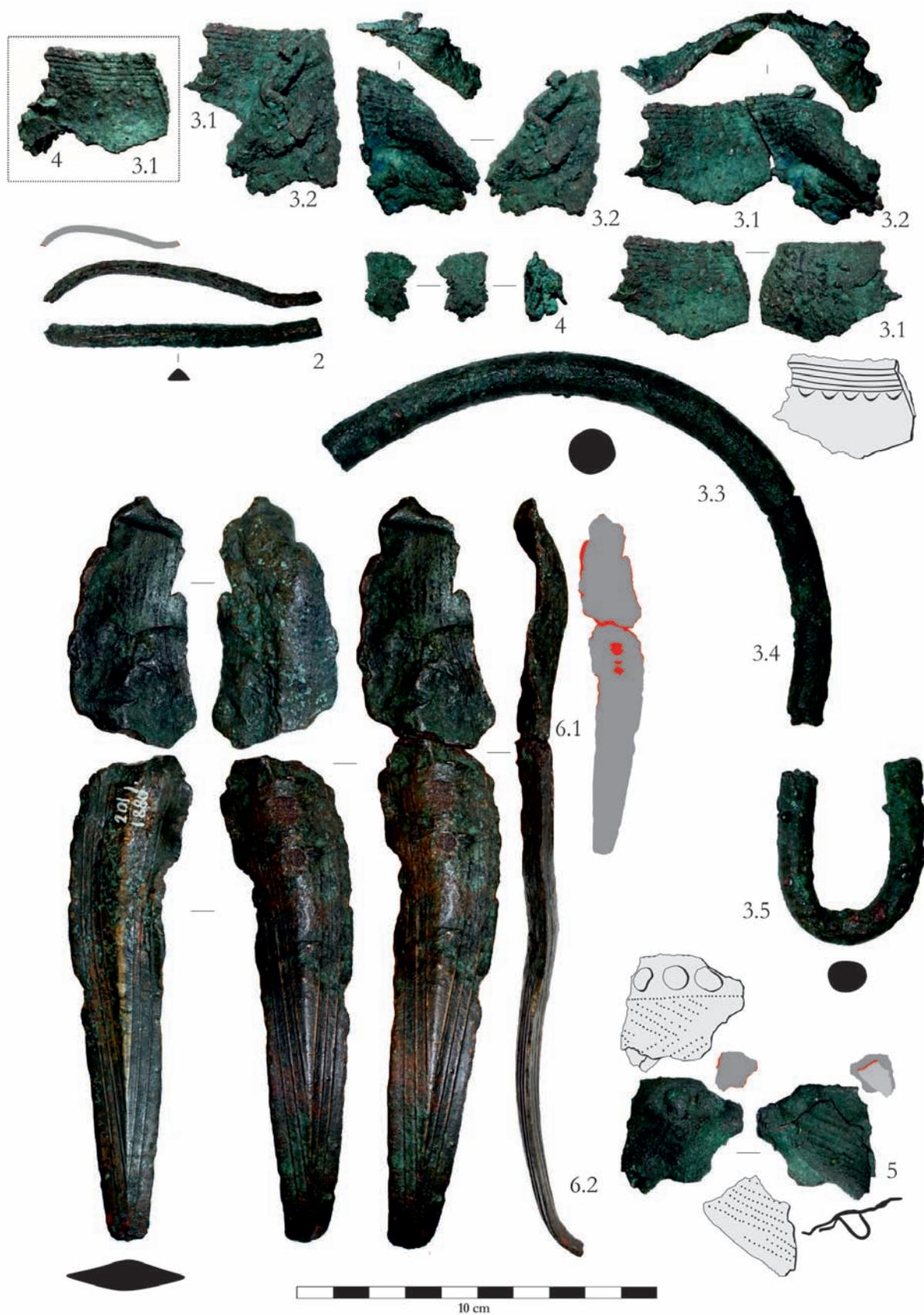


Fig. 21. 1-5 – Armspiral, cauldron, Hajdúböszörmény-style metal vessel, ‘miniature greave’ from Tatabánya-Bánhida A, 6 – Tip fragment of the Tatabánya-Bánhida ‘B’ sword (recent damages highlighted in red) (HNM, Photos: J. G. Tarbay) (Appx. 1.1).

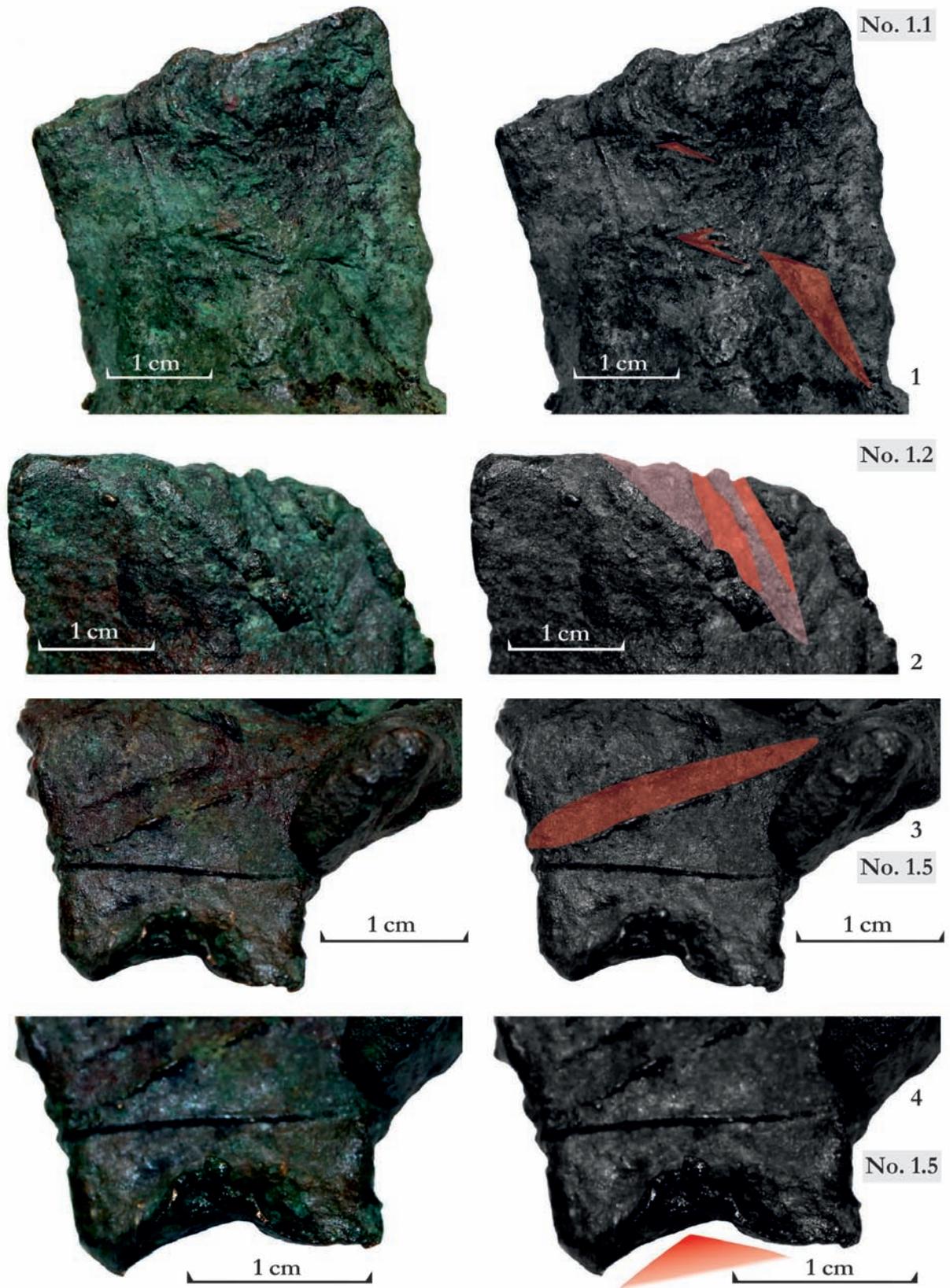


Fig. 22. Macroscopic observations on the sword from Tatabánya-Bánhida A. 1-3 - Blade impacts on melted surface, 4 - Blade impact on cutting edge (Photos: J. G. Tarbay).

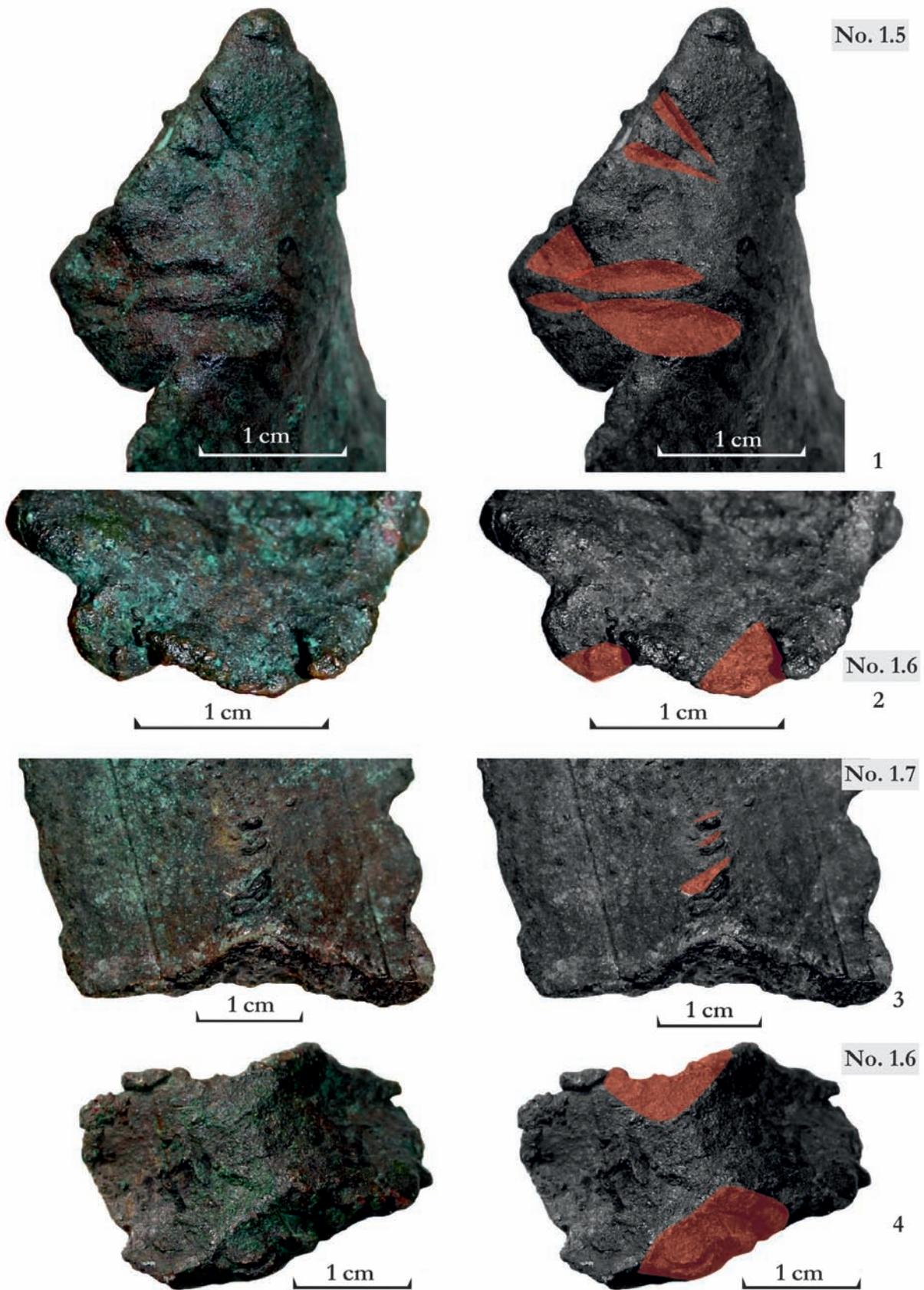


Fig. 23. Macroscopic observations. 1 – Blade impacts in cluster, 2 – Edge notching, 3 – Shallow blade impacts, 4 – Cut-like marks (Photos: J. G. Tarbay).

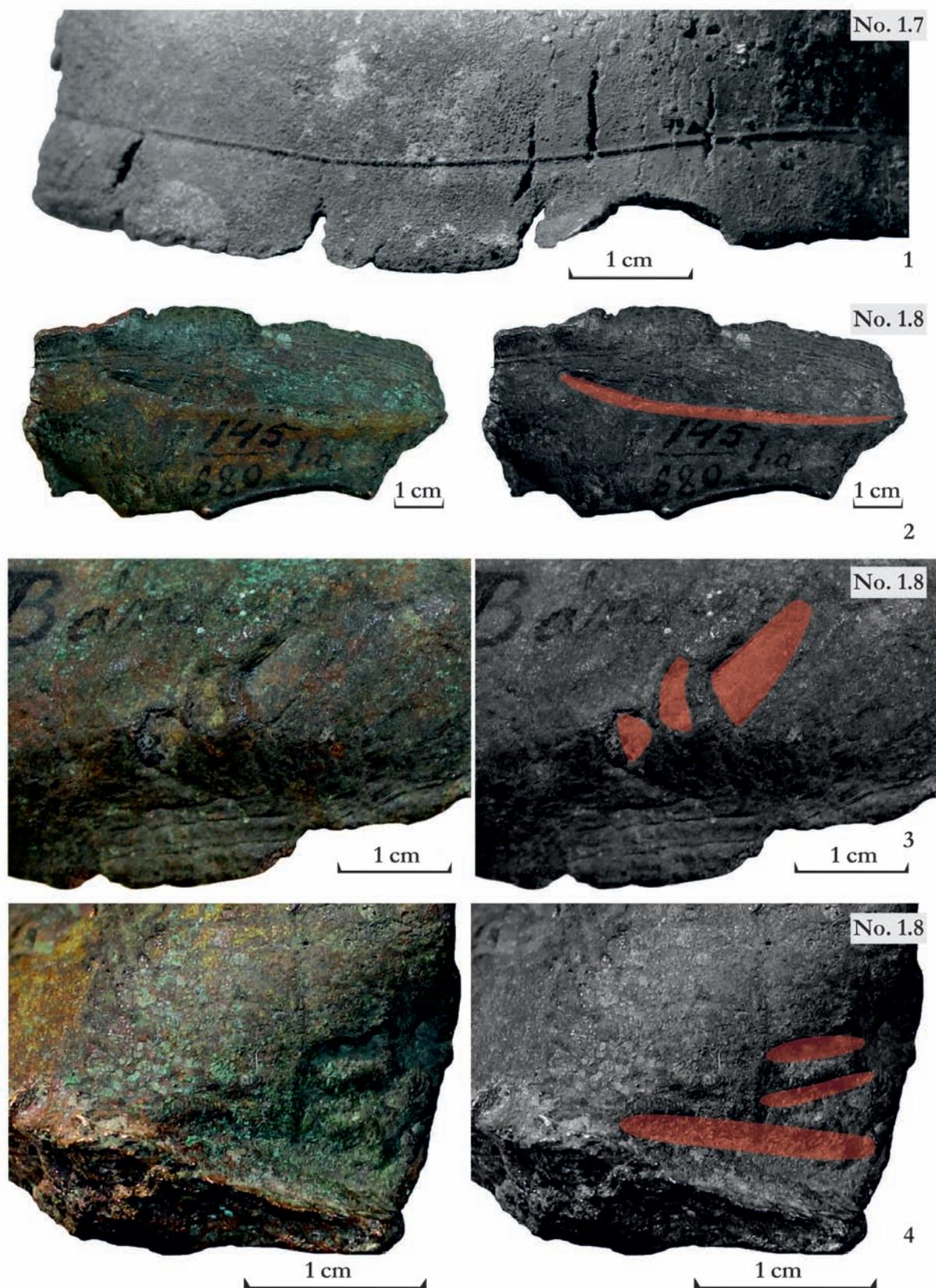


Fig. 24. Macroscopic observations. 1 – Cracks caused by bending, 2 – long blade impact (axe) 3–4 – Blade impacts in cluster (Photos: J. G. Tarbay).

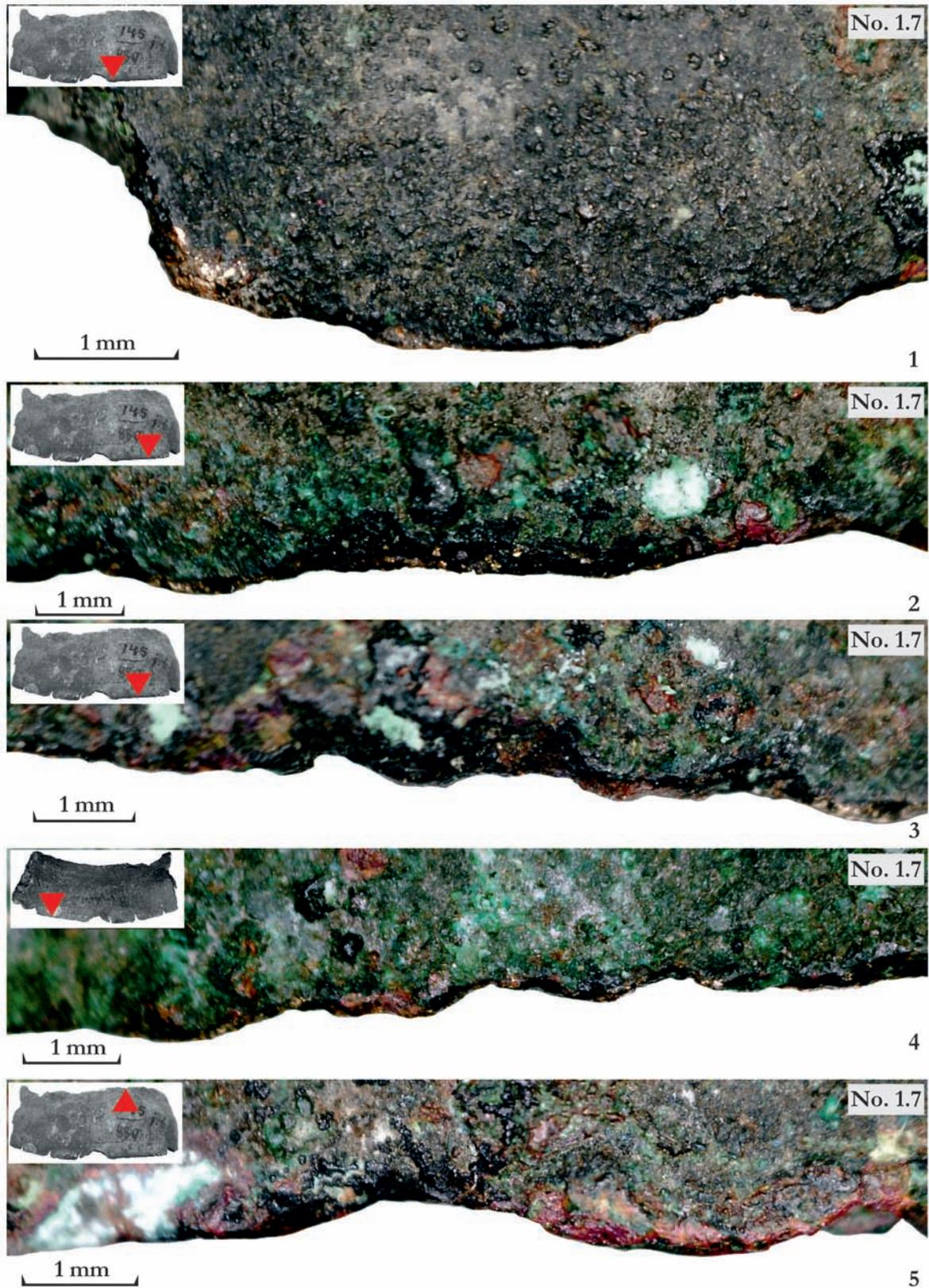


Fig. 25. Macroscopic observations. 1 – Cutting edge, 2 – Worn V-shaped notch, 3–4 – Dents in clusters, 5 – Worn notch (Photos: J. G. Tarbay).

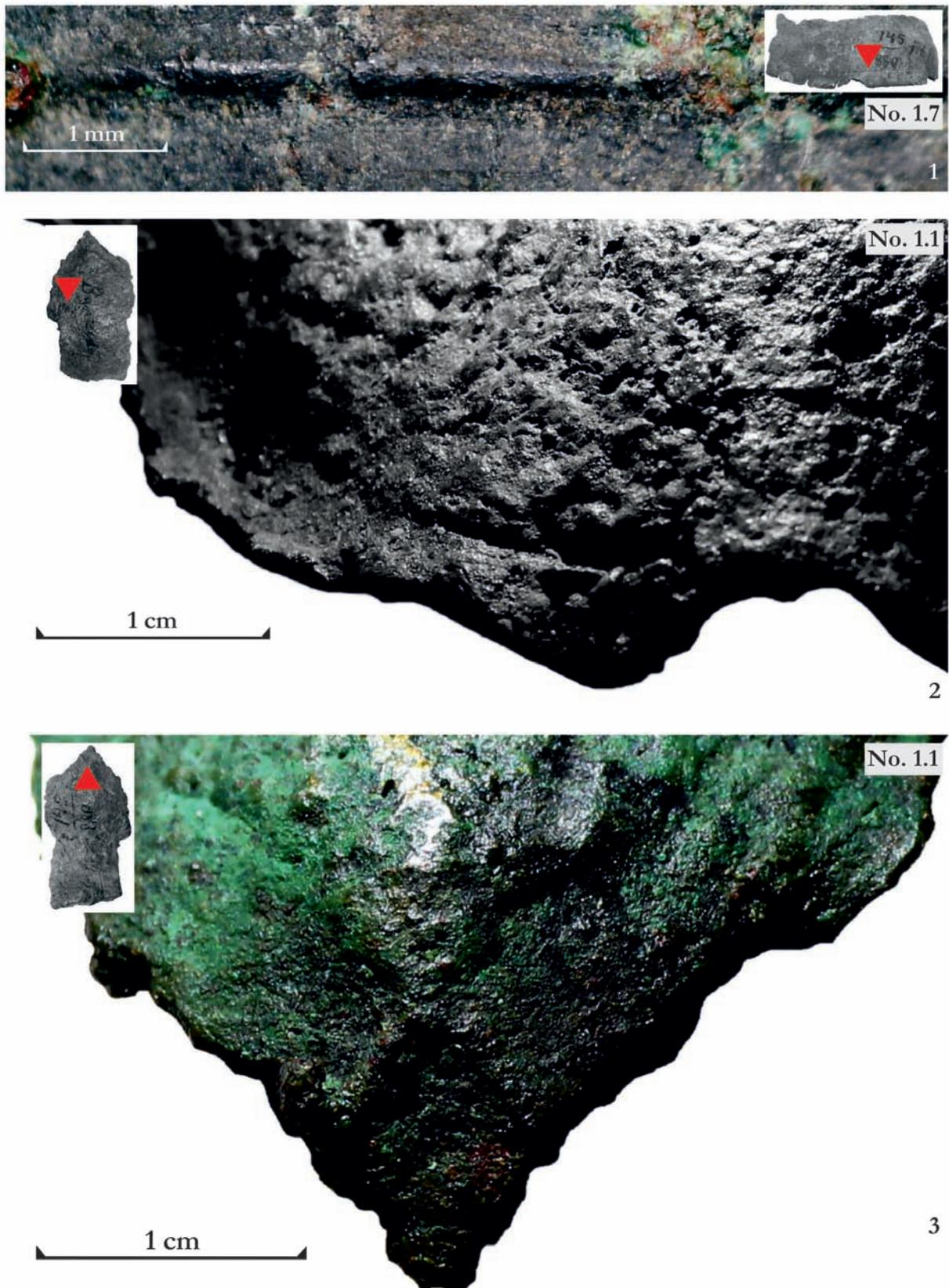


Fig. 26. Macroscopic observations. 1 – Fine grinding marks and an incomplete cast rib, 2–3 – Details of the No. 1 sword's hilt part (Photos: J. G. Tarbay).

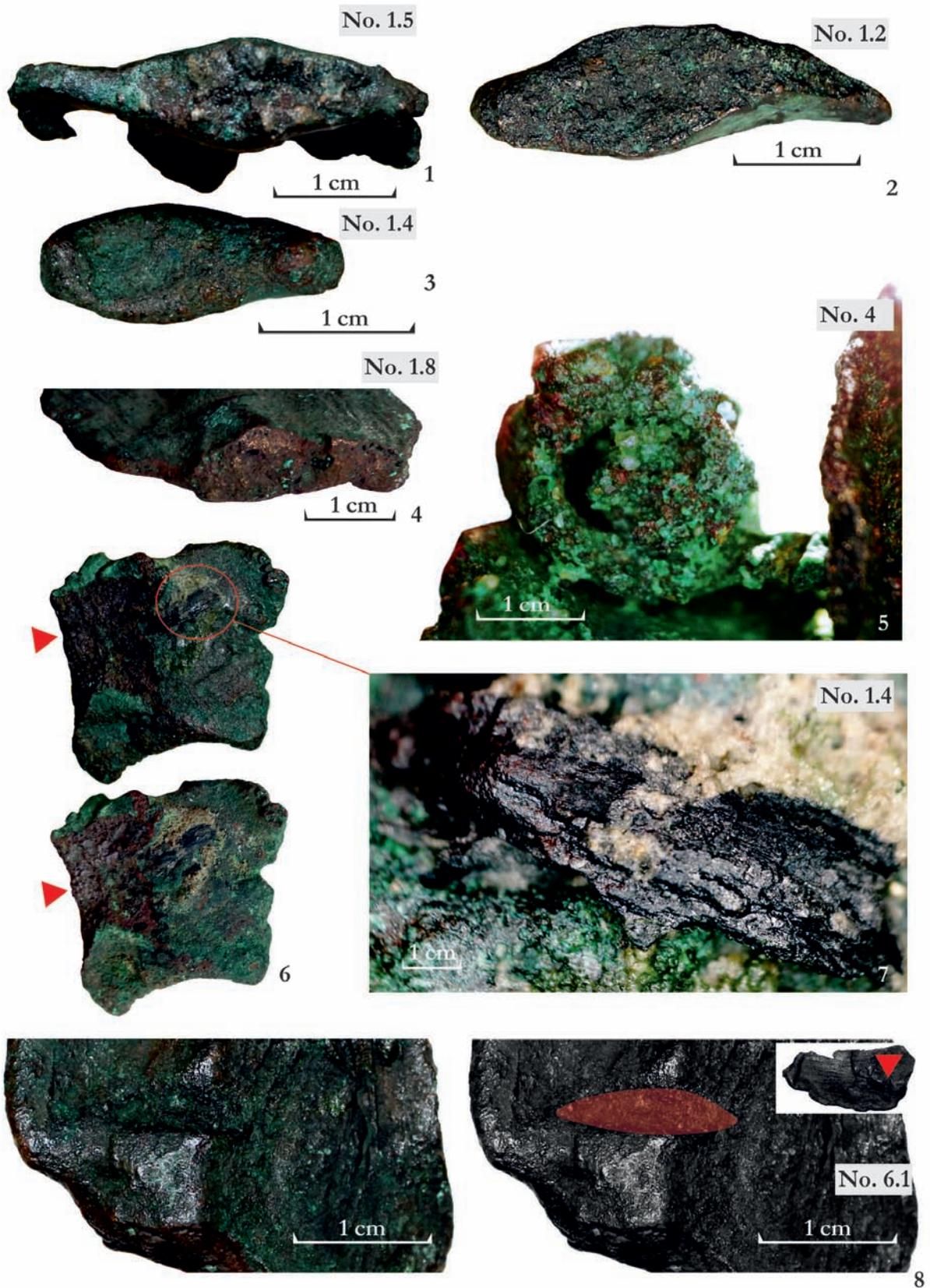


Fig. 27. 1 – Amorphous melted breakage surface, 2 – Sharp breakage surface, 3 – Completely melted breakage surface, 4 – Modern breakage surface, 5 – Folded rim of the ‘miniature greave’, 6 – Sword blade fragment with recent breakage surface and a coal piece, 7 – Micrograph of the coal piece, 8 – Deep blade impact on a sword blade (Photos: J. G. Tarbay).

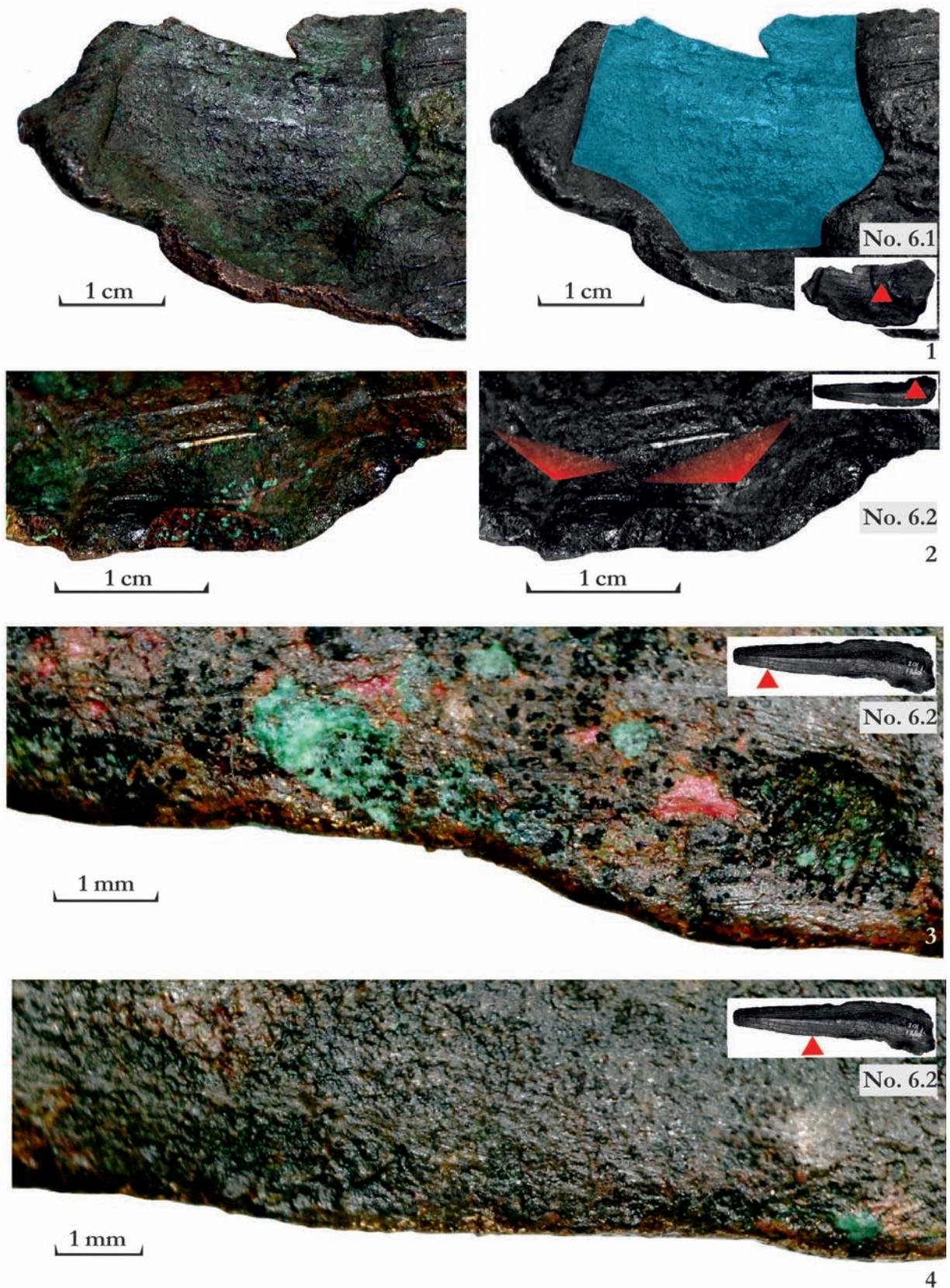


Fig. 28. 1 – Axe blade-like imprint. 2 – Deep impacts. 3–4 – Shallow worn notches and dents (Photos: J. G. Tarbay).

