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## THE LATE BRONZE AGE “SCRAP HOARD” FROM NAGYDOBSZA Part I

*The aim of this study is to evaluate the Late Bronze Age hoard from Nagydobsza (Hungary, Co. Baranya) from the perspective of the typo-chronological method and macroscopic examination. The Nagydobsza hoard consists of 263 artefacts (total weight: 19.053 g) which can be classified into five groups: weapons, tools, clothing parts, semi-finished products and metal working debris. According to the macroscopic investigation, the objects can be divided into different technological groups, such as finished products (in certain cases with traces of usage), unrefined products, “defected” objects, semi-finished products and metal working debris. Another important characteristic of the hoard is its highly fragmentary state, which is most likely the result of an intentional, non-votive partitioning of the objects. Although the parallels of the hoard can be dated between the Ha A1 and Ha B1 periods, it also shows strong relations to the “Gyermely type” hoards. Based on typological arguments, the assemblage was most likely deposited in the Ha B1.*

*A tanulmány célja, hogy a typo-kronológiai módszer és a makroszkópikus megfigyelések segítségével vegye vizsgálat alá a Nagydobszán (Baranya m.) talált késő bronzkori depóegyüttest. A nagydobszai depó 263 tárgyból áll (összsúly: 19.053 g), melyek öt fő csoportra bonthatóak: fegyverek, eszközök, ruházati elemek, félkész termékek és metallurgiai melléktermékek. A makroszkópikus vizsgálatok alapján, a leleteket több technológiai csoportra lehet osztani: kész termékek (melyeken egyes esetekben egyértelmű használati nyomok is láthatóak voltak), megmunkálatlan példányok, “hibás” öntvények, félkész termékek és fémműves melléktermékek. Az együttes erősen fragmentáltnak tekinthető, mely megítélésünk szerint vélhetőleg nem votív szándékú darabolás eredménye lehetett. Habár a depó párhuzamai a Ha A1 és Ha B1 közé keltezhetőek és a lelet szoros kapcsolatokat mutat a “Gyermely típusú” depókkal, földbe kerülési idejét a Ha B1-re tehetjük tipológiai alapon.*

Keywords: Late Bronze Age (Ha A–Ha B1), Transdanubia, scrap hoards, partitioning

Kulcsszavak: Késő bronzkor (Ha A–Ha B1), Dunántúl, fémhulladék depók, darabolás

### Introduction<sup>1</sup>

The hoard was found during soil sampling in Nyugati árkosi dűlő, northwest from Nagydobsza (Hungary, Co. Baranya) by Mihály Timár, an engineer of the “Somogy megyei Növényvédelmi és Agrokémiai Állomás”, in July 1978 (Fig. 1; PESTI 1982, 486–487; ECSÉDY 1979). The finder contacted the specialists of the Janus Pannonius Museum (Pécs), and shortly afterwards István Ecsedy carried out a rescue excavation on the site. As a result of his work, the exact find-spot of the assemblage was identified. According to his report, the hoard was

unearthed from the cut of a pit (diameter: 40x70 cm) which truncated a Neolithic Štarcevo settlement layer. Bronze Age ceramics were not found, neither during the excavation nor at the field survey (ECSÉDY 1979) (Fig. 2). The first evaluation of the hoard was carried out within the framework of my MA thesis, in 2013 (TARBAY 2013, 174–263, 496–522, Catalogue B, Pl. 1–92). The half forms of the hoard were first published together with an axe half form from the Keszölc hoard in a separate study (TARBAY 2014, 213–218).

The hoard consists of 263 artefacts (total weight: 19.053 g) which can be classified into five



Fig. 1 The location of the find spot. 1: The map of the First Ordnance Survey of Austria-Hungary; 2: A present-day Google Earth satellite image  
1. kép A lelőhely. 1: Az első katonai felmérés; 2: Jelenkori Google Earth műholdfelvétel.

typological groups: 1.: weapons: three sword fragments and a spear fragment; 2.: tools: a tang fragment of a knife or a razor, socketed axes, socketed hammers, flanged sickle fragments and a saw; 3.: clothing parts: fragment of a ring, fragment of a pendant; 4.: semi-finished products: half forms, rod ingots, oval-shaped ingots, fragmented and intact plano-convex ingots and several other individual ingot forms; 5.: metal working debris: e.g. sprues, lumps etc. According to the results of the macroscopic examination, the majority of the objects bare traces of casting defects. Traces related to usage and refining methods were observed only on a small number of artefacts. The aim of this study is to publish the whole content of the hoard and analyse its typo-chronological features. Beside the typological analyses, we also added some macroscopic and microscopic<sup>2</sup> observations which could provide additional data on the manufacturing techniques, partitioning and usage of the objects. We did not carry out a detailed analysis intentionally; this would be accomplished together with comparative experiments in a separate study.

### Evaluation

#### *Sword fragments* (Cat. nos. 1–3, Fig. 11, 1–3)

The hoard contains a solid-hilted sword fragment (Cat. no. 1, Fig. 11, 1), a blade fragment (Cat. no. 3, Fig. 11, 3) and a hilt fragment of a flange-hilted sword (Cat. no. 2, Fig. 11, 2). Similar fragments to the last one are known from the Szentes-Nagyhegy 1 (HAMPEL 1896, CXCI. t. 28) and the Csabdi (MOZSOLICS 1985, Taf. 248, 13) hoards, but on the account of their uncharacteristic forms the classification of these fragments is not possible. From typological point of view, only one specimen (Cat. no. 1) is suitable for further evaluation. This fragment can be sorted into a special, northeastern Carpathian sword type, which has been classified differently by T. Kemenczei (D type 3<sup>rd</sup> and 4<sup>th</sup> Variant and G type 4<sup>th</sup> Variant), T. Bader (Prejmer type) and Ph. Stockhammer (Szécsény and Paszab types) (BADER 1991, 135–137; KEMENCZEI 1991, 13–19; STOCKHAMMER 2004, 43, 63, 86, 183, Karte 30; VACHTA 2008, 14–17). In contrast to most Late Bronze Age swords, the hilt part of these short

weapons were cast together with the blade (HAMPEL 1877, 47, 5. ábra; NOVOTNÁ 2014, 115–116). Except from the above mentioned technological feature, this group includes many stylistic variants, which sometimes imitate other types, such as the “three-ribbed hilted-swords” (Dreiwulstschwörter): e.g. Predeal (BADER 1991, 136, Taf. 36, 329) or Zemplínske Kopčany (NOVOTNÁ 2014, 76, Taf. 26, 120). Most of them strongly reflects to their Middle Bronze Age predecessors (BÓNA 1963, 19–27), but they clearly belong to the era between the Ha A1 and Ha B1 periods (e.g. Hajdúböszörmény). Due to their individual forms, it is hard to make an exact comparison between the analysed sword and the entire group. Nevertheless, it seems to me that the sword fragment from Nagydobsza can be related to the younger “Ha A2” and Ha B1 specimens (MOZSOLICS 1972, 190–196; MOZSOLICS 1984a, Abb. 3–5; BADER 1991, 137; STOCKHAMMER 2004, 86; NOVOTNÁ 2014, 76; List 1). Concerning the distribution area of the Prejmer type swords, these weapons are in great number in the region of the present day Szabolcs-Szatmár-Bereg and Hajdú-Bihar Counties, although specimens are known sporadically from the North Balkans, Transylvania, Northern Carpathian Basin and Western Europe, too (BADER 1991, 137; List 1, Fig. 3; STOCKHAMMER 2004, 86, Karte 30; Fig. 3).

The intensively porous breakage surfaces of the Cat. no. 2 blade fragment (Fig. 11, 3) indicates the bad quality of casting (for similar phenomenon see: DRIEHAUS 1961, 31, Taf. 9, 3; BORN–HANSEN 1991, 149–150, Abb. 3a; BINGGELI 2011, 17–18; BUNNEFELD–SCHWENZER 2011, 219, 243; MÖDLINGER 2011, 33). Usewear analysis could not be carried out in the case of Cat. no. 1 fragment due to its missing blade, and only traces of polished mould shift defect were identified along its hilt (Fig. 11, 1). Similar short swords were interpreted as dysfunctional objects made for votive purposes (MÜLLER–KARPE 1961, 46). However, this presumption may not be true for all Prejmer type swords. For instance, traces of hammering and even a small notch were visible along the edges of the sword from Téglás-Bek-kert<sup>3</sup> (Fig. 4, 1–3; ZOLTAI 1909, 27, 13. ábra; KEMENCZEI 1991, 16, Taf. 7, 34). As a curiosity, the mould shift defect on the respective hilt was similar to the one observed on the sword from Nagydobsza (Fig. 4, 1). In contrast to the aforementioned piece, no traces of annealing and sharpening were visible on the blade of the sword recovered from Reck-Andezitbánya (MOZSOLICS 1972, 195, 4. kép 1) (Fig. 4, 4). These observations could indicate the possibility that the Prejmer type swords might have served different

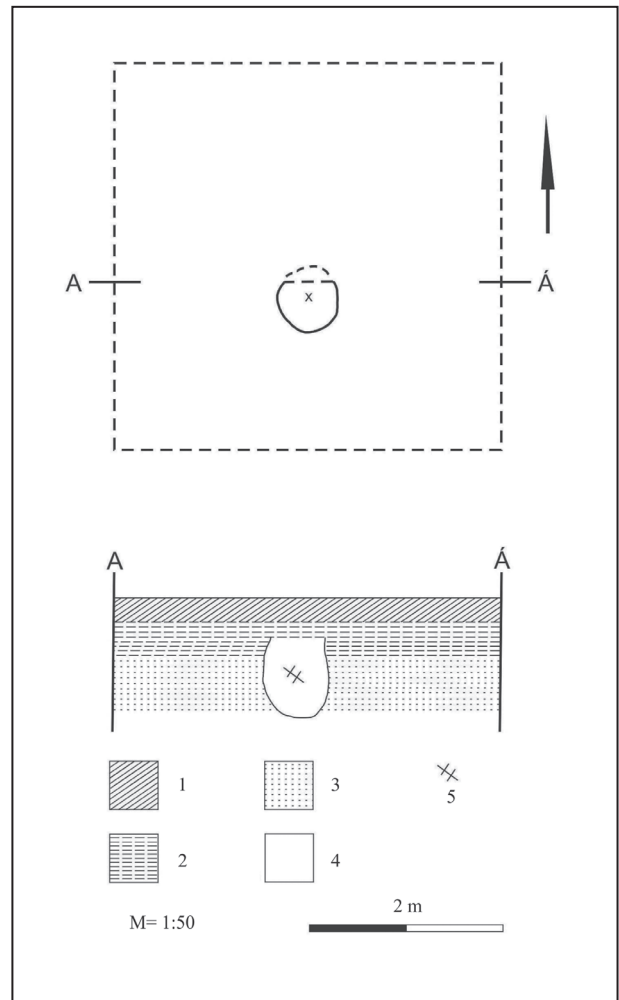


Fig. 2 Plan and section of the pit. 1: Plowed layer; 2: Peaty layer; 3: Greyish-brown layer; 4: Subsoil; 5: Hoard (ECSEDEY 1979)  
2. kép A gödör metszet és felszínrajza. 1: Szántott réteg; 2: Tőzegetes réteg; 3: Szürkés-barna réteg; 4: Altalaj; 5: Kincs (ECSEDEY 1979)

purposes and some of them were manufactured and used as real weapons, while others were deposited in unrefined state. It is important to emphasize that only further macroscopic examinations and metallurgical analyses on the whole group could provide more precise data on their functionality.

#### *Spear fragment* (Cat. no. 4, Fig. 11, 4)

Due to its fragmentary state, the Cat. no. 3 specimen is unsuitable for detailed typo-chronological evaluation. Based on its dimensions, it can be associated with smaller spear types (ŘÍHOVSKÝ 1996, 88; LESHTAKOV 2011, 26–43).

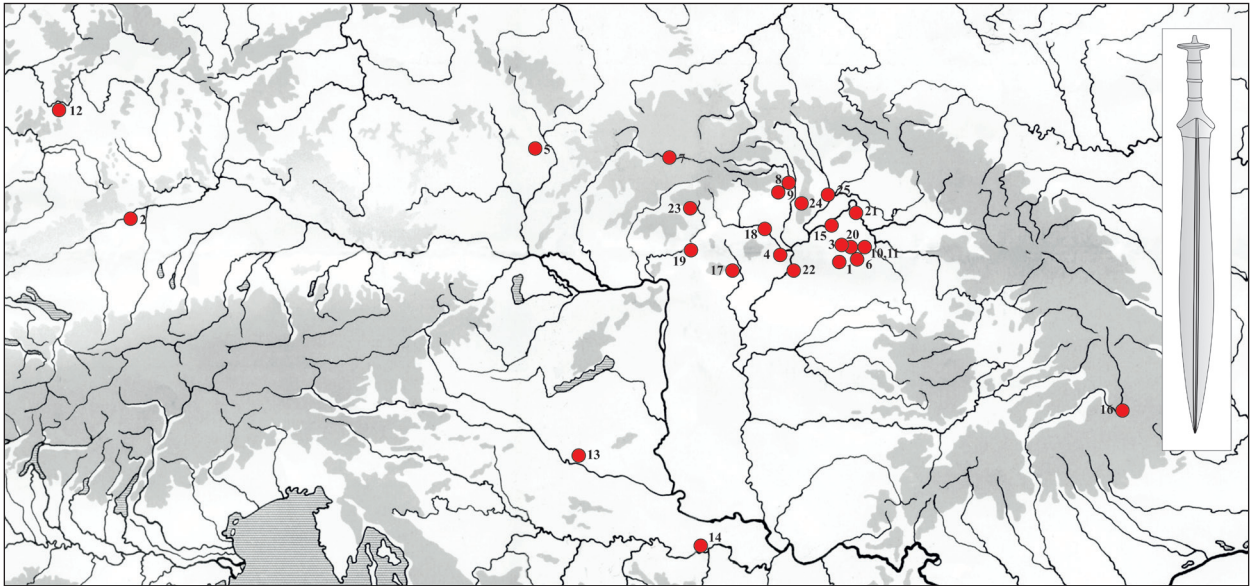


Fig. 3 Distribution of Prejmer type swords (List 1)  
3. kép Prázsmár típusú kardok elterjedése (1. lista)

*Tanged knife or razor* (Cat. no. 5, Fig. 11, 5)

The hoard contains a hilt fragment with ring terminal (Cat. no. 5). A similar, but decorated specimen can be found in the presently lost Bátaszék hoard (MOZSOLICS 1985, 95, Taf. 269, 1). Other comparable examples are known from Tata (KEMENCZEI 1996b, 233–234, Fig. 11, 12) and Stremška Mitrovica (WEBER 1996, 256, Taf. 55, 613). Hungarian researchers interpreted these objects as tanged knives, however the one from Stremška Mitrovica was sorted by C. Weber into the group of single-edged razors (MOZSOLICS 1985, 95; KEMENCZEI 1996b, 233–234; WEBER 1996, 256). In the case of the Nagydobsza specimen, the grouping criteria of C. Weber should be considered since the object is smaller than an average knife. As for its manufacturing traces, only a mould shift defect can be observed along its tang (Fig. 11, 5).

*Axes* (Cat. nos. 6–50, Fig. 11, 6–Fig. 17, 50)

Most of the Nagydobsza hoard's socketed axes are in a very fragmentary state.<sup>4</sup> Due to their state of preservation or casting defects, Cat. nos. 10, 13, 20–23, 26–28, 30, 32–48, 50 axes are unsuitable for classification. Based on their fine typological features, other specimens can be divided into five main groups: 1<sup>st</sup> group: socketed axes with straight body and thickened rim (Cat. nos. 6, 7, 11–12, 16, 18, 24–25, 29, 31); 2<sup>nd</sup> group: socketed axes with narrow body and thickened rim (Cat. nos. 8, 14–15, 17, 19); 3<sup>rd</sup> group:

socketed axe with crescent-shaped rim (Cat. no. 9); 4<sup>th</sup> group: solid-cast socketed axe (Cat. no. 12); 5<sup>th</sup> group: solid-cast miniature axe (Cat. no. 49).

*First group – socketed axes with straight body and thickened rim*

The first group consists of socketed axes with different kind of rib decorations (Cat. nos. 6, 11, 18, 25, 29, 31) and two undecorated specimens (Cat. nos. 7, 16). The distribution area of the parallels for Cat. no. 6 and Cat. no. 18 artifacts<sup>5</sup> is the northeastern and southern territory of the Carpathian Basin, however, similar specimens are also known outside of this region in the "Ha A2" and Ha B1 periods (DERGAČEV 2002, 174, 176, Taf. 127; BOROFFKA–RIDICHE 2005, 150, Liste 8, b3, Abb. 8, c9; TARBAY 2014, 188–189, List 3, Fig. 11). It is hard to find parallels for the Cat. no. 11 socketed axe due to its missing rim and amorphous decoration, but it is mostly similar to M. Gavranović's D type axes (GAVRANOVIĆ 2011, 139, Abb. 138, d). Further socketed axes can be mentioned from the Ha B1 hoards of Bosnia and Herzegovina<sup>6</sup> and also from the territory of Romania.<sup>7</sup> The parallels of the undecorated socketed axes (Cat. nos. 7, 16) were deposited between the Ha A1 and Ha B1 periods mainly in the territory of Hungary, Croatia and Moldavia (TARBAY 2014, 190, List. 5, Fig. 12). The fragmentary state of the Cat. no. 29 specimen does not allow any precise reconstruction of its original patterns. However, the rib decoration of this

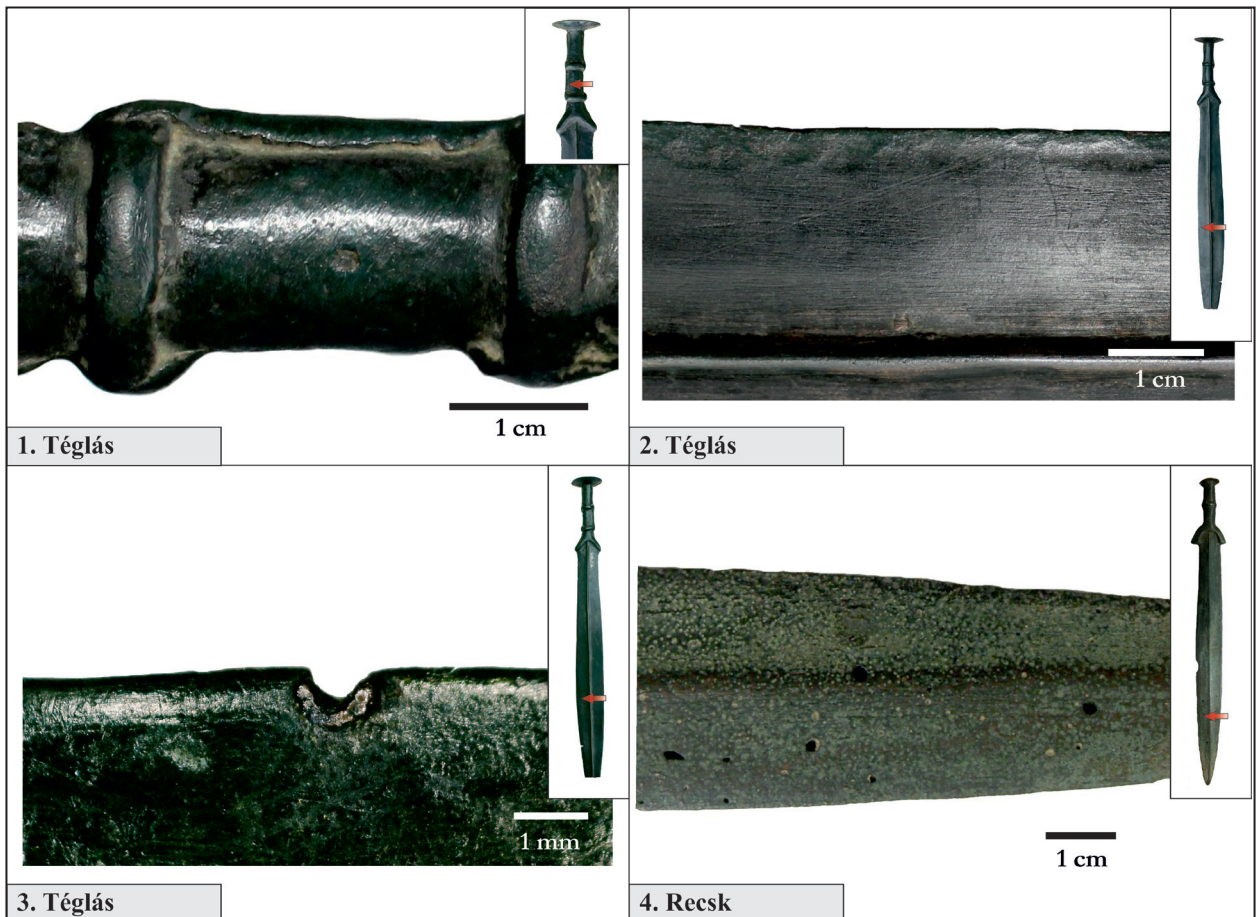


Fig. 4 Observations made during the macroscopic examination of swords from Téglás-Bek-kert (Déri Museum) and Recsk (Hungarian National Museum). 1: Mould shift defect on the hilt of the sword from Téglás; 2: Hammering and polishing traces along the edge of the sword from Téglás; 3: A small notch along the edge of the sword from Téglás; 4: Unrefined blade of the sword from Recsk

4. kép A Téglás-bek-kerti (Déri Múzeum) és recski (Magyar Nemzeti Múzeum) kardok makroszkópikus megfigyelése. 1: A téglási kard markolat oldalainak elcsúszása; 2: Kalapálás és polírozás nyomok a téglási kard pengéjén; 3: Kis csorbulásnyom a téglási kard pengéjén; 4: A recski kard megmunkálatlan pengéje

object might be composed of two or more horizontal lines and four non-contacted vertical lines. Similar axes were placed into group 2.b.6.c by B. Wanzek (WANZEK 1989, 111). From this group the most similar examples will be selected to be analysed with the Nagydobsza specimen. These axes were deposited in the territory of the Eastern Carpathian Basin, Western Europe, but similar object are also known from Italy (CARANCINI 1989, tav. 120. 3720). Even a similar mould analogy can be mentioned from the Poroszló-Aponhát Gáva settlement (PATAY 1976, Abb. 4–2). One fragment from the Urnfield settlement in Neszmély might also belong to this type (PATEK 1961, 60, Taf. XXVIII, 8; WANZEK 1989, 111; V. SZABÓ 2002, 61) (List 2, Fig. 5).

*Second group – socketed axes with narrow body and thickened rim*

The parallels of the undecorated socketed axes with narrow body and thickened rim<sup>8</sup> (e.g. Cat. nos. 8, 14, 15, 17) can be found in the inner territory of the Carpathian Basin between Ha A1 and Ha B1 (TARBAY 2014, 190, List. 6, Fig. 12). Based on the finds from Lovasberény (MOZSOLICS 1985, Taf. 244, 16) and Szentgáloskér (MOZSOLICS 1985, Taf. 111, 10), the Cat. no. 19 socketed axe with ribbed decoration can be also assigned to this group. However, due to its fragmentary state, it is impossible to find any exact analogy for it. It should be noted that the fragment in question can also be interpreted as a socketed chisel, as a similar one from Moigrad may

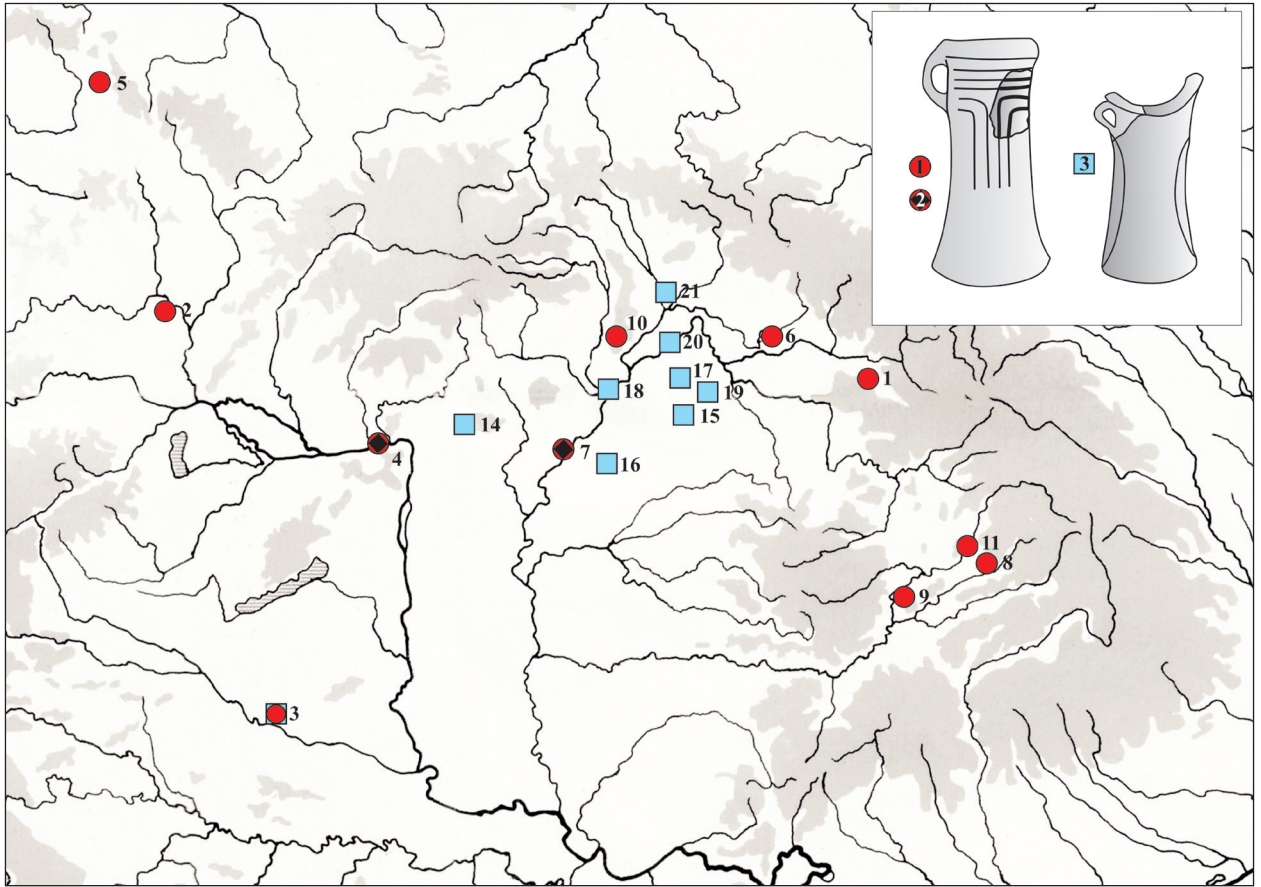


Fig. 5 The distribution of the two socketed axe types. 1: Parallels of the Cat. no. 29 socketed axe; 2: Mould parallels of the Cat. no. 29 socketed axe; 3: Parallels of the Cat. no. 9 socketed axe (List 2; List 3)  
 5. kép A két tokosbalta típus elterjedése. 1: A 29. sz. tokosbalta párhuzamai; 2: A 29. sz. tokosbalta öntőforma párhuzamai; 3: A 9. sz. tokosbalta párhuzamai (2. Lista, 3. Lista)

indicate (BÁLAN 2009, 29, Pl. XI, c.39). The Cat. no. 14 specimen can also be linked to this group based on parallels from Birján (MOZSOLICS 1985, Taf. 69, 8) and Krásna Hôrka hoards (NOVOTNÁ 1970a, 88, Taf. 37,663). However, its missing blade section left this identification uncertain.

#### *Third group – socketed axe with crescent-shaped rim*

Cat. no. 9 specimen is the only socketed axe with crescent- or beak shaped rim among the axes of the Nagydobsza hoard. The classic form of this widely distributed axe group, which includes roughly more than 370 specimens, has appeared first in the northeastern part of the Carpathian Basin in the Br D period. Their number increased significantly in the Ha A. They were also reported outside of their core distribution area, in the territory of Germany, South Poland, Czech Repub-

lic, Romania and the Balkan. Later, in the Ha B period, they decreased in number and then again appeared in larger quantity in the northeastern part of the Carpathian Basin and Transylvania (FOLTINY 1955, 90; MOZSOLICS 1973, 38–39; KIBBERT 1984, 123–124; MOZSOLICS 1985, 34; HANSEN 1994, 180; KOBAL’ 2000, 39–40; KYTLICOVÁ 2007, 137–138). Although the loop of the Nagydobsza axe is missing, its characteristic form enables us to find close analogy for it. Comparable specimens are known from the 1<sup>st</sup> Ecseg hoard (KEMENCZEI 1984, 146–147, Taf. CXVIa,31), and from the Ha B1 hoards of the northeastern Carpathian Basin (List 3; Fig 5).

#### *Fourth group – solid-cast socketed axe*

The solid-cast socketed axe (Cat. no. 12) is a rare technological phenomenon which may be associated with different type of defects caused by the



Fig. 6 Observations made during the macroscopic examination of socketed axes and socketed hammers. 1: Horizontal mould shift defect and porosity; 2: Amorphous pattern and incomplete upper part of a socketed axe; 3: Core shift defect; 4: Dysfunctional loop; 5: Vertical mould shift defect; 6: Burred face of a hammer; 7–8: Unrefined and unused faces of socketed hammers

6. kép Makroszkópikus megfigyelések tokosbaltákon és tokoskalapácsokon. 1: Öntött oldalak horizontális elcsúszása és porózus belső szerkezet; 2: Tokosbalta torzult mintával és hiányos peremmel; 3: Öntőmag elmozdulása; 4: Tömörre öntött fül; 5: Öntött oldalak vertikális elcsúszása; 6: Felgyűrődött kalapács ütőfelület; 7–8: Megmunkálatlan és használatlan kalapács ütőfelületek

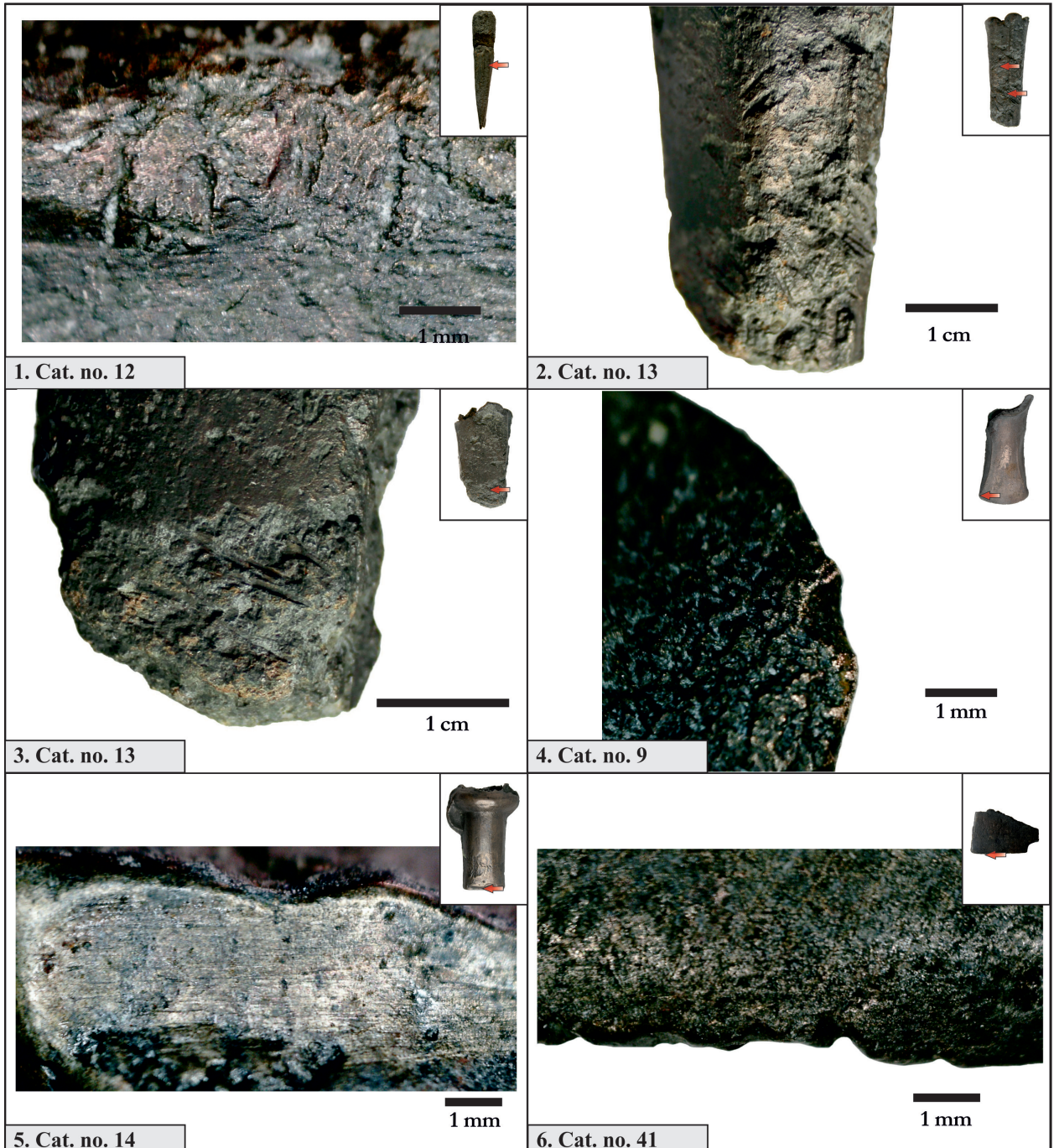


Fig. 7 Observations made during the macroscopic examination of the socketed axes. 1: Small impact marks near to the breakage point of the Cat. no. 12 socketed axe; 2–3: Small impact marks near to the breakage point of the Cat. no. 13 socketed axe; 4: Small notch; 5: Traces of polishing; 6: Small notches along the blade of the Cat. no. 41 socketed axe

7. kép Makroszkópikus megfigyelések tokosbaltákon. 1: Eszköz beütésnyomok a 12. sz. tokosbalta töréspontjához közel; 2–3: Eszköz beütésnyomok a 13. sz. tokosbalta töréspontja körül; 4: Csorbulás; 5: Polírozás nyom; 6: Kis csorbulásnyomok a 41. sz. tokosbalta pengéjén



core. Similar axe from the Carpathian Basin was first mentioned by József Hampel (HAMPEL 1896, 199) and later, other were also found in Dezmir-Bocomaia (DIETRICH 2011, 82, Taf. 2,9), Gambach (KIBBERT 1984, 178, Taf. 66,899), Tikøb (JANTZEN 2008, 120–122, Taf. 22,139) and in Hajdúböszörmény-Hetven-Laponytag.

#### *Fifth group – miniature axe*

The miniature axe (Cat. no. 49) is basically an imitation of undecorated socketed axes of the first group. During the Late Bronze Age, the miniaturization of metal artefacts in the Carpathian Basin appeared for the first time in the territory of the Piliny culture (PATAY 1995, 103–108; VLADÁR 1974, 45, Taf. 14a, 4) but it is known from the Ha A–B periods as well (JANKOVITS 1997, 9, Fig. 6; NOTROFF 2009; V. SZABÓ 2011a, 339, Taf. 5, 4). It should be noted that miniature axes were also reported outside of our research area (e.g. SCHMIDT–BURGESS 1981, 247–248; KIBBERT 1984, 178). According to our knowledge, a similar axe is known from the “Ha A2” hoard from Mačkovac (VINSKI–GASPARINI 1973, 216, Tab. 73, 8).

Based on the macroscopic examination<sup>9</sup> of the artefacts, it was possible to identify some common casting defect types on the axes of the Nagydobsza hoard (Fig. 6). The most characteristic defect is the mismatch or (horizontal/vertical) mould shift which is the result of the imprecise mould contact during the casting process: Cat. nos. 6, 8, 9, 12, 13, 16, 21, 32, 34–35, 37–40, 43–46, 49 (MOZSOLICS 1984b, 27, Taf. 14, 3; RAJKOLHE–KHAN 2014, 378–379, Fig. 6, 1, 5). The second most common defect is the misrun (e.g. Cat. nos. 9, 19, 26) which can be identified along the incomplete parts of the objects where the edge of the defect is rounded (MOZSOLICS 1984b, 27; BINGGELI 2011, 17, Fig. 10; SZABÓ 2013, 51; RAJKOLHE–KHAN 2014, 378, Fig. 5). Gas porosity was also observed on the breakage surfaces (e.g. Cat. nos. 6, 32) and in some cases, in the form of inclusions on the external surfaces of some objects (MOZSOLICS 1984b, 27; BINGGELI 2011, 15; RAJKOLHE–KHAN 2014, 378, Fig. 6, 1). Eight socketed axes bare traces of core shift which are the results of the core disposition during the casting process. In extreme cases, this defect could also result a dysfunctional object (e.g. Cat. no. 10) (Fig. 6, 3). Possibly, a flash defect caused the dysfunctional loop of the Cat. no. 14 specimen (SZABÓ 2013, 58; RAJKOLHE–KHAN 2014, 379, Fig. 9) (Fig. 6, 4). Similar loops can be found among the socketed axes of the Debrecen 3 (MOZSOLICS 1985, Taf. 264, 9, Taf. 265, 3, 10–11, Taf. 265, 1, 5),

Nagykálló (MOZSOLICS 2000, Taf. 61, 5), Szentés 4 (MOZSOLICS 2000, Taf. 97, 7) and Napkor hoards (MOZSOLICS 1985, Taf. 257, 8). In some cases amorphous patterns were also visible (e.g. Cat. nos. 6, 11) (Fig. 6, 2).

As for the fragmentation pattern of the axes, only two of them (Cat. no. 7, Cat. no. 49) were intact, the rest were fragments or in a highly fragmented state. It should be noted that the examination of the unrestored artefacts was not possible. Some breakages on the axes could be also of recent date (e.g. Cat. nos. 30, 37, 43, 45, 48, 71–73), which appears on other fragmentary objects of the hoard, too. Although their breakage morphology and the well-designed cutting and breaking could argue for their prehistoric dating. The morphology of the fragments practically follow the same trend as B. Rezi’s Transylvanian fragmentation types (REZI 2011, Fig. 1). The fragmentation pattern of the Nagydobsza hoard suggest that the hoard contains systematically partitioned socketed axes and tools. Most common forms are the upper (Cat. no. 14), lower (Cat. no. 42) and middle body parts (e.g. Cat. no. 34) but smaller rim (Cat. no. 16) and body (Cat. no. 25) fragments can also be mentioned. Even traces of intentional partitioning with an edged tool were identified at two axes (Cat. nos. 12–13). In these cases, the small impact marks<sup>10</sup> are situated near to the breakage point of the object (Fig. 7, 1–3). It should be noted that some of them can be associated with casting defects (e.g. Cat. no. 32).

Further manufacturing and usage related traces were hard to investigate due to the fragmentary state of the objects. Slight polishing traces were visible on the Cat. no. 14 specimen (Fig. 7, 5); 14 notches along the blade of the Cat. no. 41 axe (Fig. 7, 6), and another small notch on the blade of the Cat. no. 9 socketed axe fragment (Fig. 7, 4). It was also possible to identify some unrefined specimens (Cat. no. 7, 10–12, 40, 42, 43, 46, 49, 50), based on the lack of hammering or sharpening traces along their blade and edges.

#### *Socketed hammers* (Cat. no. 51–54, Fig. 17, 51–54)

An undecorated specimen (Cat. no. 52), a fragment of a lower part (Cat. no. 54) and two specimens with V rib pattern<sup>11</sup> (Cat. no. 51, 53) can be assigned into the group of socketed hammers. These metallurgical tools along with other main hammer groups (mallets, modified socketed or winged axes) were deposited mainly between Br D and Ha B periods (ŘÍHOVSKÝ 1992, 288–289; WANZEK 1992, 261; ŽERAVICA 1993, 108; HANSEN 1994, 136; PASZTHORY–

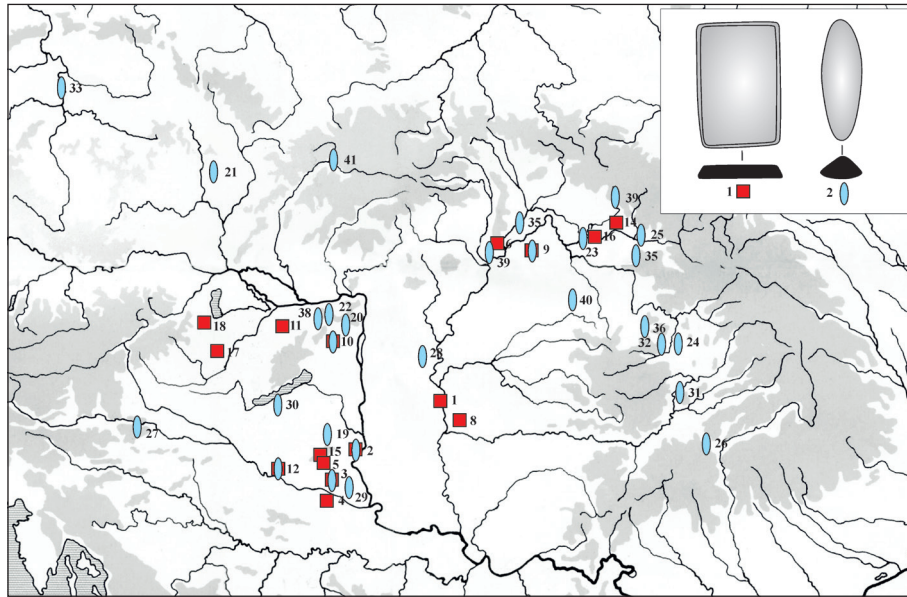


Fig. 8 1. The distribution of the (rectangular) ingots in the territory of the Carpathian Basin (quadrat) 2. The distribution of the oval-shaped (loaf) ingots in the Carpathian Basin and its adjacent areas.

8. kép 1. A négyzetes alakú öntvények elterjedése a Kárpát-medecében. 2. Az ovális formájú (vegni alakú öntvények elterjedése a Kárpát-medencében és szomszédos régióiban.

MAYER 1998, 175–176; KOBAL' 2000, 50; GOGÁLTAN 2005, 344; ILON 2015, 184–191). Their very first grouping was carried out by K. Miske whose work was followed by many prominent typological schemes based on the objects' cross-sections, decorations or the form of their face (HAMPEL 1896, 49; MISKE 1907, 28; MISKE 1929, 88; OHLHAVER 1939, 25–27, Abb. 6; MOZSOLICS 1945, 53; FOLTINY 1955, 101–102; BERNJAKOVIĆ 1960, 261; HRALOVÁ–HRALA 1971, 25; MAYER 1977, 224; JOCKENHÖVEL 1982, 462–467; KIBBERT 1984, 198; ŘÍHOVSKÝ 1992, 284–298; WANZEK 1992, 261–262, Liste 4–6; ŽERAVICA 1993, 108–109; HANSEN 1994, 143–144; PÁSZTHORY–MAYER 1998, 175; GOGÁLTAN 1999–2000; KOBAL' 2000, 50; GEDL 2004, 71–72; KÖNIG 2004, 48–50; GOGÁLTAN 2005, 269–370; NESSEL 2008, 74–77; NESSEL 2010, 3–5, Taf. 1; DIETRICH–AILINCĂI 2012, 13–17). In the present study I rather share the opinion of A. Mozsolics and S. Hansen, therefore I do not apply the aforementioned grouping schemes<sup>12</sup> intentionally, since socketed hammers are one of the most individual groups among the Late Bronze Age metallurgical tools. Therefore, they cannot be used for distinguishing short chronological periods (MOZSOLICS 1945, 53–54; HANSEN 1994, 138). Their morphology, and especially the shape of their face are strongly related to different stages of manufacturing process or usage, which has certainly changed over time. In the light of this morphological-technological issue, the sock-

eted hammers from Nagydobsza are no exceptions either. Based on the macroscopic examinations, Cat. no. 51 can be identified as a defected product by the reason of its extremely porous breakage surfaces and unpolished casting seams. Besides, the face of this hammer is completely unrefined (Fig. 6, 7). The Cat. no. 54 can be interpreted in the similar manner due to its porous breakage surface and unused face (Fig. 6, 8). The only exception is the Cat. no. 52 socketed hammer, even though its surface is slightly porous and a misrun defect is situated on the rim, the face of objects are burred (but not so intensively) in the same manner as the hammers with clear usage-related traces (FREGNI 2014, 118–119, Fig. 5, 12) (Fig. 6, 6).

*Flange-hilted sickle fragments* (Cat. nos. 58–61, Fig. 17, 58–59, Fig. 18, 60–61)

Three blade fragments of flange-handled sickles (Cat. nos. 58–60) and one handle fragment (Cat. no. 61) can be found in the Nagydobsza hoard. Hammering or sharpening traces on their blade were not visible.

*Saw* (Cat. no. 62, Fig. 18, 62)

The oval-sectioned saw fragment represents a frequent Carpathian tool type (HAMPEL 1896, 60–61; MISKE 1907, 56; MOZSOLICS 1985, 47; HANSEN 1994, 150; KOBAL' 2000, 49; DERGAČEV 2002, 179; TERŽAN 2003, 197; KÖNIG 2004, 54–55; PANČIKOVÁ

2008, 150; NESSEL 2009, 241–253, Abb. 6–7; REZI 2011, 311–312). Their main distribution area can be located in the Tisza region, Transylvania, south-eastern Transdanubia, but they were also found in West-Central Europe (HANSEN 1994, 150, Abb. 82). The saw of the Nagydobsza hoard (Cat. no. 62) can be associated with Nessel’s first group, but from chronological point of view it is without any importance since it was dated between the Ha A1 and Ha B periods (MOZSOLICS 1985, 47; NESSEL 2009, 251–252). Due to corrosion damage, the identification of hammering or serration along the edges of the object was not possible.

#### *Rings* (Cat. nos. 63–64, Fig. 18, 63–64)

The hoard contains two fragments of two common of some ring type: 1: circular-sectioned opened rings with tapering terminals (Cat. no. 63); 2: closed rings with flattened, rhomboid cross-section (Cat. no. 64). Between the Ha A1 and Ha B1 periods, the distribution area of analogies for the first type comprises the territory of northeastern Hungary, Transcarpathia, Transylvania and Transdanubia (MOZSOLICS 1985, 65–66; KEMENCZEI 1996a, 75–76; KEMENCZEI 1997, 118–121; TARBAY 2015, 321–322, List 8, Fig. 11.). The rings with rhomboid cross-section appeared in great number in the western part of the Carpathian Basin, mainly in the Ha A1 period, although specimens from younger assemblages (Ha A2, Ha B1, Ha B2) were also reported (MOZSOLICS 1985, 65; SZABÓ 1996, 214–216; TARBAY 2015, 319–320, List 5, Fig. 9.).

#### *Pendant* (Cat. no. 65, Fig. 18, 65)

Due to its fragmentary state, the exact form of the Cat. no. 65 object cannot be determined. However, its form strongly reminds to the cast crescent-shaped pendants (e.g. Sarkad) (MOZSOLICS 1985, 61–63, 211).

#### *Ingots*

##### *Half form ingots*<sup>13</sup> (Cat. nos. 66–73, Fig. 18, 66–73)

The Nagydobsza hoard contains eight half forms which can be classified into three different types: 1: hammer half forms (Cat. nos. 66–67), 2: axe half forms (Cat. nos. 68–71), 3: and ring half forms (Cat. nos. 72–75) (TARBAY 2014, Fig. 35, List 18). The most prominent specimen is probably the Cat. no. 66 hammer half form with triple V rib decoration. Its moulds<sup>14</sup> and slightly different socketed hammer<sup>15</sup> parallels are known from the Carpathian Basin and West Europe as well. The other possible hammer half form fragment (Cat. no. 67) has its

parallel among the casting moulds of Velem (MISKE 1907, 26, XXII. t. 3). Similar finds to the Cat. no. 70 axe half form are known from the Kurd and Kesz-tölc hoards, and from one looted hoard, most likely from Transdanubia (TARBAY 2014, Fig. 39, Fig. 67, 78). The pattern of the miniature axe half form (Cat. no. 69) is similar to the previously mentioned socketed axes with straight body and ribbed decoration. Comparable ring half forms to the ones from Nagydobsza (Cat. nos. 72–74) are found in “Ha A2” hoards<sup>16</sup> or as stray finds (TARBAY 2014, 218, 239, List. 18.1, 3, 9–12, Fig. 35).

Regarding the manufacturing techniques of the half forms, we need to clarify one issue. The “casting jet” on the upper part of the axe half form (Cat. no. 70) cannot be interpreted as a re-melted feature, nor as “casting jet”, as we have stated it earlier wrongly (TARBAY 2014, 218), but rather as the cooled down conical-shaped sprue, a similar casting method trace that was observed at flanged sickles, too (PRIMAS 1986, 6). This seems to be supported by the completely smooth reverse side of the object (see: Cat. nos. 67–68, 70–73). However, the miniature axe half form (Cat. no. 69) and the hammer half form (Cat. no. 66) could have been made in a single-part open mould, according to the shrinkage of their rim and intensively blistered reverse side.

##### *Rectangular ingots* (Cat. nos. 81–85; Fig. 19, 81–84)

The trapezoid-sectioned, “rectangular ingots” (Cat. nos. 81–84) besides the so called “Keftiu ingots” can be placed into the second most common quadratic ingot types in Central Europe. These semi-finished products (or “weights”) distribute primarily in the territory of the Carpathian Basin (List 4, Fig 10), Czech Republic, South Germany, Switzerland and France mainly as parts of Br D, Ha A1 and “Ha A2” assemblages (MOZSOLICS 1984b, 33; MOZSOLICS 1990, 9; PRIMAS–PERNICKA 1988, 54–55; PARE 1999, 422–449, Fig. 31; Pare 2013, 518, Fig. 29.6; ILON 2015, 59–65). In the Nagydobsza hoard the four fragments were partitioned in four different ways: half fragments; quarter fragments; middle fragments; and triangular-shaped fragments (Fig. 10, 4).

##### *Rod ingots* (Cat. nos. 88–104, Fig. 19, 88–103, Fig. 20, 104)

Within the Nagydobsza hoard two main rod ingots types can be established: 1: thick long variants (Cat. nos. 88–93, Cat. nos. 94–99); 2: wider specimens with rounded terminals (Cat. nos. 93, 100–104). Similar semi-finished products in various shape were distributed all over the whole Carpath-

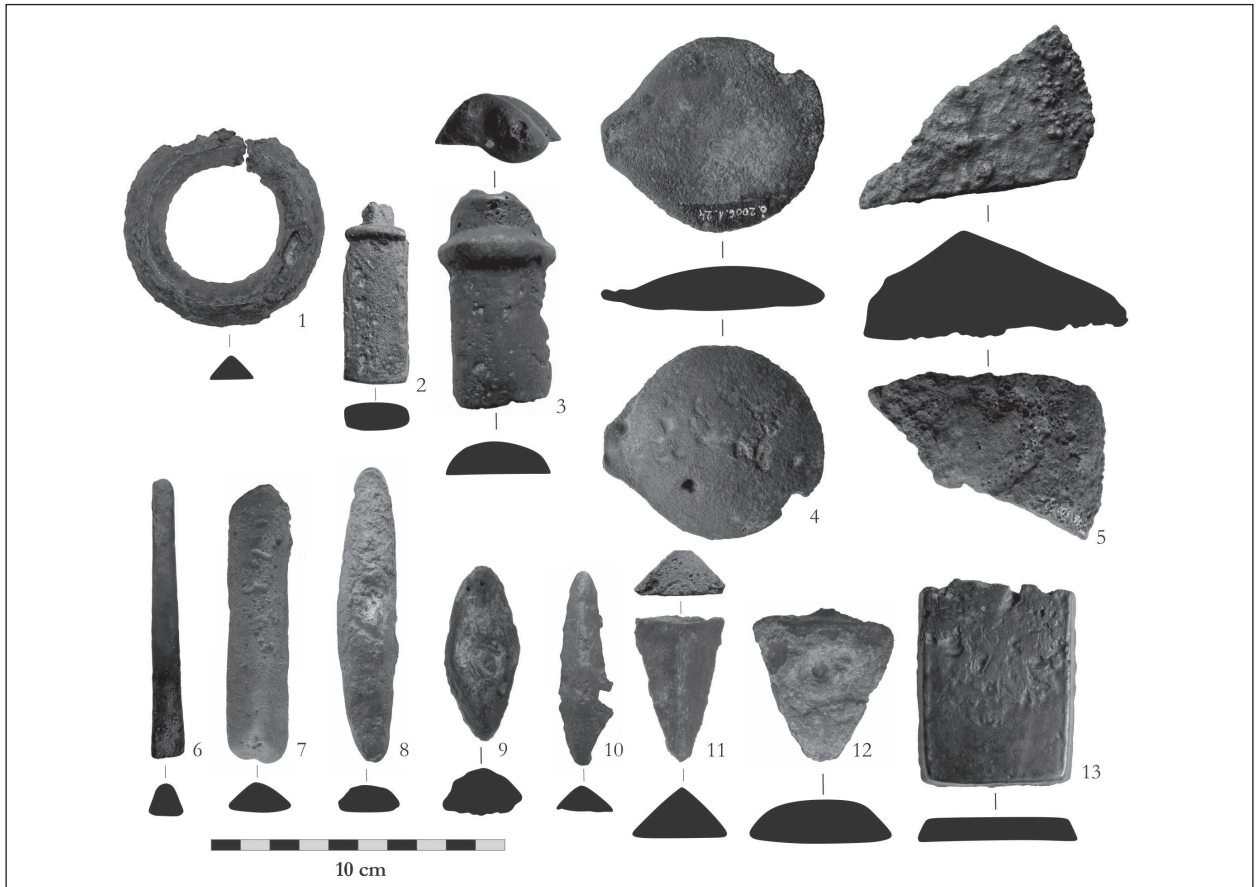


Fig. 9 Main ingot types of the Nagydobsza hoard. 1: Ring half form; 2: “Socketed” hammer half form; 3: “Socketed” axe half form; 4: Smaller plano-convex ingot; 5: Greater fragment of a plano-convex ingot; 6–7: Rod ingots; 8–10: Oval-shaped ingots; 11–12: Triangular-shaped ingots; 13: Rectangular ingot.

9. kép. A nagydobszai depó fő öntecs típusai. 1: Karika félforma; 2: “Tokoskalapács” félforma; 3: “Tokosbalta” félforma; 4: Kisebb öntőlepeny; 5: Nagyobb öntőlepeny töredéke; 6–7: Rúd alakú öntecs; 8–10: Ovális formájú (veknli) alakú öntecs; 11–12: Háromszög alakú öntecsek; 13: Négyzetes öntecs.

ian Basin and its surrounding territories, between the Br D and Ha A1 periods (MOZSOLICS 1985, 32; CZAJLIK 2012, 74; TARBAY 2014, 218–219, List 19, Fig. 40). The breakage surface of these objects are mainly solid, only one is porous (Cat. no. 90). Beside the aforementioned features, only one cutting mark was observed on the convex side of Cat. no. 100 specimen. Only two of them has been deposited in intact state (Cat. no. 98, 100), while the others were partitioned in three different ways: as half portions (Cat. nos. 90–92), middle portions (Cat. nos. 93–97, 99, 104), or edge portions (Cat. nos. 101–103) (Fig. 10, 2). They were partitioned simply by breaking<sup>17</sup>, but in some cases one should not exclude the possibility that they were regularly cut into pieces, indicated by their straight surface (e.g. Cat. nos. 96, 97, 98)

*Oval-shaped (“loaf”) ingots*<sup>18</sup> (Cat. nos. 21.105–109, 111–115, Fig. 20, 105–109, 111–115)

Within the Nagydobsza hoard three different types of oval-shaped ingots can be distinguished: Type 1: thick, long variants (Cat. no. 105–108); Type 2: wide, round-sectioned variants (Cat. no. 111–115); Type 3: wide, triangular-sectioned variants (Cat. no. 109). Similar objects were first identified by J. Hampel who classified them as “loaf-shaped forms” (HAMPEL 1896, 183–185). A similar German term<sup>19</sup> was given by A. Mozsolics, who described the Transdanubian distribution of these types (MOZSOLICS 1984b, 33). According to the composition analysis of one specimen from Biatorbágy-Herceghalom, it was presumed that it can be related to alloying process (LIVERSAGE–PERNICKA 2002, 428, Tab. 2; CZAJLIK 2012, 76–77). The oval-

shaped ingots distribute mainly in Transdanubia, Eastern Carpathian Basin, between the Br D, Ha A1 and “Ha A2” periods (List 5, Fig. 10). It should be also noted that except from the Cat. no. 105 and Cat. no. 109 half fragments, all of the other examples have been deposited in intact state (Fig. 10, 3).

*Triangular-shaped ingots (Cat. nos. 79, 110, Fig. 19, 79, Fig. 20, 110)*

First, it seems that the Cat. nos. 79 and 110 specimens are unique forms which show similarities with the 2nd variant of the oval-shaped ingots. However, they can be sorted into an independent ingot group. Comparable triangular-shaped objects can be found between the “Ha A2” and Ha B1 periods in the territory of Transdanubia and the Southern Carpathian Basin: Biatorbágy-Herceghalom (MOZSOLICS 1985, Taf. 237, 30); Csabdi (MOZSOLICS 1985, Taf. 248, 1), Hódmezővásárhely-Fehértó puszta 1a (MOZSOLICS 1985, Taf. 255, 13); Máriakéménd (unpublished); Siklósnagyfalu/Beremend (MOZSOLICS 1985, Taf. 254, 17); Szentés-Nagyhegy (KEMENCZEI 1996a, Abb. 32, 8); Szombathely-Jáki út (unpublished).

*Plano-convex ingots (Cat. nos. 117–188; Fig. 20, 117–120; Fig. 21–26, 181–187)*

In the Nagydobsza hoard, several different plano-convex ingots and the related fragments can be found. From these, only their intact or less fragmented examples are suitable for classification. The diameter and weight of the four small plano-convex ingots are similar to the so called miniature G6r type (Cat. nos. 117–120). There are two intact (Cat. nos. 121–123) and one fragmentary (Cat. no. 123) specimens whose diameters (between 6 and 6.7 cm) are above the standard sizes of the former type, however their general dimensions are not as large as the ingots of the Lovasberény type (CZAJLIK 2012, 69). The dimensions of the Cat. no. 125 plano-convex ingot correspond well with the lower standard size limit of the Lovasberény type (CZAJLIK 2012, 69–70). The attribution of the Cat. no. 124 flat specimen is uncertain since its diameter (8.8 cm) shows similarities with the Lovasberény type, although the form and dimensions of this object seem to correspond with the S6ghegy type ingots (CZAJLIK 1996, 170; CZAJLIK 2012, 66, 69). The situation is the same in the case of the amorphous Cat. no. 126 ingot. The estimated weight and sizes of the Cat. no. 127 half portion could have been similar to the Lovasberény type (CZAJLIK 2012, 69). The classification of the Cat. no. 128 is less certain, although its estimated diameter fit well into the standard sizes of the Lo-

vasberény type, but its estimated weight is higher. The classification of the “quarter like” edge fragments are problematic since they may represent quarter fragments of smaller plano-convex ingot types or further partitioned fragments of greater ingots (Fig. 10, 1). We were unable to establish a convincing delimitation between them, neither with the help of macroscopic observation. In my estimation, in two cases, (Cat. nos. 129 and 139) their identification as fragments of G6r type ingots could be certain, taking into account their shape and dimensions. The other fragments (Cat. nos. 130, 132–138, 140–141) were most likely parts of Lovasberény or G6r type plano-convex ingots. Larger ingot types (CZAJLIK 2012, 68) were only represented by different type of smaller edge partitions (e.g. Cat. no. 131) or “slices” (Cat. no. 142–143, 149–151). Their identification as parts of larger ingot types can be supported by their considerably heavy weight.

In the analysed collection, the quality of the plano-convex ingot could only be observed macroscopically. As their breakage surfaces indicate, most of them have solid inner structure (e.g. Cat. nos. 143, 147). Porous specimens can also be found among them (e.g. Cat. no. 150). It is noteworthy that many pieces display clear traces of layered casting: Cat. nos. 121, 130, 138, 146–147, 156, 161 (CZAJLIK 2012, 64; MODL 2010, 133, Abb. 8).

As for the fragmentation types of the Nagydobsza hoard’s plano-convex ingots, only a small percent are intact.<sup>20</sup> Usually their dominant part are partitioned. Judging by the regular shape of these fragments, it seem to me that they were partitioned intentionally as it has been already observed in many cases (e.g. MOZSOLICS 1984b, 38–39; MODL 2010, 135). During the examination of the finds, it was not manageable to identify impact marks caused by “hammers” or edged tools which could suggest another partitioning method (MOZSOLICS 1984b, 38–39; MODL 2010, 135–137, Abb. 12–14; NESSEL 2014, 405–407). Inspired by the study of B. Nessel, (NESSEL 2014) I attempted to describe the partition types of the Nagydobsza hoard’s plano-convex ingots. The form of their partitioning can be divided into different shapes: half portions (Cat. nos. 127–128); “quarter like” edge portions (Cat. nos. 129–130, 132–141), edge portions of different – trapezoid, triangular, quadratic – shapes (Cat. nos. 131, 145–172, 187), “slices” (Cat. nos. 142–144) and rectangular-shaped “middle” portions (Cat. nos. 173–186). Taking into account this partitioning pattern, it can be concluded that mostly edge fragments, rectangular-shaped portions

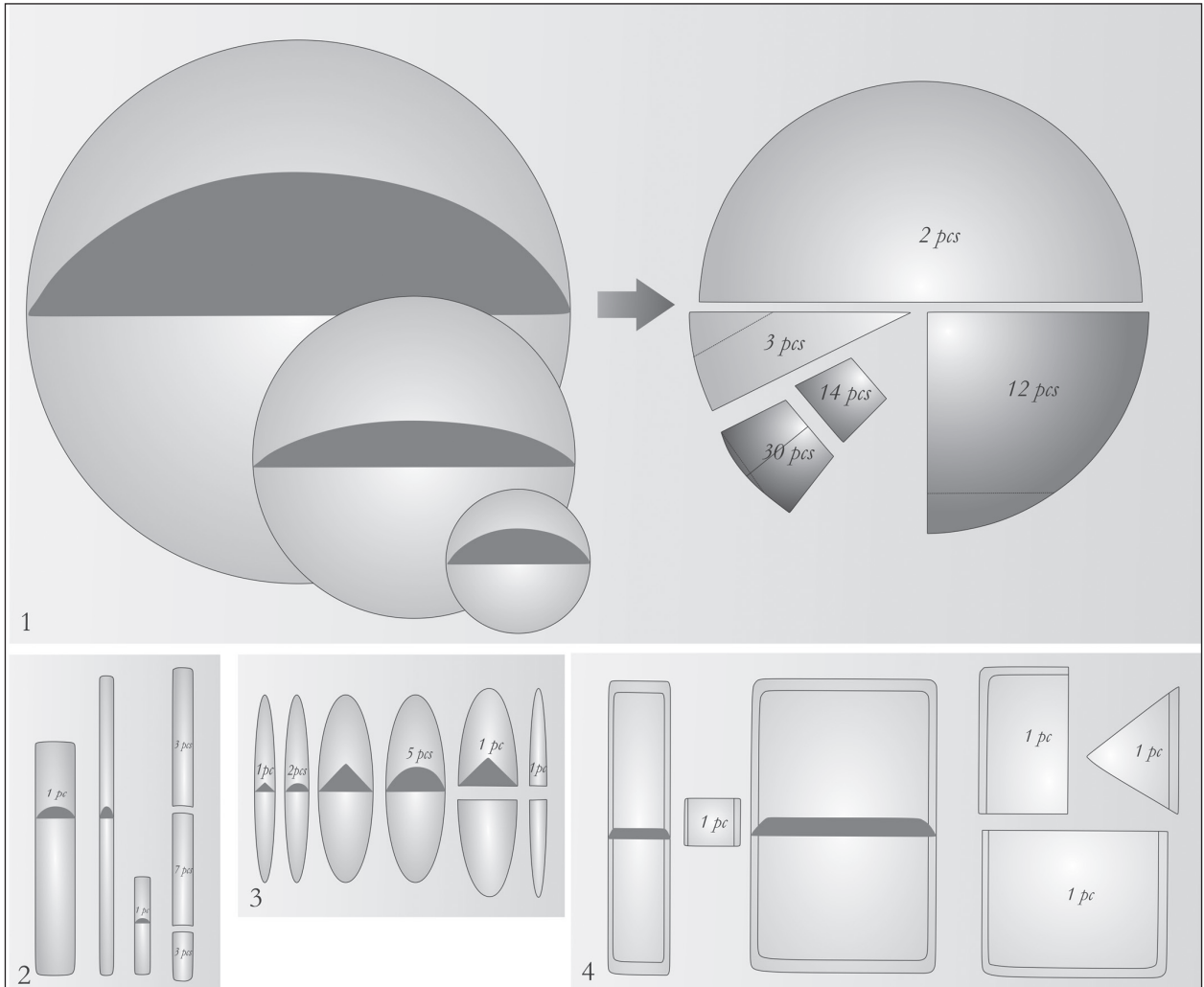


Fig. 10 Partition variants of the Nagyobsza hoard's main ingots types 1: Plano-convex ingots; 2: Rod ingots; 3: Oval-shaped ingots; 4: Rectangular ingots

10. kép A nagyobszai depó leggyakoribb öntvényeinek darabolási változatai 1: Öntőlepenyek; 2: Rúd alakú öntvény; 3: Ovális alakú öntvény; 4: Négyzetes ingot.

and “quarter like” partitions were deposited in the hoard. In other words, these fragments are practically the smallest partitions, the products of the final stages of systematic partitioning.

*Individual ingot forms* (Cat. nos. 74–80, 86–87, Fig. 19, 74–78, 80, 86–87)

The hoard contains several other unidentifiable ingots and fragments of different shapes (Cat. nos. 74–80, 86–87). It is highly possible that the Cat. no. 87 object is a rod ingot with flash defect. The hoard also contain an object (Cat. no. 85) which shows similarities with the rectangular ingot type but its cross-section is oval-shaped. We are only aware of one similar objects from the Esztergom hoard (MOZSOLICS

1985, Taf. 138,9). This object could be also described as a defected object.

*Metallurgical by-products and unclassifiable fragments*

*“Bronze lumps and droplets”* (Cat. nos. 188<sup>21</sup>–247, Fig. 26, 188–195; Fig. 28)

To this category of bronze lumps some amorphous fragments were also placed whose classification is uncertain due to their forms. They could have formed irrelevant portions of plano-convex ingots or different types of metal working debris, such as slags, droplets etc. (WAARSENBURG–MAAS 2001, 48; KUIJPERS 2008, 93).

*Sprues* (Cat. nos. 248–263, Fig. 29–30)

The Nagydobsza hoard contains 16 solidified sprues<sup>22</sup> (Cat. nos. 248–263). Concerning their typology, the studies written by D. Jantzen and B. Nessel should be mentioned. They elaborated a scheme which makes distinction between the sprue shape and object type they were associated with (JANTZEN 2008, 215–218, Abb. 77; NESSEL 2012, 145–151). Seven sprues (Cat. nos. 249–251, 253, 255–257, 260) can be sorted into the I.2 type. These artifacts could be associated with the manufacturing of socketed objects (NESSEL 2012, 147, 158, Abb. 2). Their form are various, specimens with D or quadratic cross-section, even ribbed ones, similarly to sprues of the 5<sup>th</sup> mould type of B. Wanzek, can be mentioned (WANZEK 1989, 49, Abb. 5, 8). The I.4 type is represented by only one specimen (Cat. no. 259). Identical sprues are known from the “Balaton area”, Jászkarajenő, Popești and from Scandinavia: Randbøl, Udbyneder (NESSEL 2012, 148, 157). It is highly probable that this sprue type, judging by its shape, can be related to socketed axes with thickened rim and straight body. The upper part of the object can be a result of the slant positioning of the moulds during the casting process (ARMBRUSTER 2000, 68–69, Abb. 33). Other scenarios can be also taken into account, such as the intentional or accidental disposition of the moulds. Three specimens resembles with Nessel’s II.1 type artifacts, as it is evidenced by their semicircle or triangular cross-section (NESSEL 2012, 149–150). They were probably parts of sickles or knives; and were distributed in the Carpathian Basin, Austria and Czech Republic (NESSEL 2012, 158). The Cat. nos. 248 and 258 can be ranged into the II.3.1. type (NESSEL 2012a, 150–151, Abb. 7), which are related to sickle manufacturing, evidenced by similar unbroken sprues from Velká Roudka (SALAŠ 2005b, Tab. 286, 3–5) and Baks 2 (V. SZABÓ 2011b, Taf. 8, 3, Taf. 9, 3).

As their breakage surface suggest, most of the sprues have been broken off. The use of saw was presumed only in one case: Cat. no. 257 (HAMPEL 1896, 199; FERENCZY 1976, 246; JANTZEN 2008, 226–227). The macroscopic examination of sprues delimited two different types according to their inner structures: sprues with porous inner structure (Cat. 248, 251–252, 260) and sprues with solid structure (Cat. no. 249–250, 253–259, 261–263).

*“Recycle bin of a smith?” Notes on the “scrap hoard” deposition*

Regarding the composition and the preliminary results of the macroscopic analysis, the Nagydob-

szas assemblage can be related to a Pan-European deposition phenomenon, known by the researchers under different interpretative names, such as “scrap hoards”, “founder’s hoards”, “workshops” or “metallurgist’s hoards” etc. (HAMPEL 1896, 185; CHILDE 1930, 44–45; HUTH 1997, 178–183; BRADLEY 2005, 148; ȚARLEA 2008, 84–85; REZI 2011, 303; GORI 2014, 274–275). Most of these assemblages were found in fragmentary state, and they are often composed of defected products, fragments of used artefacts, semi-finished and unrefined pieces, metal working debris and sometimes parts of the well-defined metalworking toolkit. In Hungary, the most distinctive Late Bronze Age examples – along with the Nagydobsza hoard – are known from Siklós-nagyfalu (Beremend), Lovasberény, Márok, and Szentes-Nagyhegy (MOZSOLICS 1990, 9). The deposition of these objects was often explained with the activities of smiths, traders or smaller communities who have hidden their precious raw material stock for future recycling. This non-ritual concept has changed over the years, and a votive character had been attributed to it as new theoretical models have emerged (CHILDE 1930, 44–45; MOZSOLICS 1981, 409; MOZSOLICS 1985, 95–96, 144–149; MOZSOLICS 2000, 77; HUTH 1997, 178–179; LEVY 1981, 175–178; TURK 1997, 49; FONTIJN 2002, 13–21; BRADLEY 2005, 148–150; NEIPERT 2006, 33–37; ȚARLEA 2008, 84–89; DIETRICH 2012, 212; DIETRICH 2014, 474). Similar complex interpretation is not yet possible in the case of the Nagydobsza hoard, especially not in the lack of systematic field surveys and topographic analysis of the hoard’s find-spot. The relation of the hoard and the Late Bronze Age micro-regional landscape, respective the settlement structure is also needed to be established (FONTIJN 2002, 259–269; BALLMER 2010; MALIM et al. 2010, 117–127, Fig. 19; NEUMANN 2012).<sup>23</sup> Nevertheless, the applied analytical methods enabled the elaboration of a typological as well as of a preliminary technological description of the hoard which could bring us closer to the reason of its deposition.

Regarding the dating of the assemblage, the deposited artefacts represent classical forms from the period between the Ha A1 and Ha B1. Although certain objects, such as the Prejmer type sword, the rings with tapering terminals and the axe half forms have already appeared in the Ha A1 period, most of their parallels were composing elements of “Ha A2” and Ha B1 assemblages. In my estimation, the strong “Ha A2” character of the parallels is only the result of the Hungarian dating schemes, which is still under discussion since it has been questioned by S. Hansen (MOZSOLICS 1985; HANSEN 1994; TURK

1996, 111–117; KEMENCZEI 1996a, 75–77; MOZSOLICS 2000; TARBAY 2014, 222–227; VÁCZI 2014, 49–51). In relation to this, the socketed axe with thickened rim (Cat. no. 29, List 2) and the socketed axe with crescent-shaped rim (Cat. no. 9, List 3) should be mentioned as the closest parallels of the Prejmer type sword (Cat. no. 1, List 1). They are dated mainly to the Ha B1 period, even after the traditional Hungarian chronological schemes, which clearly suggest that the hoard was deposited in the above mentioned period (KEMENCZEI 1996a; MOZSOLICS 2000).

Most of the artefacts from the Nagydobsza hoard are “supraregional” types. Their analogies were unearthed from the eastern, western and southern part of the Carpathian Basin (e.g. TARBAY 2014, Fig. 11–12, Fig. 26, Fig. 28, Fig. 35, Fig. 40). The distribution of the mould parallels for the Cat. no. 29 socketed axe illustrates the best this “supraregional” character. These objects were found both in the northern territory of the Transdanubian Urnfield culture (Neszmély) (PÁTEK 1961, 60, Taf. XXVII, 8) and within the territory of the Gáva Culture, in Poroszló-Aponhát (PATAY 1976, Abb. 4, 2). In association with the Ha B1 deposition of the hoard, one should not forget about the “eastern” parallels of the Prejmer type sword and the socketed axe with crescent-shaped rim, especially if we take into account the fact that their main distribution area overlaps with the distribution of the Hajdúböszörmény type hoards (Fig. 3, Fig. 5; MOZSOLICS 2000, Abb. 2).

A typical aspect of the Nagydobsza hoard is its highly fragmentary state.<sup>24</sup> Out of 65 objects, only four are intact (Cat. nos. 7–9). Among these fragmentary objects there can be found unrefined (e.g. Cat. nos. 40, 42–43), unusable defected (e.g. Cat. nos. 10–11, 21, 26, 29–30, 32, 44, 46, 50) and some partitioned fragments belonging to possibly used and useable tools (e.g. Cat. nos. 14, 41, 52). The ingots display similar fragmentation patterns; only a small percent of them are intact. In this respect, several different explanations (e.g. pre-monetary concept, votive motivations etc.) have been formulated (see: SOMMERFELD 1994, 37–61; NEBELSICK 1997; CHAPMAN 2000; REZI 2011, 303–307; MÖRTZ 2013, 55–59). In my estimation, the partitioned state of the Nagydobsza hoard’s ingots are not a result of a ritual destruction but rather the consequence of intentional, non-ritual partitioning (MODL 2010, 145–147; NESSEL 2014, 405–407). Concerning the fragmentation shapes of the swords, socketed tools, saw, rings, and flanged sickles it seems that they have been organized into regular forms. There have been observed even impact marks caused by partitioning tools along the

breakage points of two objects (Fig. 7, 1–3) and on the surface of an ingot (Fig. 19, 100). In light of the discussion above, there is no doubt that the objects of the Nagydobsza hoard were intentionally partitioned. But it is not entirely clear if this happened during the deposition act of the assemblage. It is also worth to mention that these breakage types are determined by the shape, thickness and inner structure of the objects; no wonder that most of the breakage surface belonging to the socketed axes are in horizontal position, and the vertical breakages were only observed along the weakest, upper part of the objects. Another interesting fact is that certain breakage surfaces can be related directly to casting defects (e.g. core shifts, porous inner structures, misrun defects) which can also cause or make easier this process. In contrast to the classic weapon hoards, where the damage traces concentrate on the functional parts of the objects, with the intention to make the object irreversible (NOVÁK–VÁCZI 2012, 99), the fragmentation character of the Nagydobsza hoard probably reflects the aim to create the smallest fragments possible. Therefore, it is more likely that the fragmented objects, regardless of the fact that they were parts of defective-, used- or unrefined products, were treated as raw material and their partitioning served similar purpose as the partitioning of the ingots.

The interpretation of the casting defects should be treated with caution. Most of them (e.g. mismatch, misrun, flash, amorphous patterns) are rather aesthetic defects which can be corrected by further manufacturing processes (e.g. by polishing the objects’ surface as in the case of the Prejmer type sword) or simply tolerated by the metallurgist or the owner. Consequently, the term “defective product” is not entirely correct. One might ask: *What type of objects can be really interpreted as “defective product” in terms of usability?* We can get closer to the answer if we examine the anthropological research of D. E. Everly who studied the bronze bell manufacturing of the Ban Pba Ao smiths in northeastern Thailand, Ubon. According to his field observations, the smiths selected their finished products by their characteristic sound, and not by their physical appearance, hence bells with no visible imperfections were placed into the recycle bin, while bells with small holes (misrun defect), which passed the sound test, were considered and treated as finished products (EVERLY 2004, 113–114). The situation is also valid for the Late Bronze Age Carpathian Basin, especially in the case of the socketed weapons and tools. During my ongoing PhD research on the “Gyermely type hoards” from the territory of Hungary, similar toleration of minor casting defects was observed at



almost every studied hoard. A fine example is the spear with misrun defect from the Gyermely-Szomor hoard (MOZSOLICS 1985, Taf. 240, 6) which was polished and grinded, despite of its “inferior” quality of casting. The socketed axe from Gáborján should also be mentioned (KEMENCZEI 1996a, Abb. 15, 1). It was hammered, sharpened and probably used as it is indicated by the notches along its blade. There are many questions in this concern which can be answered only after systematic experiments. In any case, it would be more propiate in the future to make distinction between the real “defected product”, which are non-functional, and the products with “aesthetic defects”. In order to achieve this goal, a combination of future macroscopic examinations, experiments and Vickers hardness testing on the questioned objects would be essential (MÜLLER 2011).

At first glance, it might seem that the Nagydobsza hoard has no votive character and it is merely a collection of ingots, waste products and “invaluable” fragments of “defected”, unrefined and finished objects. Moreover, the fragmentation types of this hoard can be rather associated with metallurgical process, and not with a “ritual violence” (NEBELSICK 1997). But these features do not exclude the votive character of the assemblage (BRADLEY 1990, 118; NEEDHAM 2001, 279–282). Compared to the “mega hoards” which includes enormous amounts of objects, such as the well-known assemblages from Romania (e.g. Uioara de Sus-Tăul Mare) (PETRESCU-DÎMBOVIȚA 1978, 132–135; RUSU 1981, 375–377; DIETRICH 2014, Fig. 1), the total weight (19.053 g) and the quantity of the artefacts (263 pcs.) in the Nagydobsza hoard seems to be insignificant. Yet, this amount of recycled bronze is fairly enough for manufacturing larger quantities of objects. One should not exclude the possibility either that the hoard is only a small amount of the original raw material collection as the partitioned state of ingots may suggest (Fig. 10). Except from its material value, the symbolic role of the hoard’s main components can be also illustrated with some examples, such as the ingots and the fragmented objects (BRADLEY 1990, 118). Despite the fact that ingots appeared mainly in hoards or as stray finds in settlements, they are also known from graves (JOCKENHÖVEL 1973). They were reported even as elements of manipulated objects. For instance, the socket of an unpublished axe from the Lovasberény hoard was filled with a small plano-convex ingot fragment (MOZSOLICS 1985, 144–145). This phenomenon is only one example of a widely distributed deposition practice (DIETRICH 2014, 478–482, Fig. 3; TARBAY

2014, 208). However, the most stunning example for this practice is the 2<sup>nd</sup> hoard of Szilvásvárads-Alsónagyverő. In this case, a small sickle fragment and five ingots were deposited into the fracture of a rock, at the edge of the hill settlement (V. SZABÓ 2011a, 342–343, Taf. 10, 3). All these situations mentioned above are fine examples for the votive character of ingots and broken artefacts. All these examples could argue for the possibility that a hoard with “profane character” could have been deposited for votive purposes (BRADLEY 1990, 118; NEEDHAM 2001, 279–282), too. In addition to the aforementioned issues, the topographical situation of the hoard is also interesting, especially if we take into account the fact that the Nyugati árkosi dűlő is a peatland close to the Völgyi árok, as it can be seen on the 1<sup>st</sup> military survey’s map (Fig. 1). Such wetland contexts were often associated with votive deposition practices, although explanations related to profane use were also suggested (LEVY 1981, 176; BRADLEY 1990, 118; RANDSBORG 2002; SOROCEANU 2012, 238–246, Abb. 9; WILLROTH 1985, 363–364, 381–397). An interesting example reflects the contrary of the features related above. The Siklósnagyfalu<sup>25</sup> hoard (Beremend), which consists of 149 objects and weights 20.8 kg, has almost a completely similar typological composition and technological pattern as the one from Nagydobsza. It was also found a pit but in a Ha A-B settlement, close to the remains of a house (KISS 1969; KISS 1970; MOZSOLICS 1985, 95–96). It would be no wonder if similar settlement remains were situated near to the finding place of the Nagydobsza hoard as well. Anyway, the field survey of the assemblage would undoubtedly provide some crucial data which would contribute to the final interpretation.

In conclusion, the Nagydobsza assemblage can be placed into a special Ha B1 hoard type. Its composition (ingots, broken objects, defective and unrefined products, metallurgical toolkit or its parts) and the partitioning pattern of objects can be well-studied. In my estimation, the fragmentation pattern of the hoard refer to a non-ritual character. In order to give a complete interpretation of this hoard, future research is inevitable. This research should focus on the systematic topographical survey of the find spot, which could allow us to revise the results of the typo-chronology and macroscopic examinations, and interpret the hoard in its micro-regional context. In addition to this, a comparative macroscopic examination and elemental composition analysis on similar hoards, especially on the hoard from Beremend, could help us to establish a detailed description of this deposition practice.

## APPENDIX

## Catalogue

1. **Sword** (ö.2006.1.1): Three-ribbed hilt fragment of a sword with solid-cast terminal. The terminal is disc-shaped with extension. The shoulders are straight and the interface of the hilt plate and the blade is concave. Polished mould shift is visible along the narrow side of its terminal. Due to the fragmentary state of the object, the observation of usage-related traces was not possible. Length: 11.3 cm, width (disc-shaped terminal): 3.5x3.5 cm, w.l. (middle of the hilt): 1.7x1.4 cm, width (shoulders): 4.2 cm, 0.6 cm, thickness (blade): 0.6 cm, 0.2 cm, weight: 109 g.
2. **Sword** (ö.2006.1.52): Hilt fragment of a flange-hilted sword. Length: 5.3 cm, thickness: 0.7 cm, weight: 12 g.
3. **Sword** (ö.2006.1.2): Oval-sectioned blade fragment of a sword. The surface of the object, and its breakage are porous. No traces of sharpening or hammering were visible on the object. Length: 4.6 cm, width: 3.4 cm, thickness: 0.8 cm, weight: 39 g.
4. **Spear** (ö.2006.1.10): Small fragment of a spear with the remains of the blade and the socket. Length: 2.9 cm, width: 1.4, 1 cm, thickness: 0.2 cm, weight: 8 g.
5. **Knife or razor** (ö.2006.1.52): Fragment of a small, rhomboid-sectioned knife or razor with ring terminal. Slight mould shift can be observed along the narrow side of the object. Length: 6.4 cm, width: 1.5 cm, thickness: 0.5 cm, weight: 10 g.
6. **Socketed axe** (ö.2006.1.3): Fragment of a socketed axe with thickened rim and straight, oval-sectioned body. Rivet holes are visible along its narrow side. The amorphous patterns of the object are composed of three horizontal, two broken and one Y and V ribs. Porosity and slight mould shift can be observed along the breakage surface of the object. Length: 8.4 cm, width: 5.2, 4.3 cm, weight: 196 g.
7. **Socketed axe** (ö.2006.1.6): Undecorated socketed axe with thickened rim and straight, quadratic-sectioned body. The loop is broken. Slight misrun defect can be seen along the rim of the axe. The surface is intensively corroded. No traces of hammering or sharpening were visible on the blade of the object. Two parallel depression can be seen near to the blade. Length: 14.4 cm, width: 5.1 cm, 5.2 cm, weight: 463 g.
8. **Socketed axe** (ö.2006.1.6): Undecorated socketed axe with thickened rim and slightly curved, oval-sectioned body. The edge of the axe is flat. Parts of the blade section of the axe are broken. Slight misrun defect can be seen along the rim of the object. No traces of hammering or sharpening are visible along the blade of the object. Length: 13.5 cm, width: 4.2 cm, 3.5 cm, weight: 293 g.
9. **Socketed axe** (ö.2006.1.6): Socketed axe with crescent-shaped rim and slightly curved, hexagonal-sectioned body. The edge of the object is rounded. The loop is missing due to a misrun defect. The surface of the object is porous. As a result of corrosion damage, hammering and sharpening traces are not visible along the blade, only a small notch can be observed on that part. Length: 9.5 cm, width: 3.8 cm, 3.4 cm, weight: 152 g.
10. **Socketed axe** (ö.2006.1.7): Hexagonal-sectioned, narrow socketed axe fragment with flat edge. Due to a core shift, the body parts of the axe are asymmetrical. The object is intensively porous as a result of damage caused by corrosion. Length: 9.8 cm, width: 3.8 cm, 1.7 cm, weight: 151 g.
11. **Socketed axe** (ö.2006.1.7): Hexagonal-sectioned socketed axe. As a result of a misrun defect, the rim of the object is missing. The socket is asymmetrical and dysfunctional due to core shift. The amorphous rib patterns most likely consist of one curved Y rib, two broken ribs and one horizontal rib. Length: 10.4 cm, width: 5.9 cm, 1.7 cm, weight: 449 g.
12. **Socketed axe** (ö.2006.1.7): Solid-cast, hexagonal-sectioned socketed axe without decoration. Slight mould shift can be seen along the narrow sides of the object. Small impact damages are visible near to the broken part of the object. Length: 12.1 cm, width: 4.1 cm, 2.6 cm, weight: 476 g.
13. **Socketed axe** (ö.2006.1.7): Narrow socketed axe fragment with slightly thickened rim. The rim is amorphous due to a misrun defect. The body parts of the object are shifted as a result of mould shift. Close to the breakage point impact marks are visible. The surface of the object is porous. Length: 6 cm, width: 3.6 cm, 2.5 cm, weight: 147 g.
14. **Socketed axe** (ö.2006.1.6): Undecorated, narrow socketed axe fragment with thickened rim and a solid-cast loop. Depression is visible on the wider body parts and polishing can be observed on the lower part of the object. Length: 6.5 cm, width: 4.6 cm, 3 cm, weight: 134 g.
15. **Socketed axe** (ö.2006.1.6): Undecorated, narrow socketed axe fragment with thickened rim. The surface of the axe is porous. Length: 6.4 cm, width: 3.8 cm, 2.7 cm, weight: 91 g.
16. **Socketed axe** (ö.2006.1.10): Socketed axe fragment

- with thickened rim. Mould shift can be seen along the rim of the axe. The breakage surface of the object are porous. Length: 4.1 cm, width: 2.9 cm, 4.2 cm, weight: 67 g.
17. **Socketed axe** (ö.2006.1.10): Socketed axe fragment with slightly thickened rim. Length: 3.3 cm, width: 2.1 cm, 3.5 cm, weight: 36 g.
  18. **Socketed axe** (ö.2006.1.10): Socketed axe fragment with thickened rim. The rib decoration of the object is composed of three horizontal ribs and the remains of a V rib. Flash defect can be seen along the upper part of the rim. The breakage surface of the object is porous. Length: 5.2 cm, width: 2.9 cm, 0.8 cm, weight: 22 g.
  19. **Socketed axe** (ö.2006.1.110): Narrow socketed axe fragment with thickened rim. The object is oval-sectioned and decorated with two horizontal ribs. Misrun defect can be observed on the breakage surface of the object. Length: 2.5 cm, width: 4.1 cm, 2.7 cm, weight: 34 g.
  20. **Socketed axe** (ö.2006.1.10): Socketed axe fragment with thickened rim. The surface of the object is porous. Length: 3.6 cm, width: 2 cm, 2 cm, weight: 17 g.
  21. **Socketed axe** (ö.2006.1.10): Socketed axe fragment with thickened rim. The body parts of the object are shifted due to core shift. Misrun defect can be observed on the breakage surface of the object. The outer surface of the axe is slightly porous. Length: 2 cm, width: 3.3 cm, 2.6 cm, weight: 15 g.
  22. **Socketed axe** (ö.2006.1.10): Socketed axe fragment with slightly thickened rim. The breakage surface of the object is porous. Length: 2.7 cm, width: 1.6 cm, 2.9 cm, weight: 14 g.
  23. **Socketed axe** (ö.2006.1.52): Fragment of a socketed axe with thickened rim. Misrun defect is visible along the rim of the object. Length: 2 cm, width: 1.9 cm, 2.4 cm, weight: 6 g.
  24. **Socketed axe** (ö.2006.1.2): Fragment of a socketed axe with thickened rim. The body parts of the axe are vertically shifted. The breakage surface of the object is porous. Length: 2.6 cm, width: 1.7 cm, 3.2 cm, weight: 12 g.
  25. **Socketed axe** (ö.2006.1.10): Fragment of a socketed axe. Rib decoration, which consists of one Y rib and one broken rib can be seen on the surface of the object. Length: 4 cm, width: 2 cm, 1.3 cm, weight: 18 g.
  26. **Socketed axe** (ö.2006.1.10): Body fragment of a socketed axe. Two vertical ribs are visible on the object. Due to core shift, the body parts of the axe are asymmetrical. A misrun defect can also be observed on the surface of the object. Length: 3.6 cm, width: 2.8 cm, 2.2 cm, weight: 42 g.
  27. **Socketed axe** (ö.2006.1.10): Socketed axe without rim. Misrun defect can be seen on the upper of the object. Length: 2.3 cm, width: 2.2 cm, weight: 6 g.
  28. **Socketed axe** (ö.2006.1.52): Fragment of a socketed axe. Length: 3 cm, width: 1.8 cm, weight: 14 g.
  29. **Socketed axe** (ö.2006.1.49): Fragment of a socketed axe with the remains of rib decoration which consists of two horizontal- and two curved ribs. The breakage surface of the object is porous. Length: 3.6 cm, width: 2 cm, 2.3 cm, weight: 35 g.
  30. **Socketed axe** (ö.2006.1.51): Fragment of a socketed axe. Due to core shift, the socket is asymmetrical. The breakage surface of the object is porous. Recent breakage can only be seen on the upper part. Length: 3.9 cm, width: 3.8 cm, 1.6 cm, weight: 67 g.
  31. **Socketed axe** (ö.2006.1.10): Fragment of a socketed axe. One vertical rib can be seen on the surface of the object. Length: 2.6 cm, width: 1.5 cm, 1.8 cm, weight: 17 g.
  32. **Socketed axe** (ö.2006.1.11): Fragment of an oval-sectioned socketed axe. The breakage surface of the object is porous. The upper part of the object is missing due to a casting defect. Slight mould shift can be seen along the narrow side of the object. Length: 2.8 cm, width: 2.9 cm, 1.5 cm, weight: 62 g.
  33. **Socketed axe** (ö.2006.1.11): Fragment of an oval-sectioned socketed axe. Slight depression can be seen on the surface of the object. Length: 4 cm, width: 4 cm, 1.5 cm, weight: 89 g.
  34. **Socketed axe** (ö.2006.1.11): Fragment of an oval-shaped, narrow socketed axe. Mould shift can be seen along the narrow side and a core shift along the breakage surface of the object. Length: 4.4 cm, width: 2.5 cm, 1.4 cm, weight: 84 g.
  35. **Socketed axe** (ö.2006.1.11): Fragment of an undecorated socketed axe with oval sectioned body. The rim of the axe is imperfect due to a misrun defect. Mould shift can be seen along the narrow side of the object. Length: 3.8 cm, width: 2.6 cm, 1.5 cm, weight: 84 g.
  36. **Socketed axe** (ö.2006.1.11): Quadratic-sectioned socketed axe fragment. The surface of the object is porous. Core shift can be seen along the rim. Length: 5.4 cm, width: 2.5 cm, 2 cm, weight: 92 g.
  37. **Socketed axe** (ö.2006.1.12): Fragment of a narrow socketed axe. Mould shift can be seen on the breakage surface of the object. The breakage surface of the objects is recent. Length: 5.3 cm, width: 2.3 cm, 1 cm, weight: 52 g.
  38. **Socketed axe** (ö.2006.1.11): Fragment of a socketed axe. Mould shift can be seen on the narrow side of the object. The breakage surface is porous. Length: 3.5 cm, width: 2.5 cm, 1.5 cm, weight: 61 g.
  39. **Socketed axe** (ö.2006.1.12): Fragment of a narrow socketed axe with oval-shaped cross-section. Along

- its porous breakage surface, slight mould shift can be observed. Length: 2.7 cm, width: 2.7 cm, 0.8 cm, weight: 30 g.
40. **Socketed axe** (ö.2006.1.12): Lower fragment of a narrow socketed axe. Its cross-section is oval-shaped. Mould shift is visible along its narrow sides. The fragment can be interpreted as an unrefined one. Length: 5.3 cm, width: 2.3 cm, 3.2 cm, weight: 82 g.
  41. **Socketed axe** (ö.2006.1.12): Blade fragment of a socketed axe. Porosity is not visible along its breakage surface. Notches can be identified along its edge. Length: 3 cm, width: 4.7 cm, 1 cm, weight: 56 g.
  42. **Socketed axe** (ö.2006.1.12): Blade fragment of a unrefined socketed axe. The surface of the object is porous. Length: 3 cm, width: 4.3 cm, 0.8 cm, weight: 39 g.
  43. **Socketed axe** (ö.2006.1.12): Blade fragment of a unrefined socketed axe. Slight mould shift can be seen along its narrow side. The breakage surface of the object is recent. Length: 4.3 cm, width: 2.4 cm, 1 cm, weight: 57 g.
  44. **Socketed axe** (ö.2006.1.11): Fragment of an oval-sectioned, narrow socketed axe. The breakage surface of the object is porous. Mould shift can be identified along its upper part. Depression is visible on its surface. Length: 2.5 cm, width: 2.5 cm, 1.6 cm, weight: 44 g.
  45. **Socketed axe** (ö.2006.1.25): Fragment of an oval-sectioned, narrow socketed axe. Mould shift can be seen along its narrow side. One of the breakage surface of the object is recent. Length: 2 cm, width: 2.4 cm, 1.5 cm, weight: 23 g.
  46. **Socketed axe** (ö.2006.1.12): Blade fragment of an unrefined socketed axe. Slight mould shift can be seen along its porous breakage surface. Length: 2.6 cm, width: 3.6 cm, 0.6 cm, weight: 29 g.
  47. **Socketed axe** (ö.2006.1.49): Fragment of a socketed axe. Length: 2.7 cm, width: 5 cm, 13 cm, weight: 67 g.
  48. **Socketed axe** (ö.2006.1.52): Body part of a socketed axe in two recent fragments. Length: 2.2 cm, width: 2.9 cm, 1.4 cm, weight: 35 g.
  49. **Miniature axe** (ö.2006.1.5): Solid-cast miniature axe with thickened rim and oval-sectioned body. Hammering or sharpening are not visible on the blade. Slight mould shift can be seen along its narrow sides. Length: 7 cm, width: 2.3 cm, 1 cm, weight: 50 g.
  50. **Socketed axe** (ö.2006.1.52): Amorphous blade fragment of a socketed axe. Misrun defect can be observed along its edge. Length: 1.7 cm, width: 4 cm, 0.5 cm, weight: 17 g.
  51. **Socketed hammer** (ö.2006.1.8): Hexagonal sectioned socketed hammer fragment. Two V ribs are visible on its upper part. The breakage surface of the object is porous. Casting seams are visible along its narrow side. A depressions can be observed on its face. Length: 3.9 cm, width: 3.9 cm, 2.1 cm, width (face): 3.4 cm, 1.4 cm, weight: 69 g.
  52. **Socketed hammer** (ö.2006.1.8): Hexagonal-sectioned socketed hammer with slightly thickened rim. Casting seams are visible along its narrow sides. The surface of the object is porous. Misrun defect can be observed on the rim of the object. Its face is burred. Length: 8.5 cm, width: 3.4 cm, 2 cm, width (face): 3 cm, 1.4 cm, weight: 218 g.
  53. **Socketed hammer** (ö.2006.1.10): Socketed hammer fragment with slightly thickened rim and rib decoration which consists of three V ribs. Length: 2.2 cm, width: 2.1 cm, 0.5 cm, weight: 7 g.
  54. **Socketed hammer** (ö.2006.1.35): Lower fragment of a hexagonal-sectioned socketed hammer with curved face. Misrun defects can be seen on its face. The breakage surface of the object is porous. Length: 3.1 cm, width: 4.3x1.3 cm, width (face): 3.8 cm x 1.6 cm, weight: 95 g.
  55. **Socketed tool** (ö.2006.1.10): Fragment of a socketed tool with slightly thickened rim. Length: 3.1 cm, width: 1.7 cm, weight: 16 g.
  56. **Socketed tool**: Rim fragment of a socketed tool. Length: 1.9 cm, width: 1.7 cm, weight: 7 g.
  57. **Socketed tool**: Rim fragment of a socketed tool. Length: 1.8 cm, width: 2 cm, weight: 10 g.
  58. **Flanged sickle** (ö.2006.1.4): Blade fragment of a flanged sickle with inner rib decoration. The edge of the object is unrefined. Length: 4.1 cm, width: 3 cm, weight: 18 g.
  59. **Flanged sickle** (ö.2006.1.4): Blade fragment of a flanged sickle with double inner rib decoration. The edge of the object is unrefined. Length: 3 cm, width: 3 cm, weight: 13 g.
  60. **Flanged sickle** (ö.2006.1.4): Blade fragment of a flanged sickle. The edge of the object is unrefined. Length: 4.5 cm, width: 2.1 cm, weight: 12 g.
  61. **Flanged sickle** (ö.2006.1.4): Hilt fragment of a flanged sickle. The base of the hilt is curved. Length: 5.2 cm, width: 2.3 cm, weight: 14 g.
  62. **Saw** (ö.2006.1.9): Fragment of a semi-oval sectioned saw. The edge of the object is unrefined. Length: 5.7 cm, width: 1.6 cm, thickness: 0.2 cm, weight: 9 g.
  63. **Ring** (ö.2006.1.29): Fragment of a quadratic-sectioned, opened ring with tapering terminals. 5.5x 1.5 cm, thickness: 0.5 cm, 0.5 cm, weight: 10 g.
  64. **Ring** (ö.2006.1.20): Fragment of a rhomboid-sectioned, closed ring. 7.8x3.9 cm, thickness: 0.3 cm, weight: 13 g.
  65. **Pendant** (ö.2006.1.20): Fragment of a crescent-shaped pendant. 2.1x1.6 cm, thickness: 0.9 cm, weight: 2 g.

66. **Hammer half form** (ö.2006.1.14): Half form of a socketed hammer with thickened rim and three V rib decoration. A ribbed sprue is visible on its rim. The flat side of the object is intensively blistered. Length: 9.1 cm, width: 3.2 cm, 3.1 cm, weight: 177 g.
67. **Hammer half form** (ö.2006.1.12): Fragment of a quadratic sectioned hammer half form. Length: 3.5 cm, width: 3.4 cm, 0.5 cm, weight: 30 g.
68. **Axe half form** (ö.2006.1.12): Blade fragment of an axe half form. The breakage surface of the object is porous. Length: 4.3 cm, width: 4.3 cm, 0.7 cm, weight: 39 g.
69. **Axe half form** (ö.2006.1.15): Fragment of an axe half form with thickened rim and rib decoration which consists of three horizontal ribs, one V rib and one Y rib. Length: 4.8 cm, width: 3.2 cm, 1 cm, weight: 52 g.
70. **Axe half form** (ö.2006.1.15): Fragment of a semi-circle-sectioned axe half form with thickened rim. A conical-shaped sprue can be identified on its upper part. The flat side of the object is porous. Length: 7.4 cm, width: 4.1 cm, 3.4 cm, weight: 130 g.
71. **Axe half form** (ö.2006.1.49, ö.2006.1.52): Fragment of a semicircle-sectioned axe half form. The breakage surface of the object is recent. Length: 5.4 cm, width: 2.5x0.5 cm, weight: 28 g.
72. **Ring half form** (ö.2006.1.17, ö.2006.1.17): Semicircle-sectioned ring half form. The breakage surface of the object are recent. 6.5x6.4 cm, height: 1.8 cm, weight: 52 g.
73. **Ring half form** (ö.2006.1.27, ö.2006.17): Fragment of a ring half form. The breakage surfaces of the object are recent. 6.6x3.5 cm, height: 0.7 cm, weight: 50 g.
74. **Ring half form** (ö.2006.1.27): Semicircle-sectioned fragment of a ring half form. 4.2x2 cm, height: 1.7 cm, weight: 50 g.
75. **Ring half form** (ö.2006.1.52): Semicircle-sectioned fragment of a ring half form. 4x2 cm, height: 1.6 cm, weight: 20 g.
76. **Half form (?)** (ö.2006.1.17): Uncertain fragment of a half form. 3x1.5 cm, height: 0.7 cm, weight: 10 g.
77. **Ingot** (ö.2006.1.42): Oval-sectioned ingot fragment. The breakage surface of the object is porous. 2.8x2.6 cm, height: 1 cm, weight: 40 g.
78. **Ingot** (ö.2006.1.42): Oval-sectioned fragment of an ingot. The breakage surface of the object is porous. 5.6x4.6 cm, height: 0.6 cm, weight: 69 g.
79. **Triangular-shaped ingot** (ö.2006.1.44). Triangular-shaped ingot. A small hole can be seen on the middle of the object. The remains of the sprue are still visible on narrow side of the ingot. 4.1x3.8 cm, height: 1.2 cm, weight: 60 g.
80. **Ingot** (ö.2006.1.44): Triangular-shaped, oval-sectioned ingot. 4.5x2.8 cm, height: 0.9 cm, weight: 45 g.
81. **Rectangular ingot** (ö.2006.1.51): Quadratic-sectioned fragment of a rectangular ingot. 4.2x3 cm, height: 0.7 cm, weight: 35 g.
82. **Rectangular ingot** (ö.2006.1.32): Quadratic-sectioned fragment of a rectangular ingot. The surface of the object is intensively porous. 7.4x5.5 cm, height: 0.7 cm, weight: 201 g.
83. **Rectangular ingot** (ö.2006.1.35): Fragment of a rectangular ingot. 4.4x2.9 cm, height: 1.1 cm, weight: 64 g.
84. **Rectangular ingot** (ö.2006.1.52): Fragment of a narrow rectangular ingot. 1.8 x2.3 cm, height: 0.9 cm, weight: 18 g.
85. **Ingot** (ö.2006.1.33): Oval-sectioned fragment of a rectangular ingot. Flash defect can be seen on its narrow side. 6.4 x6 cm, height: 0.8 cm, weight: 97 g.
86. **Ingot** (ö.2006.1.47): Oval-sectioned ingot. 4.5x1.6 cm, height: 0.9 cm, weight: 25 g.
87. **Ingot** (ö.2006.1.51): Fragment of a triangular-shaped ingot or a rod ingot with flash defect. 3.7x2.6 cm, height: 0.5 cm, weight: 10 g.
88. **Rod ingot** (ö.2006.1.26): Half fragment of a quadratic-sectioned rod ingot. 11x1.4 cm, height: 1.4 cm, weight: 83 g.
89. **Rod ingot** (ö.2006.1.26): Half fragment of a semicircle-sectioned rod ingot. 8x1.2 cm, height: 0.8 cm, weight: 39 g.
90. **Rod ingot** (ö.2006.1.30): Half fragment of a semicircle-sectioned rod ingot. The breakage surface of the object is porous. 6.8x1 cm, height: 0.6 cm, weight: 18 g.
91. **Rod ingot** (ö.2006.1.30): Half fragment of a semicircle-sectioned rod ingot. 7.8x0.9 cm, height: 0.9 cm, weight: 32 g.
92. **Rod ingot** (ö.2006.1.30): Half fragment of a semicircle-sectioned rod ingot. The surface of the object is porous. 8.2x1.4 cm, height: 0.4 cm, weight: 29 g.
93. **Rod ingot** (ö.2006.1.26): Middle edge fragment of a semicircle-sectioned rod ingot. 3.9x1.1 cm, height: 0.8 cm, weight: 17 g.
94. **Rod ingot** (ö.2006.1.26): Middle part of a semicircle-sectioned rod ingot. 3.7x1 cm, height: 0.6 cm, weight: 13 g.
95. **Rod ingot** (ö.2006.1.26): Middle part of a semicircle-sectioned rod ingot. 4.4x1.2 cm, height: 0.9 cm, weight: 27 g.
96. **Rod ingot** (ö.2006.1.26): Middle part of a quadratic-sectioned rod ingot. Porosity is visible along its flat side. 4.4x1 cm, height: 1.5 cm, weight: 42 g.
97. **Rod ingot** (ö.2006.1.26): Central part of a semicircle-sectioned rod ingot. 3x1.2 cm, height: 1.1 cm, weight: 15 g.

98. **Rod ingot** (ö.2006.1.52): Semicircle-sectioned small rod ingot. 4.5x1 cm, height: 1.1 cm, weight: 23 g.
99. **Rod ingot** (ö.2006.1.26): Middle part of a semicircle-sectioned, wider rod ingot. 4.1x1.4 cm, height: 0.7 cm, weight: 28 g.
100. **Rod ingot** (ö.2006.1.22): Wide, semicircle-sectioned rod ingot. A small impact damage can be seen near to its rounded terminals. 9.5x2.2 cm, height: 1 cm, weight: 95 g.
101. **Rod ingot** (ö.2006.1.52): Greater edge fragment of a wider, semicircle-sectioned rod ingot with rounded terminals. 3.2x1.6 cm, height: 0.5 cm, weight: 12 g.
102. **Rod ingot** (ö.2006.1.52): Edge fragment of a wider semicircle-sectioned rod ingot. 3.2x1.6 cm, height: 0.5 cm, weight: 12 g.
103. **Rod ingot** (ö.2006.1.52): Edge fragment of a semicircle-sectioned rod ingot. 1.5x2 cm, height: 1 cm, weight: 11 g.
104. **Rod ingot** (ö.2006.1.52): Middle fragment of a rod ingot. 1.5x1.8 cm, height: 0.7 cm, weight: 7 g.
105. **Oval-shaped ingot** (ö.2006.1.26): Half fragment of a long, semicircle-sectioned, oval-shaped ingot. Misrun defect can be seen along its narrow side. 8x1.6 cm, height: 0.9 cm, weight: 56 g.
106. **Oval-shaped ingot** (ö.2006.1.18): Long, semicircle-sectioned, oval-shaped ingot. 9.8x1.8 cm, height: 0.8 cm, weight: 69 g.
107. **Oval-shaped ingot** (ö.2006.1.30): Long, semicircle-sectioned, oval-shaped ingot. 5.9x1.4 cm, height: 0.7 cm, weight: 19 g.
108. **Oval-shaped ingot** (ö.2006.1.18): Long, semicircle-sectioned, oval-shaped ingot. A possible misrun defect can be seen along its narrow side. 6.4x1.8 cm, height: 0.8 cm, weight: 27 g.
109. **Oval-shaped ingot** (ö.2006.1.28): Half fragment of a triangular-sectioned, oval-shaped ingot. A possible misrun defect can be seen along its narrow side. 6.4x4 cm, height: 1.2 cm, weight: 74 g.
110. **Triangular-shaped ingot** (ö.2006.1.37): Triangular-sectioned ingot. 5x2.6 cm, height: 1.3 cm, weight: 82 g.
111. **Oval-shaped ingot** (ö.2006.1.18): Intact, semicircle-sectioned oval-shaped ingot. 6x2.6 cm, height: 1.3 cm, weight: 54 g.
112. **Oval-shaped ingot** (ö.2006.1.18): Intact, semicircle-sectioned oval-shaped ingot. 8.4x2.8 cm, height: 1.1 cm, weight: 96 g.
113. **Oval-shaped ingot** (ö.2006.1.18): Intact, semicircle-sectioned oval-shaped ingot. 7x2.8 cm, height: 1.2 cm, weight: 105 g.
114. **Oval-shaped ingot** (ö.2006.1.18): Intact, semicircle-sectioned oval-shaped ingot. 7.1x2.4 cm, height: 0.8 cm, weight: 65 g.
115. **Oval-shaped ingot** (ö.2006.1.41): Semicircle-sectioned oval-shaped ingot. 6.5x3.4 cm, height: 1.2 cm, weight: 91 g.
116. **Oval-shaped ingot or bronze lump** (ö.2006.1.52): Semicircle-sectioned oval-shaped ingot or bronze lump. 3.8x1.9 cm, height: 1.4 cm, weight: 24 g.
117. **Plano-convex ingot** (ö.2006.1.23): Intact, small, round plano-convex ingot. Its edges were most likely "chipped". 4x4.5 cm, height: 1.2 cm, weight: 107 g.
118. **Plano-convex ingot** (ö.2006.1.23): Intact, small, round plano-convex ingot. 4.3x3.9 cm, height: 1.3 cm, weight: 85 g.
119. **Plano-convex ingot** (ö.2006.1.23): Intact, small, round plano-convex ingot. A possible tool imprint can be seen on its flat side. 4.7x4.2 cm, height: 1.2 cm, weight: 87 g.
120. **Plano-convex ingot** (ö.2006.1.40): Intact, amorphous round, small plano-convex ingot. The convex part of the object is slightly porous. 4.4x7.3 cm, height: 1.2 cm, weight: 142 g.
121. **Plano-convex ingot** (ö.2006.1.24): Intact, small, round plano-convex ingot. Layered casting is visible on its convex side. 6.6x5.2 cm, height: 1.4 cm, weight: 193 g.
122. **Plano-convex ingot** (ö.2006.1.24): Intact, small, round plano-convex ingot. The convex side of the object is slightly porous. A greater depression can be seen in the middle of its flat side. 6.6x7.6 cm, height: 1.2 cm, weight: 202 g.
123. **Plano-convex ingot** (ö.2006.1.24): Intact small, round plano-convex ingot. The inner structure of the objects is intensively porous. 6x6.8 cm, height: 1.5 cm, weight: 191 g.
124. **Plano-convex ingot** (ö.2006.1.25): Intact, small, flat plano-convex ingot. Crater like porosity can be observed on its convex side. 8.4x8.8 cm, height: 0.9 cm, weight: 219 g.
125. **Plano-convex ingot** (ö.2006.1.25): Small, round plano-convex ingot. 9.1x9.8 cm, height: 1.2 cm, weight: 542 g.
126. **Plano-convex ingot** (ö.2006.1.39): Flat, amorphous, fragmented plano-convex ingot. 9.7x9.9 cm, height: 1 cm, weight: 277 g.
127. **Plano-convex ingot** (ö.2006.1.45): Slightly oval-shaped, half portion of a round plano-convex ingot. The inner structure of the object is solid. 6x8.8 cm, height: 1.5 cm, weight: 252 g.
128. **Plano-convex ingot** (ö.2006.1.46): Half portion of a small, round plano-convex ingot. The breakage- and the flat surface of the object are porous. 4x5.9 cm, height: 1.6 cm, weight: 112 g.
129. **Plano-convex ingot** (ö.2006.1.51): Quarter portion of a small, round plano-convex ingot. The inner structure of the object is solid. 4.3x3 cm, height: 0.7 cm, weight: 53 g.

- 130. Plano-convex ingot** (ö.2006.1.50): Quarter edge portion of a small, round plano-convex ingot. Layered casting can be seen along its breakage surface. 5.1x7.3 cm, height: 1.5 cm, weight: 194 g.
- 131. Plano-convex ingot** (ö.2006.1.51): Edge portion of a plano-convex ingot. The convex side and the breakage surface of the object are slightly porous. 6.2x9.5 cm, height: 3.7 cm, weight: 596 g.
- 132. Plano-convex ingot** (ö.2006.1.51): Quarter edge portion of a flat plano-convex ingot. 4.9x6.8 cm, height: 1.3 cm, weight: 158 g.
- 133. Plano-convex ingot** (ö.2006.1.51): Quarter edge portion of a flat plano-convex ingot. 6.5x5.3 cm, height: 1.4 cm, weight: 134 g.
- 134. Plano-convex ingot** (ö.2006.1.51): Quarter edge portion of a plano-convex ingot. 2.7x4.7 cm, height: 2 cm, weight: 83 g.
- 135. Plano-convex ingot** (ö.2006.1.52): Quarter edge portion of a plano-convex ingot. The breakage surface of the objects is porous. 2.3x3.5 cm, height: 1.5 cm, weight: 39 g.
- 136. Plano-convex ingot** (ö.2006.1.52): Quarter fragment of a plano-convex ingot. 3.5x4.3 cm, height: 0.8 cm, weight: 42 g.
- 137. Plano-convex ingot** (ö.2006.1.52): Quarter portion of a small plano-convex ingot. 2.5x3.4 cm, height: 1 cm, weight: 13 g.
- 138. Plano-convex ingot** (ö.2006.1.52): Fragmented quarter portion of a small plano-convex ingot. Layered casting is visible along its breakage surface. 3.5x3.8 cm, height: 1 cm, weight: 46 g.
- 139. Plano-convex ingot** (ö.2006.1.52): Quarter fragment of a small plano-convex ingot. 2.3x2.7 cm, height: 0.9 cm, weight: 18 g.
- 140. Plano-convex ingot** (ö.2006.1.52): Quarter fragment of a small plano-convex ingot. 3.7x3.8 cm, height: 1.2 cm, weight: 40 g.
- 141. Plano-convex ingot** (ö.2006.1.51): Fragmented quarter edge portion of a plano-convex ingot. 5.7x6.9 cm, height: 1.4 cm, weight: 151 g.
- 142. Plano-convex ingot** (ö.2006.1.51): “Slice” of a plano-convex ingot. The breakage surface of the object is porous. 5x9.1 cm, height: 3.5 cm, weight: 345 g.
- 143. Plano-convex ingot** (ö.2006.1.51): Slice of a plano-convex ingot. The convex surface is porous. 6.5x8.7 cm, height: 3.4 cm, weight: 395 g.
- 144. Plano-convex ingot** (ö.2006.1.51): Slice of a plano-convex ingot. 4.1x5.9 cm, height: 2.3 cm, weight: 131 g.
- 145. Plano-convex ingot** (ö.2006.1.51): Slice of a plano-convex ingot. The breakage surface and the convex side of the object are slightly porous. 4.5x6.6 cm, height: 2.8 cm, weight: 207 g.
- 146. Plano-convex ingot** (ö.2006.1.50): Edge portion of a round plano-convex ingot. Layered casting is visible along its breakage surface. 4.3x7.2 cm, height: 1.2 cm, weight: 143 g.
- 147. Plano-convex ingot** (ö.2006.1.48): Edge portion of a plano-convex ingot. Layered casting can be seen along its breakage surface. The inner structure of the object is solid. 7.9x5.5 cm, height: 1.5 cm, weight: 244 g.
- 148. Plano-convex ingot** (ö.2006.1.51): Edge portion of a flat, plano-convex ingot. The inner structure of the object is solid. 7.7x5.4 cm, height: 1.4 cm, weight: 173 g.
- 149. Plano-convex ingot** (ö.2006.1.51): Edge portion of a plano-convex ingot, the convex side of the object is slightly porous. 6x7.2 cm, height: 3.7 cm, weight: 437 g.
- 150. Plano-convex ingot** (ö.2006.1.51): Edge portion of a plano-convex ingot. The convex- and the breakage surface of the object are porous. 6.4x6.2 cm, height: 3.1 cm, weight: 321 g.
- 151. Plano-convex ingot** (ö.2006.1.51): Edge portion of a plano-convex ingot. The convex- and the breakage surface of the object are porous. 5.3x5.3 cm, height: 3.3 cm, weight: 304 g.
- 152. Plano-convex ingot** (ö.2006.1.51): Edge portion of a plano-convex ingot. 4.8x6.7 cm, height: 2.9 cm, weight: 338 g.
- 153. Plano-convex ingot** (ö.2006.1.52): Edge portion of a plano-convex ingot. The breakage surface of the object is porous. 5.5x6.4 cm, height: 2.2 cm, weight: 113 g.
- 154. Plano-convex ingot** (ö.2006.1.52): Edge portion of a plano-convex ingot. The breakage surface of the objects is porous. 3.1x5.2 cm, height: 1.7 cm, weight: 76 g.
- 155. Plano-convex ingot** (ö.2006.1.51): Edge portion of a plano-convex ingot. 3x5.5 cm, height: 2.5 cm, weight: 131 g.
- 156. Plano-convex ingot** (ö.2006.1.51): Edge portion of a plano-convex ingot. The reverse side of the objects is porous. Layered casting can be seen on the breakage surface of the object. 4.3x5 cm, height: 0.9 cm, weight: 56 g.
- 157. Plano-convex ingot** (ö.2006.1.51): Small edge portion of a plano-convex ingot. 3x3.7 cm, height: 1.2 cm, weight: 31 g.
- 158. Plano-convex ingot** (ö.2006.1.52): Small edge portion of a plano-convex ingot. 2.4x3.1 cm, height: 1 cm, weight: 20 g.
- 159. Plano-convex ingot** (ö.2006.1.52): Edge portion of a plano-convex ingot. 3.1x4.8 cm, height: 1.1 cm, weight: 53 g.
- 160. Plano-convex ingot** (ö.2006.1.52): Edge portion of a plano-convex ingot. 3.4x6 cm, height: 1.2 cm,

- weight: 53 g.
- 161. Plano-convex ingot** (ö.2006.1.51): Edge fragment of a plano-convex ingot. Layered casting can be seen along its breakage surface. 5.3x3.5 cm, height: 1.1 cm, weight: 73 g.
- 162. Plano-convex ingot** (ö.2006.1.52): Edge fragment of a plano-convex ingot. 1.7x3.7 cm, height: 0.9 cm, weight: 15 g.
- 163. Plano-convex ingot** (ö.2006.1.51): Edge fragment of a plano-convex ingot. 4.4x2.8 cm, height: 1.5 cm, weight: 54 g.
- 164. Plano-convex ingot** (ö.2006.1.51): Edge fragment of a plano-convex ingot. 5.4x5 cm, height: 2.4 cm, weight: 291 g.
- 165. Plano-convex ingot** (ö.2006.1.51): Edge fragment of a plano-convex ingot. 5.8x2.9 cm, height: 2 cm, weight: 58 g.
- 166. Plano-convex ingot** (ö.2006.1.52): Edge portion of a flat plano-convex ingot. The inner structure of the object is solid. 1.7x5.5 cm, height: 0.6 cm, weight: 13 g.
- 167. Plano-convex ingot** (ö.2006.52): Edge fragment of a plano-convex ingot. The inner structure of the object is solid. 2.2x2.3 cm, height: 1.3 cm, weight: 12 g.
- 168. Plano-convex ingot** (ö.2006.1.52): Fragment of a flat plano-convex ingot. 3.5x4.4 cm, height: 1 cm, weight: 33 g.
- 169. Plano-convex ingot** (ö.2006.1.52): Edge fragment of a plano-convex ingot. 4.9x2.1 cm, height: 1.4 cm, weight: 33 g.
- 170. Plano-convex ingot** (ö.2006.1.52): Edge fragment of a plano-convex ingot. The breakage surface of the object is porous. 2x4 cm, height: 0.9 cm, weight: 14 g.
- 171. Plano-convex ingot** (ö.2006.1.52): Edge fragment of a plano-convex ingot. 2x3.3 cm, height: 1.2 cm, weight: 12 g.
- 172. Plano-convex ingot** (ö.2006.1.52): Fragmented edge portion of a plano-convex ingot. The convex side and the breakage surface of the object are porous. 3x4.5 cm, height: 2.6 cm, weight: 73 g.
- 173. Plano-convex ingot** (ö.2006.1.51): Middle portion of a plano-convex ingot. Its edges are incomplete. Porosity is visible along its flat side. 5.7x4.9 cm, height: 2.8 cm, weight: 166 g.
- 174. Plano-convex ingot** (ö.2006.1.51): Middle fragment of a plano-convex ingot. The breakage surface of the object is porous. 2.2x3.7 cm, height: 1.7 cm, weight: 37 g.
- 175. Plano-convex ingot** (ö.2006.1.52): Middle fragment of a plano-convex ingot. 2.1x4.2 cm, height: 1.6 cm, weight: 56 g.
- 176. Plano-convex ingot** (ö.2006.1.51): Middle fragment of a plano-convex ingot. 6.7x3.9 cm, height: 1.6 cm, weight: 236 g.
- 177. Plano-convex ingot** (ö.2006.1.51): Middle fragment of a plano-convex ingot. 7x4.4 cm, height: 2.2 cm, weight: 250 g.
- 178. Plano-convex ingot** (ö.2006.1.51): Amorphous middle fragment of a plano-convex ingot. 5.7x3.5 cm, height: 2.3 cm, weight: 164 g.
- 179. Plano-convex ingot** (ö.2006.1.52): Middle fragment of a plano-convex ingot. 3.4x2.9 cm, height: 2.8 cm, weight: 85 g.
- 180. Plano-convex ingot** (ö.2006.52): Middle fragment of a plano-convex ingot. 2.9x4.1 cm, height: 1.8 cm, weight: 45 g.
- 181. Plano-convex ingot** (ö.2006.1.51): Middle fragment of a plano-convex ingot. The breakage surface of the object is porous. 5.1x4 cm, height: 1.4 cm, weight: 73 g.
- 182. Plano-convex ingot** (ö.2006.1.51): Middle fragment of a plano-convex ingot. 4x3.8 cm, height: 2.4 cm, weight: 149 g.
- 183. Plano-convex ingot** (ö.2006.1.51): Middle fragment of a plano-convex ingot. 4.3x3.9 cm, height: 1.8 cm, weight: 70 g.
- 184. Plano-convex ingot** (ö.2006.1.51): Middle fragment of a plano-convex ingot. 4.5x2.4 cm, height: 1.7 cm, weight: 56 g.
- 185. Plano-convex ingot** (ö.2006.1.52): Small middle fragment of a plano-convex ingot. 1.9x2.5 cm, height: 1.6 cm, weight: 28 g.
- 186. Plano-convex ingot** (ö.2006.1.52): Middle fragment of a plano-convex ingot. 1.9x1.4 cm, height: 1.3 cm, weight: 11 g.
- 187. Plano-convex ingot** (ö.2006.1.52): Amorphous edge fragment of a plano-convex ingot. 3.8x4.1 cm, height: 1.6 cm, weight: 37 g.
- 188. Plano-convex ingot/bronze lump** (ö.2006.1.52): Fragment of a flat plano-convex ingot or bronze lump. Its edge is rounded and amorphous. 5.6x8.3 cm, height: 1 cm, weight: 151 g.
- 189. Plano-convex ingot/bronze lump** (ö.2006.1.51): Oval-shaped plano-convex ingot or bronze lump. 3.6x5.2 cm, height: 1.4 cm, weight: 65 g.
- 190. Plano-convex ingot/bronze lump** (ö.2006.1.52): Amorphous plano-convex ingot or bronze lump. 5.1x4.4 cm, height: 1.5 cm, weight: 95 g.
- 191. Plano-convex ingot/bronze lump** (ö.2006.1.52): Amorphous fragment of a plano-convex ingot or bronze lump. The convex side and the breakage surface of the object are porous. 3.9x6 cm, height: 0.7 cm, weight: 54 g.
- 192. Plano-convex ingot/bronze lump** (ö.2006.1.52): Fragment of a plano-convex ingot or bronze lump. 2.2x3.4 cm, height: 1.1 cm, weight: 29 g.
- 193. Plano-convex ingot/bronze lump** (ö.2006.1.52):



- Rounded edge fragment of a small plano-convex ingot or bronze lump. The surface of the object is porous. 3x3.8 cm, height: 0.5 cm, weight: 29 g.
194. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous bronze lump. 4.7x6.1 cm, height: 0.9 cm, weight: 73 g.
195. **Bronze lump** (ö.2006.1.52): Oval-shaped bronze lump. 2x3.9 cm, height: 1.9 cm, weight: 28 g.
196. **Bronze lump** (ö.2006.1.52): Flat, round bronze lump. 3x3.3 cm, height: 0.8 cm, weight: 33 g.
197. **Bronze lump** (ö.2006.1.51): Flat, oval-shaped bronze lump. 6.1x3.8 cm, height: 0.7 cm, weight: 42 g.
198. **Bronze lump** (ö.2006.1.52): Amorphous round bronze lump. 3.7x2.9 cm, height: 0.7 cm, weight: 21 g.
199. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 3.2x3.6 cm, height: 1 cm, weight: 22 g.
200. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 3.8x2.5 cm, height: 0.8 cm, weight: 26 g.
201. **Bronze lump** (ö.2006.1.52): Amorphous round bronze lump. 4x3.1 cm, height: 1.2 cm, weight: 35 g.
202. **Bronze lump** (ö.2006.1.52): Fragment of a bronze lump. 1.8x2.4 cm, height: 1.1 cm, weight: 15 g.
203. **Bronze lump** (ö.2006.1.52): Amorphous round bronze lump. 2.2x3.2 cm, height: 1 cm, weight: 11 g.
204. **Bronze lump** (ö.2006.1.52): Fragment of a bronze lump. 1.8x2.6 cm, height: 1.9 cm, weight: 18 g.
205. **Bronze lump** (ö.2006.1.52): Amorphous round bronze lump. 2.6x2.9 cm, height: 0.9 cm, weight: 22 g.
206. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 1.8x2 cm, height: 1.6 cm, weight: 14 g.
207. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 1.9x2.2 cm, height: 1.5 cm, weight: 12 g.
208. **Bronze lump** (ö.2006.1.52): Flat bronze lump. 2.7x3.8 cm, height: 0.5 cm, weight: 21 g.
209. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous, flat bronze lump. 2.4x3.5 cm, height: 0.7 cm, weight: 15 g.
210. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous, flat bronze lump. 2.5x2.5 cm, height: 0.9 cm, weight: 14 g.
211. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous, flat bronze lump. 2.1x3.1 cm, height: 0.7 cm, weight: 14 g.
212. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous, flat bronze lump. 2.1x2.7 cm, height: 0.8 cm, weight: 13 g.
213. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous, flat bronze lump. 1.8x4.3 cm, height: 1.2 cm, weight: 13 g.
214. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous, bronze lump. 3.4x2.5 cm, height: 1.5 cm, weight: 46 g.
215. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous, bronze lump. 2.2x2.8 cm, height: 0.7 cm, weight: 10 g.
216. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous, bronze lump. 1.6x2.3 cm, height: 0.8 cm, weight: 9 g.
217. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous, bronze lump. 3.6x1.7 cm, height: 0.6 cm, weight: 12 g.
218. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous, bronze lump. 2.4x3.2 cm, height: 0.3 cm, weight: 8 g.
219. **Bronze lump** (ö.2006.1.52): Fragment of an amorphous, bronze lump. 2.3x1.5 cm, height: 0.6 cm, weight: 10 g.
220. **Bronze lump** (ö.2006.1.52): Fragment of a flat bronze lump. 1.8x3.5 cm, height: 0.5 cm, weight: 8 g.
221. **Bronze lump** (ö.2006.1.52): Fragment of a flat bronze lump. 2.2x2.4 cm, height: 0.4 cm, weight: 7 g.
222. **Bronze lump** (ö.2006.1.52): Fragment of a bronze lump. 1.5x2.2 cm, height: 0.9 cm, weight: 7 g.
223. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 3.9x1.9 cm, height: 1 cm, weight: 29 g.
224. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 1.3x2.1 cm, height: 1.4 cm, weight: 10 g.
225. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 2.9x1.3 cm, height: 1.3 cm, weight: 6 g.
226. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump or middle fragment of a plano-convex ingot. 1.8x2.7 cm, height: 1.8 cm, weight: 23 g.
227. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 2.4x1.3 cm, height: 0.8 cm, weight: 4 g.
228. **Bronze lump** (ö.2006.1.52): Rounded bronze lump. 2.1x1.4 cm, height: 1.5 cm, weight: 12 g.
229. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 3.3x4.8 cm, height: 1.3 cm, weight: 67 g.
230. **Bronze lump** (ö.2006.1.25): Amorphous, quadratic-sectioned bronze lump. 3.7x3.7 cm, height: 3.3 cm, weight: 119 g.
231. **Bronze lump** (ö.2006.1.25): Flat, bronze lump. 6x4.6 cm, height: 0.9 cm, weight: 80 g.
232. **Bronze lump** (ö.2006.1.51): Flat bronze lump. 2.6x4.9 cm, height: 0.9 cm, weight: 25 g.
233. **Bronze lump** (ö.2006.1.51): Amorphous fragment of a bronze lump. 3.2x4.9 cm, height: 0.5 cm, weight: 38 g.
234. **Bronze lump** (ö.2006.1.52): Flat, oval-shaped bronze lump. 3x4.5 cm, height: 0.4 cm, weight: 21 g.
235. **Bronze lump** (ö.2006.1.51): Flat, round bronze lump. 3.8x4.9 cm, height: 0.5 cm, weight: 35 g.
236. **Bronze lump** (ö.2006.1.52): Small, flat bronze lump. 2.2x1.6 cm, height: 0.1 cm, weight: 1 g.
237. **Bronze lump** (ö.2006.1.13): Flat, fragmented bronze lump. 3.9x9.8 cm, height: 0.5 cm, weight: 67 g.

238. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 3x3.7 cm, height: 1.1 cm, weight: 34 g.
239. **Bronze lump** (ö.2006.1.52): Amorphous fragment of a bronze lump. 1.9x2.8 cm, height: 0.6 cm, weight: 8 g.
240. **Bronze lump** (ö.2006.1.52): Amorphous fragment of a bronze lump. 3.1x1.4 cm, height: 0.8 cm, weight: 7 g.
241. **Bronze lump** (ö.2006.1.52): Amorphous fragment of a bronze lump. 2x1.4 cm, height: 0.5 cm, weight: 4 g.
242. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 2.8x1.8 cm, height: 0.7 cm, weight: 7 g.
243. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 2.4x1.8 cm, height: 0.5 cm, weight: 3 g.
244. **Bronze lump** (ö.2006.1.52): Amorphous bronze lump. 2.2x1.8 cm, height: 0.7 cm, weight: 6 g.
245. **Bronze lump** (ö.2006.1.51): Flat, long bronze bronze lump. 2.9x7.9 cm, height: 0.7 cm, weight: 41 g.
246. **Bronze lump** (ö.2006.1.52): Small, flat bronze lump, its edge is rounded. 1.8x3 cm, height: 0.6 cm, weight: 6 g.
247. **Bronze lump** (ö.2006.1.52): Small, flat, thin bronze bronze lump. 3.2x1 cm, height: 0.4 cm, weight: 4 g.
248. **Sprue** (ö.2006.1.52): Conical-shaped, small, broken sprue. The structure of the object is porous. Length: 1.4 cm, width: 2.2 cm, 1.2 cm, weight: 8 g.
249. **Sprue** (ö.2006.1.52): Rectangular-shaped sprue. The reverse surface of the object is slightly porous. Length: 4.1 cm, width: 1.5 cm, 2.8 cm, weight: 35 g.
250. **Sprue** (ö.2006.1.52): Semicircle-sectioned sprue with two runners. The surface of the object is solid. Length: 4.1 cm, width: 2.5 cm, 3.4 cm, weight: 63 g.
251. **Sprue** (ö.2006.52): Semicircle-sectioned sprue fragment. Its breakage surface is intensively porous. Length: 2.2 cm, width: 2.4 cm, 2.8 cm, weight: 20 g.
252. **Sprue** (ö.2006.52): Semicircle-sectioned sprue. Gas bubble is visible in its reverse surface. Length: 3.3 cm, width: 2.9 cm, 3.5 cm, weight: 37 g.
253. **Sprue** (ö.2006.25): Ribbed, semicircle-sectioned sprue. Length: 3.5 cm, width: 1 cm, 2.3 cm, weight: 21 g.
254. **Sprue** (ö.2006.52): Rectangular-shaped sprue. Length: 2.9 cm, width: 2.1 cm, 2.6 cm, weight: 35 g.
255. **Sprue** (ö.2006.21): Semicircle-sectioned sprue. Its surface is solid. Length: 3.9 cm, width: 2.8 cm, 4.3 cm, weight: 48 g.
256. **Sprue** (ö.2006.1.10): Fragment of a ribbed sprue. Length: 2.5 cm, width: 2.5 cm, 2.4 cm, weight: 13 g.
257. **Sprue** (ö.2006.1.21): Semicircle-sectioned sprue with possible traces of sawing. Length: 3 cm, width: 3.6 cm, 4.2 cm, weight: 103 g.
258. **Sprue** (ö.2006.1.64): Conical-shaped sprue. Length: 3.7 cm, width: 4.5 cm, 2.4 cm, weight: 83 g.
259. **Sprue** (ö.2006.1.52): Quadratic-sectioned sprue with remains of four runners. Length: 4 cm, width: 4.2 cm, 3.7 cm, weight: 216 g.
260. **Sprue** (ö.2006.1.21): Small, semicircle-sectioned sprue. The reverse side is porous. Length: 3.3 cm, width: 1.9 cm, 2.9 cm, weight: 26 g.
261. **Sprue** (ö.2006.1.36): Semicircle-sectioned sprue. Length: 4.4 cm, width: 3 cm, 2 cm, weight: 52 g.
262. **Sprue** (ö.2006.1.36): Semicircle-sectioned sprue with remains of two runners. Length: 4.5 cm, width: 2.5 cm, 2.6 cm, weight: 49 g.
263. **Sprue** (ö.2006.1.52): Small fragment of a rectangular-shaped sprue. The surface of the object is porous. Length: 1.7 cm, width: 2.8 cm, 1.5 cm, weight: 10 g.

#### *Lists of parallels*

##### *List 1. Solid-hilted, short swords (Cat. no. 1, Prejmer type swords)*

1. **Debrecen-Látókép 2** (Hungary, Hajdú-Bihar) – hoard: KEMENCZEI 1991, 16, Taf. 6, 28.
2. **Dillingen an der Donau** (Germany, Bavaria) – stray find: MÜLLER-KARPE 1961, 103, Taf. 24, 7; QUILLFELDT 1995, 183–184, Taf. 61, 179.
3. **Hajdúböszörmény 1** (Hungary, Szabolcs-Szatmár-Bereg) – hoard: MOZSOLICS 1984a, Abb. 3, 1–5.
4. **Hejőszalonta** (Hungary, Borsod-Abaúj-Zemplén) – hoard: Kemenczei 1991, 44, Taf. 3, 166.
5. **Hradisko 1** (Czech Republic, Kroměříž) – hoard: SALAŠ 2005a, SALAŠ 2005b, 266, Tab. 6, 30.
6. **Kántorjánosi** (Hungary, Szabolcs-Szatmár-Bereg) – hoard: KEMENCZEI 1991, 14–15, Taf. 5, 21.
7. **Komjatná** (Slovakia, Ružomberok) – hoard: NOVOTNÁ 2014, 74, Taf. 26, 116.
8. **Košice-Barca** (Slovakia, Košice) – stray find: NOVOTNÁ 2014, 75, Taf. 26, 117.
9. **Krasznokvajda** (Hungary, Borsod-Abaúj-Zemplén) – hoard: KEMENCZEI 1991, 16, Taf. 7, 31–32.
10. **Mátészalka** (Hungary, Szabolcs-Szatmár-Bereg) – stray find: KEMENCZEI 1991, 15, Taf. 5, 22.
11. **Mátészalka** (Hungary, Szabolcs-Szatmár-Bereg) – looted hoard: V. SZABÓ 2013, Fig. 16.
12. **Nassig** (Germany, Baden-Württemberg) – “grave”: QUILLFELDT 1995, 185, Taf. 61, 180.
13. **Nagyobsza** (Hungary, Baranya) – hoard.
14. **Otok-Privlaka** (Croatia, Otok) – hoard: VINSKI-GASPARINI 1973, 217, Taf. 27, 1.
15. **Paszab** (Hungary, Szabolcs-Szatmár-Bereg) – hoard: KEMENCZEI 1991, 16, 18, Taf. 7, 33, Taf. 9, 45.
16. **Prejmer** (Romania, Braşov) – hoard: BADER 1991, 136, Taf. 36, 328.
17. **Recsk** (Hungary, Heves) – hoard: KEMENCZEI 1991, 15, Taf. 6, 23–24.
18. **Sajószentpéter** (Hungary, Borsod-Abaúj-Zemplén)

- stray find: KEMENCZEI 1991, 43, Taf. 37, 159.
19. **Szécsény** (Hungary, Nógrád) – stray find: KEMENCZEI 1991, 43, Taf. 37, 160.
  20. **Téglás** (Hungary, Hajdú-Bihar) – hoard: KEMENCZEI 1991, 16, Taf. 7, 33.
  21. **Tiszabездéd** (Hungary, Szabolcs-Szatmár-Bereg) – hoard: KEMENCZEI 1991, 18, Taf. 8, 47, Taf. 10, 48–49.
  22. **Tiszakeszi** (Hungary, Borsod-Abaúj-Zemplén) – stray find: KEMENCZEI 1991, 16, Taf. 7, 35.
  23. **Tuhár** (Slovakia, Lučenec) – stray find: NOVOTNÁ 2014, 75, Taf. 26, 118.
  24. **Zsujta** (Hungary, Borsod-Abaúj-Zemplén) – hoard: KEMENCZEI 1991, 15, Taf. 6, 25.
  25. **Vojany** (Slovakia, Michalovce) – stray find: NOVOTNÁ 2014, 74, Taf. 25, 115A.
  26. **Hungary** (collection of the Hungarian National Museum) – unprovenanced: KEMENCZEI 1991, 15, Taf. 6, 26.
  27. **Hungary** (collection of the MoD. Military History Institute and Museum) – unprovenanced.

*List 2. Socketed axes with thickened rim (Cat. no. 29)*

1. **Glod** (Romania, Maramureş) – hoard: PETRESCU-DÎMBOVIȚA 1978, 149, Taf. 258c, 6
2. **Herrnbaumgarten** (Austria, Mistelbach) – hoard: MAYER 1977, 195–196, Taf. 80, 1109.
3. **Nagydobsza** (Hungary, Baranya) – hoard.
4. **Neszmély** (Hungary, Komárom-Esztergom) – settlement: PATEK 1961, 60, Taf. XXVIII, 8.
5. **Nové Město nad Metují 1** (Czech Republik, Hradec Králové) – hoard: KYTLICOVÁ 2007, 286, Taf. 182c.2.
6. **Oleshnyk 1** (Ukraine, Vinogradovo) – hoard: KOBAL’ 2000, 91, Taf. 88, 21, 23–24, 26.
7. **Poroszló-Aponhát** (Hungary, Heves) – settlement, mould: PATAY 1976, Abb. 4, 2.
8. **Sîngeorgiu de Pădure** (Romania, Mureş) – stray find: PETRESCU-DÎMBOVIȚA 1978, 157–158, Taf. 275b, 1.
9. **Șpălnaca 1** (Romania, Alba) – hoard: PETRESCU-DÎMBOVIȚA 1978, 145–146, Taf. 244, 11.
10. **Tállya** (Hungary, Borsod-Abaúj-Zemplén) – hoard: V. SZABÓ 2011a, Taf. 4, 2.
11. **Tîrgu Mureş** (Romania, Mureş) – hoard: PETRESCU-DÎMBOVIȚA 1978, 150, Taf. 264, 14.
12. **Unprovenanced** (Collection of Samuel Egger): SOROCEANU 2011, Pl. III, 28.
13. **Unprovenanced** (Italy, Armeria di Castel Sant’Angelo, Roma): CARANCINI 1984, 144, Tav. 120, 3720.

*List 3. Socketed axe with crescent-shaped rim (Cat. no. 9)*

14. **Ecseg** (Hungary, Nógrád) – hoard: KEMENCZEI 1984,

146–147, Taf. CXVIa, 31.

15. **Kántorjánosi** (Hungary, Szabolcs-Szatmár-Bereg) – hoard: MOZSOLICS 2000, 51, Taf. 42, 1, 4.
3. **Nagydobsza** (Hungary, Baranya) – hoard.
16. **Nádudvar-Halomzug 2** (Hungary, Hajdú-Bihar) – hoard: MOZSOLICS 2000, 57–59, Taf. 56, 16.
17. **Nyírtura 2** (Hungary, Szabolcs-Szatmár-Bereg) – hoard: MOZSOLICS 2000, 63–64, Taf. 70, 1.
18. **Polgár** (Hungary, Hajdú-Bihar) – hoard: MOZSOLICS 2000, Taf. 74, 3.
19. **Rohod 3** (Hungary, Szabolcs-Szatmár-Bereg) – hoard: KEMENCZEI 1984, 182, 428, Taf. CCXVIII, 19.
20. **Tiszakarád 2** (Hungary, Borsod-Abaúj-Zemplén) – hoard: MOZSOLICS 2000, 85, Taf. 108, 2, 9.
21. **Zemplínske Kopčany** (Slovakia, Michalovce) – hoard: NOVOTNÁ 2014, 76, Taf. 26, 120.

*List 4. Rectangular ingots in the Carpathian Basin*

1. **Baks-Temetőpart** (Hungary, Csongrád) – settlement: V. SZABÓ 2011b, 6. kép 1.
2. **Bátaszék** (Hungary, Tolna) – hoard: MOZSOLICS 1985, 95, Taf. 269, 18.
3. **Beremend/Siklósnagyfalu** (Hungary, Baranya) – hoard: MOZSOLICS 1985, 94–96, Taf. 252, 2–4, 6.
4. **Bizovac** (Croatia, Osijek-Baranja) – hoard: VINSKI-GASPARINI 1973, 212, Tab. 35, 5.
5. **Birján** (Hungary, Baranya) – hoard: MOZSOLICS 1985, 98–99, Taf. 68, 9.
6. **Bodrogkeresztúr 2** (Hungary, Borsod-Abaúj-Zemplén) – private collection: PRIMAS-PERNICKA 1998, 56, Abb. 20, 3.
7. **“Hermann Historica”** – looted hoard: [http://www.hermann-historica.de/auktion/hhm60.pl?f=NR\\_LOT&c=2193&t=temartic\\_A\\_D&db=kat60\\_a.txt](http://www.hermann-historica.de/auktion/hhm60.pl?f=NR_LOT&c=2193&t=temartic_A_D&db=kat60_a.txt) (2013.02.10. 10:45).
8. **Hódmezővásárhely** (Hungary, Csongrád) – stray find: BANNER 1944–1945, 30, Taf. XI, 10.
9. **Kemecse 3** (Hungary, Szabolcs-Szatmár-Bereg) – hoard: JÓSA–KEMENCZEI 1965, 34, Taf. XXX, 127.
10. **Lovasberény** (Hungary, Fejér) – hoard: MOZSOLICS 1985, 144–145, Taf. 245, 13, 14, 17.
11. **Nagydém** (Hungary, Veszprém) – hoards (two unpublished finds which were documented during our PhD research): HAMPEL 1893.
12. **Nagydobsza** (Hungary, Baranya) – hoard.
14. **Oleshnyk 2** (Ukraine, Vinogradovo) – hoard: KOBAL’ 2000, 91–92, Taf. 67, 7.
15. **Pécs-Jakabhegy** (Hungary, Baranya) – settlement: PRIMAS-PERNICKA 1998, 55, Abb. 2, 1.
16. **Tiszabecs** (Hungary, Szabolcs-Szatmár-Bereg) – hoard: PRIMAS-PERNICKA 1998, 56, Abb. 20, 4.
17. **Vát** (Hungary, Vas) – settlement: ILON 2015, 60, Fig. 33. 3–4.

18. **Velem** (Hungary, Vas) – hoard: MISKE 1907, Taf. XX, 4, 6–7.

List 5. *Oval-shaped ingots*

19. **Aparthant** (Hungary, Tolna) – settlement: MOZSOLICS 1984b, 49.
2. **Bátaszék** (Hungary, Tolna) – hoard: MOZSOLICS 1985, 95, Taf. 269, 3–7.
3. **Beremend/Siklósnagyfalu** (Hungary, Baranya) – hoard: MOZSOLICS 1985, 95–96, Taf. 252, 13–17, Taf. 254, 8–9.
20. **Biatorbágy-Herceghalom** (Hungary, Pest) – hoards: MOZSOLICS 1985, 127–128, Taf. 237, 28–30.
21. **Blučina 4** (Czech Republic, Brno-Venkov) – hoard: SALAŠ 2005a, 289–292; SALAŠ 2005b, Tab. 60, 77.
22. **Bokod** (Hungary, Komárom-Esztergom) – hoard: PATAI 1964, 2. ábra 3.
23. **Borzhava** (Ukraine, Beregovo) – hoard: KOBAL' 2000, 76, Taf. 55a, 48–49.
24. **Dezmir** (Romania, Cluj) – hoard: PETRESCU-DÎMBOVIȚA 1978, 137, Taf. 218, 26.
25. **Dibrova** (Ukraine, Tjačevo) – hoard: KOBAL' 2000, 79, Taf. 32, 36.
26. **Gușterița 2** (Romania, Sibiu) – hoard: PETRESCU-DÎMBOVIȚA 1978, 120–122, Taf. 118a, 371, 377.
27. **Hočko Pohorje** (Slovenia, Hoče-Slivnica) – hoard: ČERČE–ŠINKOVEC 1995, 177–195, Pl. 86, 207.
28. **Jászkarajenő** (Hungary, Pest) – hoard: MOZSOLICS 1985, 129–130.
9. **Kemece 3** (Hungary, Szabolcs-Szatmár-Bereg) – hoard: MOZSOLICS 1985, 132–134, Taf. 187, 4–10.
10. **Lovasberény** (Hungary, Fejér) – hoard: MOZSOLICS 1985, 144–145, Taf. 245, 22.
29. **Márok** (Hungary, Baranya) – hoard: MOZSOLICS 1985, 146–149, Taf. 95, 14.
12. **Nagydobsza** (Hungary, Baranya) – hoard.
30. **Öreglak** (Hungary, Somogy) – hoard: MOZSOLICS 1985, 163–165, Taf. 76, 12, Taf. 84, 22.
31. **Uioara de Sus** (Romania, Alba) – hoard: PETRESCU-DÎMBOVIȚA 1978, 105, Taf. 42, 14–15.
32. **Panticeu** (Romania, Cluj) – hoard: PETRESCU-DÎMBOVIȚA 1978, 105, Taf. 41b, 23.
33. **Praha-Dejvice 1** (Czech Republic, Praha) – hoard: KYTLICOVÁ 2007, 294, Taf. 39, 24.
34. **Prilog** (Romania, Satu Mare) – hoard: PETRESCU-DÎMBOVIȚA 1978, 105, Taf. 42, 14–15.
35. **Sárazsadány** (Hungary, Borsod-Abaúj-Zemplén) – hoard: MOZSOLICS 1985, 184, Taf. 170, 13–14.
36. **Sfăraș** (Romania, Sălaj) – hoard: PETRESCU-DÎMBOVIȚA 1978, 126–127, Taf. 134, 28.
37. **Suskovo** (Ukraine, Svaljava) – hoard: KOBAL' 2000, 95–96, Taf. 74, 31.
38. **Tatabánya-Bánhida** (Hungary, Komárom-Esztergom) – hoard: KEMENCZEI 1983, 61, 2. kép 20.
39. **Tiszadob** (Hungary, Szabolcs-Szatmár-Bereg) – hoard: KEMENCZEI 1984, 187, 399, Taf. CLXXXIX, 9, 15.
40. **Valea Iui Mihai** (Romania, Alba) – hoard: PRIMAS-PERNICKA 1998, 52, Abb. 19, 1.
41. **Zvolen-Pustý A** (Slovakia, Zvolen) – hoard: NOVOTNÁ 1970b, 124, Taf. VII.

Notes

- 1 Special thanks are due to István Ecsedy and Csilla Gáti for the opportunity of studying and evaluating the artefacts. I am also grateful to Gábor V. Szabó for his supervising, help and inspiring advice. Special thanks go to Ádám Vecsey for his expertise on the technological traits of the hoard. The publication was supported by the Hungarian Scientific Research Fund (OTKA K 112427 project). The photography of the objects was partly carried out by Károly Kozma photo artist (Damjanich János Museum, Szolnok) and the author. Grateful thanks are due to Lóránt Vass for the linguistic revision of the text.
- 2 The macroscopic observations were made with high resolution pictures and a dnt DigiMicro Mobile microscope camera.
- 3 I am indebted to János Dani (Déri Museum, Debrecen) for the opportunity of studying artefacts and publishing the preliminary results of their macroscopic examination.
- 4 The identification of Cat. nos. 55–56 and 57 is uncertain because these fragments can also be interpreted as socketed hammers.
- 5 Cat. no. 25 specimen can also be assigned into this type, although its fragmentary state made this classification uncertain.
- 6 E.g. Debelo brdo 1, Drenov do, Mačkovac, Monj (KÖNIG 2004, 195–197, 207–208, Taf. 49, 5, Taf. 51, 3, Taf. 55, 1, Taf. 58, 5).
- 7 E.g. Suatu, Sîmbăta Nouă 1, Țelna (PETRESCU-DÎMBOVIȚA 1978, 144, 146–148, Taf. 242, 10, Taf. 252, 9, Taf. 249, 5).
- 8 These axes can be associated with V. Dergačev's so called "Palotabozsok type" axes. We do not use this term in this paper intentionally due to its morphological diversity (DERGAČEV 2002, 176, Taf. 128).
- 9 We intentionally left out some less identifiable casting defect types which we would like to analyse in the second study.

- 10 Similar damages are suspected to have been carried out with bronze chisels (SZABÓ 1993, 199; PANČIKOVÁ 2008, 152; NOVÁK–VÁCZI 2010, 89–99; REZI 2011, 316; SZABÓ 2013, 59, Fig. 8, 1–13).
- 11 Socketed hammers with similar V rib patterns and moulds are known from the following sites: Adrian (BERCIU–POPA 1967, 78, Abb. 2, 16a-c); Aiud (GOGÁLTAN 2005, 346, Taf. I, 2); Aiud 3 (GOGÁLTAN 2005, 346, Taf. I, 1–3); Bogata (GOGÁLTAN 2005, 349, Taf. III, 10); Budapest area (FOLTINY 1969, 50, Pl. 14, 20, 22); Draßburg (MAYER 1977, 223, Taf. 89, 1330); Földdeák (KEMENCZEI 1996a, Abb. 14a, 3); Heusenstamm (KIBBERT 1984, Taf. 93a, 4); Hódmezővásárhely-Gorzsa (V. SZABÓ 1996, 15, 23. kép 1); Lengyeltóti 2 (WANZEK 1992, Taf. 1, 3, 6–7, Taf. 8, 5–7); Lengyeltóti 3 (MOZSOLICS 1985, 142–143, Taf. 109, 36–38); Loučka (SALAŠ 2014, 64, Obr. 14, 4); Offenbach (MÜLLER-KARPE 1959a, 296; MÜLLER-KARPE 1959b, Taf. 178c, 1); Neckargartach (PARET 1954, 9, Taf. 8, 10–11); Uioara de Sus (GOGÁLTAN 2005, 362, Taf. IX, 55, Taf. X, 57–58); Uriu (HAMPEL 1886, X. tábla 13); St. Andrä a. d. Traisen (MAYER 1977, 223, Taf. 89, 1329); Velem (MISKE 1907, Taf. XXIV, 2); Tiszaföldvár (HAMPEL 1886, IV. tábla 4–5, 9–10); Vidovice (KÖNIG 2004, 227, Taf. 5, 9); Zvoleněves (HRALOVÁ–HRALA 1971, Obr. 4, 2).
- 12 In the scheme of F. Gogáltan the Cat. nos. 51–52 are close to 5a type (socketed hammers with hexagon-cross section), and the Cat. no. 54 to his 6<sup>th</sup> type (GOGÁLTAN 2005, 369). According to B. Nessel’s functional typology, the Cat. nos. 51–52 specimens can be sorted into the first function group’s 1<sup>st</sup> type and the Cat. no. 54 specimen into the 2<sup>nd</sup> type (NESSEL 2008, 74–75). Two fine parallels can be mentioned for the Cat. no. 52 specimen: Zvolen (NOVOTNÁ 1970a, 99, Taf. 43, 802) and Plenița (PETRESCU-DÎMBOVIȚA 1978, Taf. 222c, 1).
- 13 For detailed evaluation and functional interpretations, see the following cited articles (MOZSOLICS 1975, 9; MOZSOLICS 1984b, 39; WANZEK 1989, 37–38; KOBAL 2000, 86; DIETRICH 2011, 81; TARBAY 2014, 213–218).
- 14 St. Andrä a. d. Traisen (MAYER 1977, 223, Taf. 89, 1329); Neckargartach (PARET 1954, 9, Taf. 8, 10–11); Tiszaföldvár (HAMPEL 1886, IV. tábla 4–5, 9–10); Zvoleněves (HRALOVÁ HRALA 1971, Obr. 4, 2); Velem (MISKE 1907, Taf. XXIV, 2).
- 15 E. g. Aiud (GOGÁLTAN 2005, 346, Taf. I, 2); Lengyeltóti 3 (MOZSOLICS 1985, 142–143, Taf. 109, 36, 38); Boljanić (KÖNIG 2004, 191–194, Taf. 19, 32, 38).
- 16 The ring half forms of the Lovasberény hoard were not catalogued in our previous article (MOZSOLICS 1985, 144–145).
- 17 It is also possible that some of these breakages are recent, results of the unprofessional excavation but cannot be determined due to the restored state of the objects.
- 18 The identification of the Cat. no. 116 objects as oval-shaped ingot is uncertain, it can be also interpreted as a bronze lump.
- 19 In the present study we intended to use the terminology of M. Primas and E. Pernicka (PRIMAS–PERNICKA 1998, 52–54).
- 20 It should be noted that some minor breakages of the objects could have been of recent date due to the current fragile state of the object. One should not exclude the possibility either that the larger breakages were also caused by recent damages. This hypothesis cannot be further argued since the state of the unrestored object has not been documented. In the frame of my PhD research some recent breakages were observed on unrestored plano-convex ingots from the Szombathely-Jáki út hoard which were shattered into many pieces by the finders.
- 21 Cat. nos. 188–193 objects can be irrelevant, small parts of plano-convex ingot as well.
- 22 Or commonly known in the archaeological literature as “casting jets” or “Gußzapfen” (HAMPEL 1896, 190, 199; MISKE 1907, 59–60; MOZSOLICS 1984b, 27–28; JANTZEN 2008, 215; KUIJPERS 2008, 92).
- 23 This work is still in progress in the frame of OTKA K 112427 project.
- 24 It should be emphasized that the original state of the objects before restoration were not been documented. The recent breakage surfaces (Cat. nos. 30, 37, 43, 45, 48, 71–73) suggest that the original assemblage had been probably made up of less fragmented objects.
- 25 The find spot was published later as Beremend but from an administrative point of view it belongs to Siklónagyfalú. Archaeological Data Warehouse of the Janus Pannonius Museum (Inventory Number: 2742–2011).

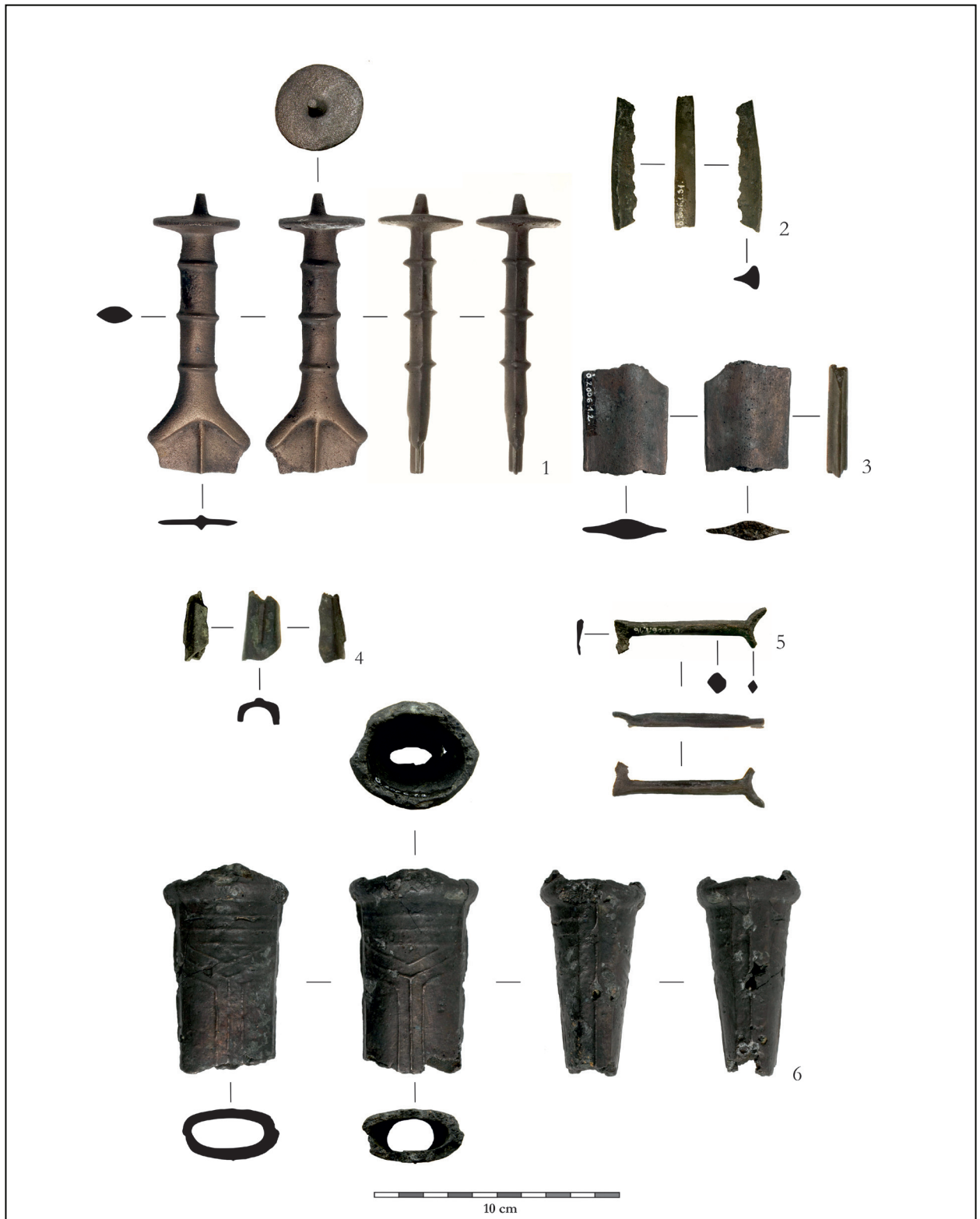


Fig. 11 Objects from the hoard. 1–3: Sword fragments; 4: Spear fragment; 5: Razor or knife fragment; 6: Upper fragment of a socketed axe

11. kép A bronzdepó tárgyai. 1–3: Kard töredékek; 4: Lándzsa töredék; 5: Borotva vagy kés töredék; 6: Tokosbalta felső részének töredéke.



Fig. 12 Objects from the hoard. 7–8: Socketed axes  
12. kép A bronzdepó tárgyai. 7–8: Tokosbalták

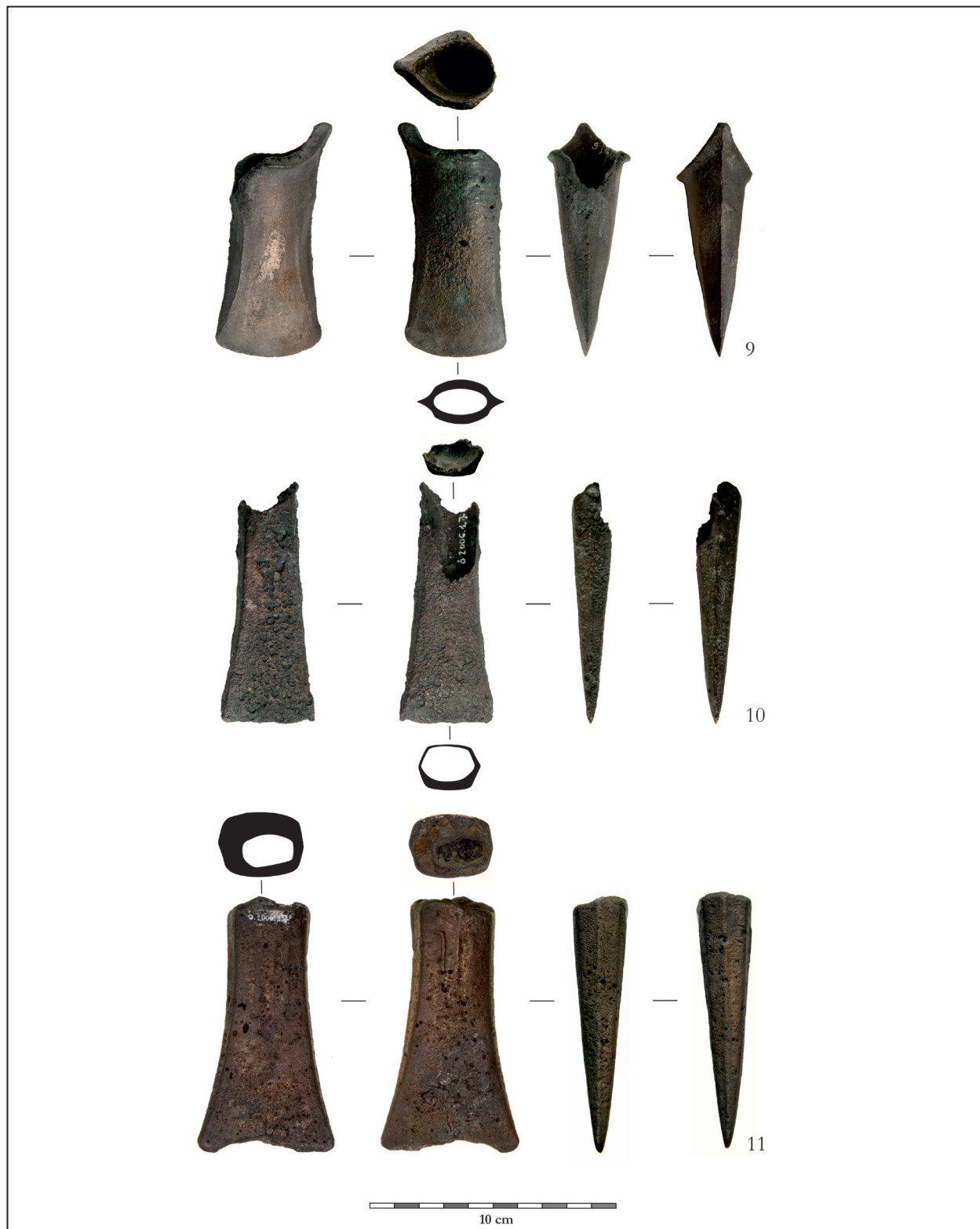


Fig. 13 Objects from the hoard. 9–11: Socketed axes  
 13. kép A bronzdepó tárgyai. 9–11: Tokosbalták





Fig. 14 Objects from the hoard. 12–17: Socketed axe fragments  
14. kép A bronzdepó tárgyai. 12–17: Tokosbalta töredékek

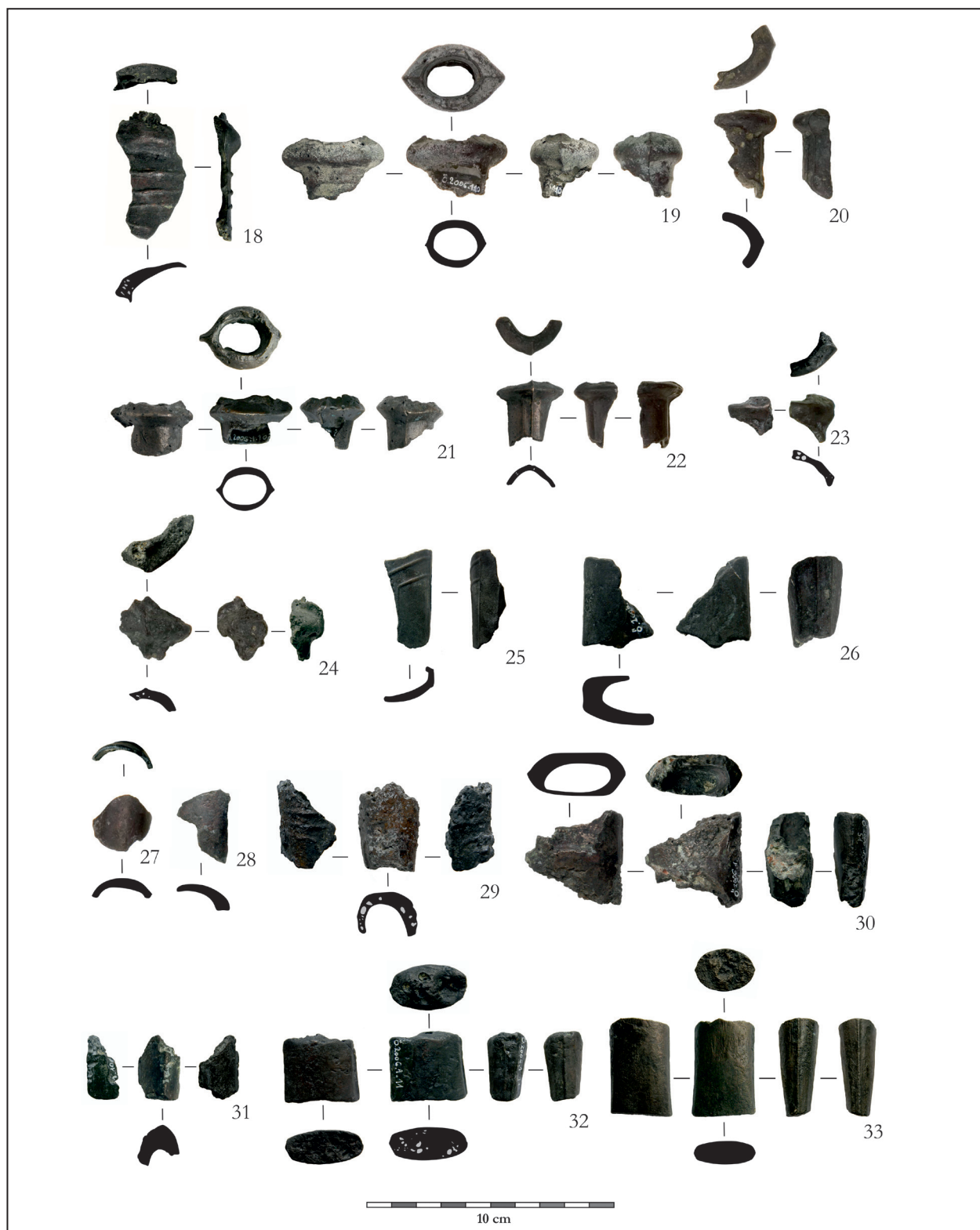


Fig. 15 Objects from the hoard. 18–33: Socketed axe fragments  
 15. kép A bronzdepó tárgyai. 18–33: Tokosbalta töredékek

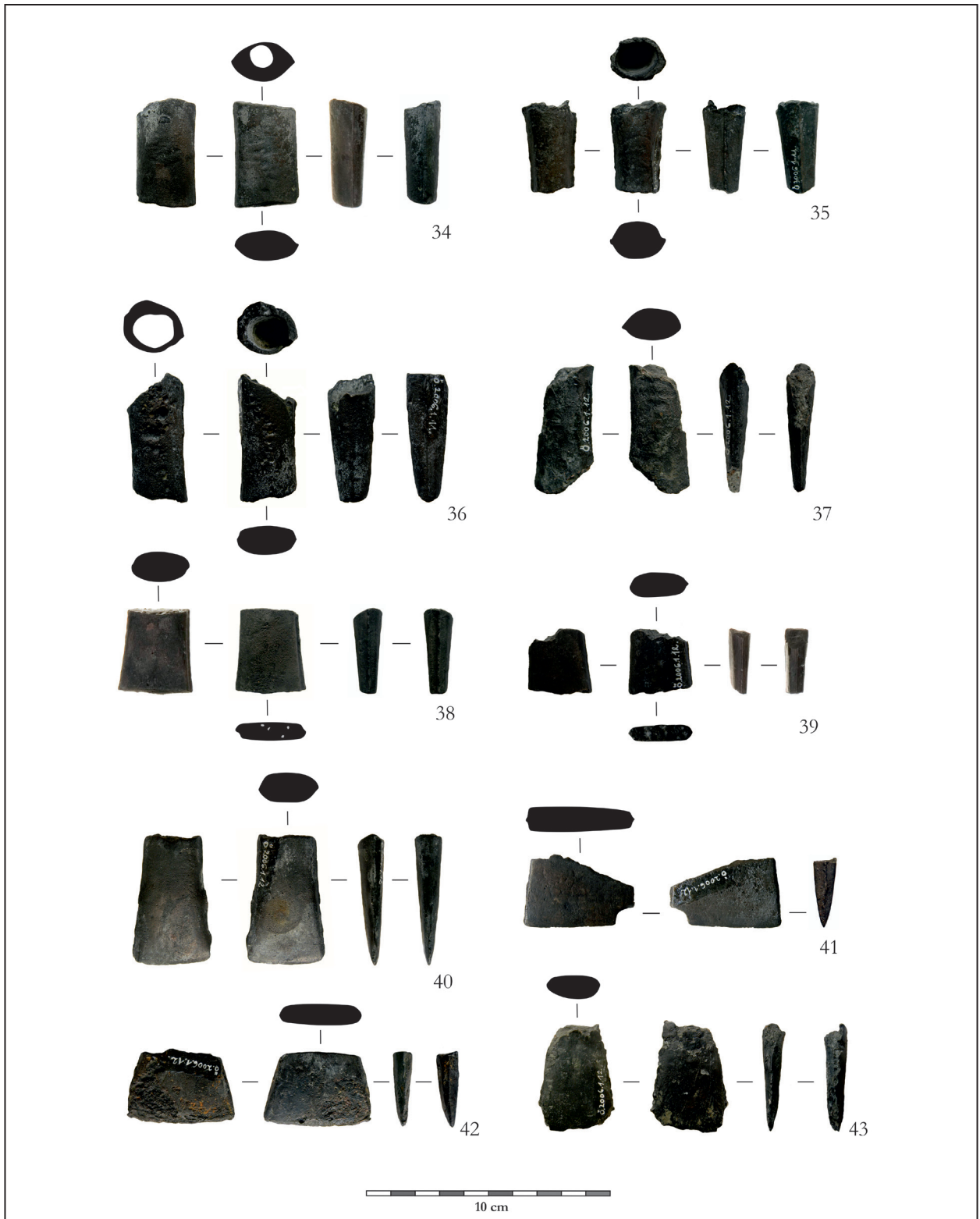


Fig. 16 Objects from the hoard. 34–43: Socketed axe fragments  
 16. kép A bronzdepó tárgyai. 34–43: Tokosbalta töredékek



Fig. 17 Objects from the hoard. 44–48: Socketed axe fragments; 49: Miniature axe; 50: Blade fragment of a socketed axe; 51–54: Socketed hammers; 55–57: Socketed tools; 58–59: Flange sickle fragments  
 17. kép A bronzdepó tárgyai. 44–48: Tokosbalta töredékek; 49: Miniatúr balta; 50: Tokosbalta pengetőredéke; 51–54: Tokoskalapácsok; 55–57: Tokoseszközök; 58–59: Nyélnyújtványos sarló töredékek



Fig. 18 Objects from the hoard. 60–61: Flange sickle fragments; 62: Saw; 63–64: Rings; 65: Pendant; 66–76: Half forms; 77–78; 79: Triangular-shaped ingots.

18. kép A bronzdepó tárgyai. 60–61: Nyélnyújtványos sarlók töredékei; 62: Fűrész; 63–64: Karikák; 65: Csüngő; 66–76: Félforma alakú öntvények; 77–78; 79: Háromszög alakú öntvények.



Fig. 19 Objects from the hoard. 81–84: Rectangular ingots; 85–103: Rod ingots

19. kép A bronzdepó tárgyai. 81–84: Négyzetes négyzetes alakú öntvények; 85–103: Rúd alakú öntvények

20. kép A bronzdepó tárgyai. 104. rúd alakú öntvény; 105-109. ovális/vegni alakú öntvények; 110. háromszög alakú öntvény; 111-115. ovális/vegni alakú öntvények; 116. ovális öntvény vagy bronzrög; 117-120. Öntőleplenyek.

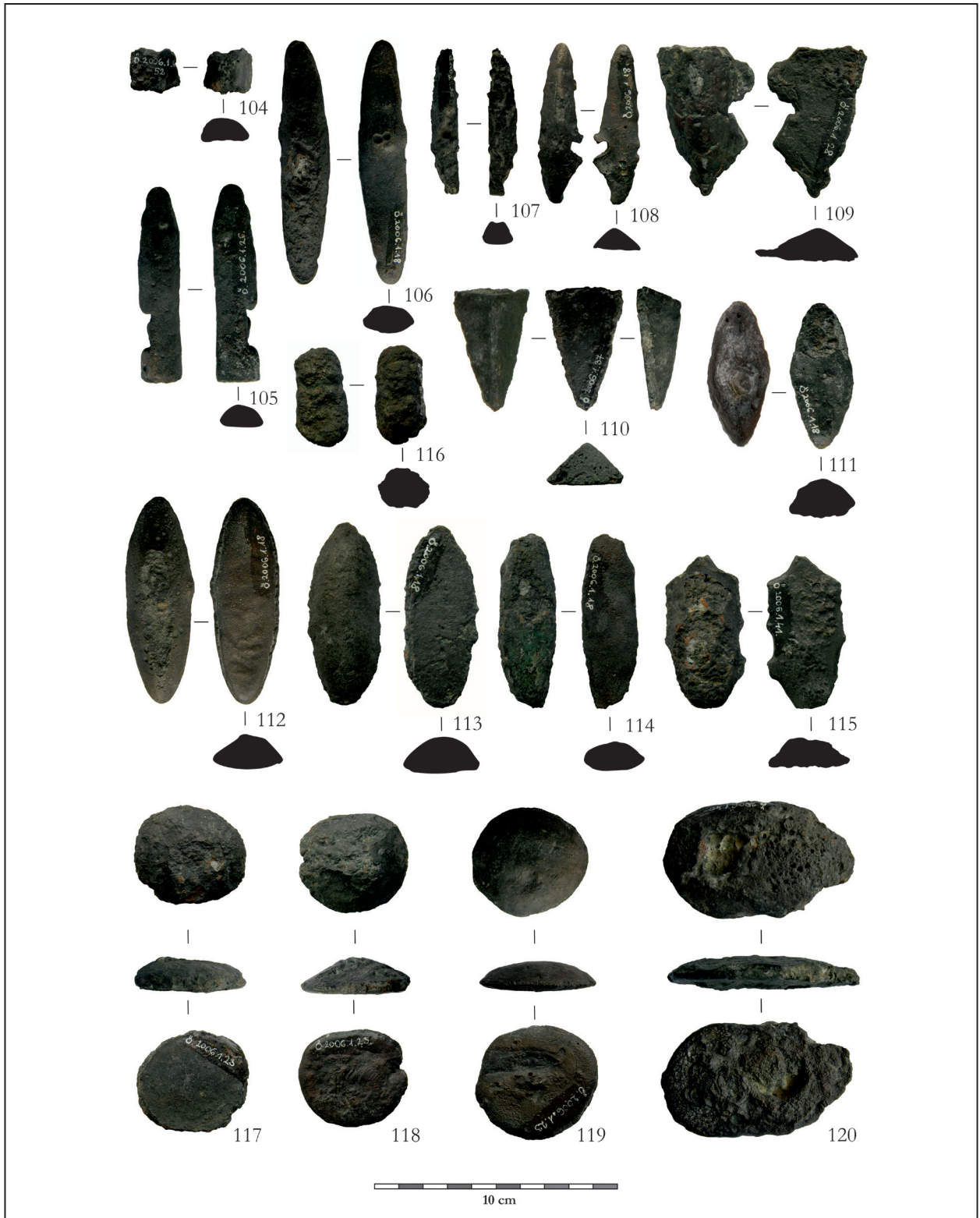


Fig. 20 Objects from the hoard. 104: Rod ingot; 105–109: Oval-shaped ingots; 110: Triangular-shaped ingot; 111–115: Oval-shaped ingots; 116: Oval-shaped ingot or bronze lump; 117–120: Plano-convex ingots

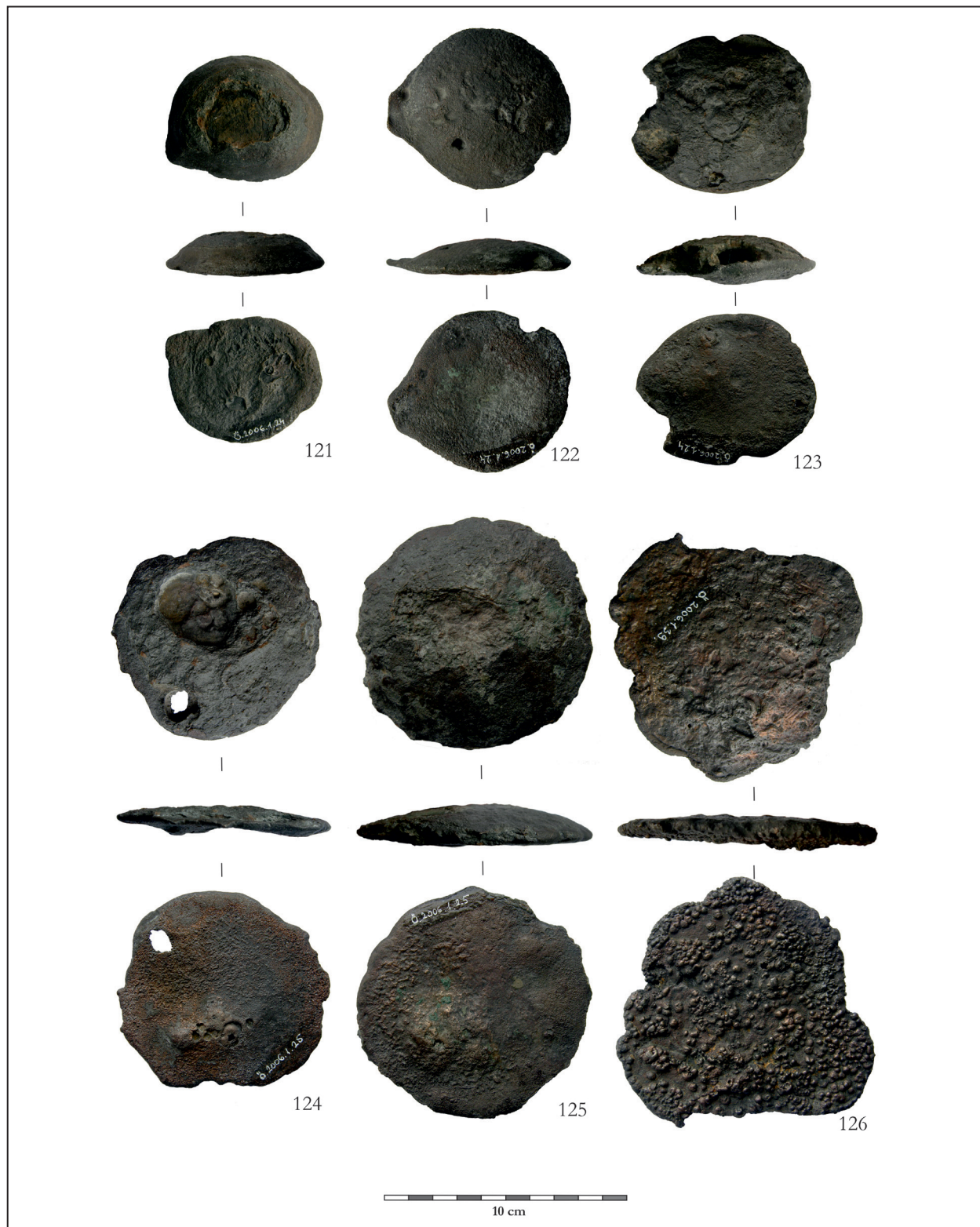


Fig. 21 Objects from the hoard. 121–126: Plano-convex ingots  
 21. kép A bronzdepó tárgyai. 121–126: Öntőlepenyek



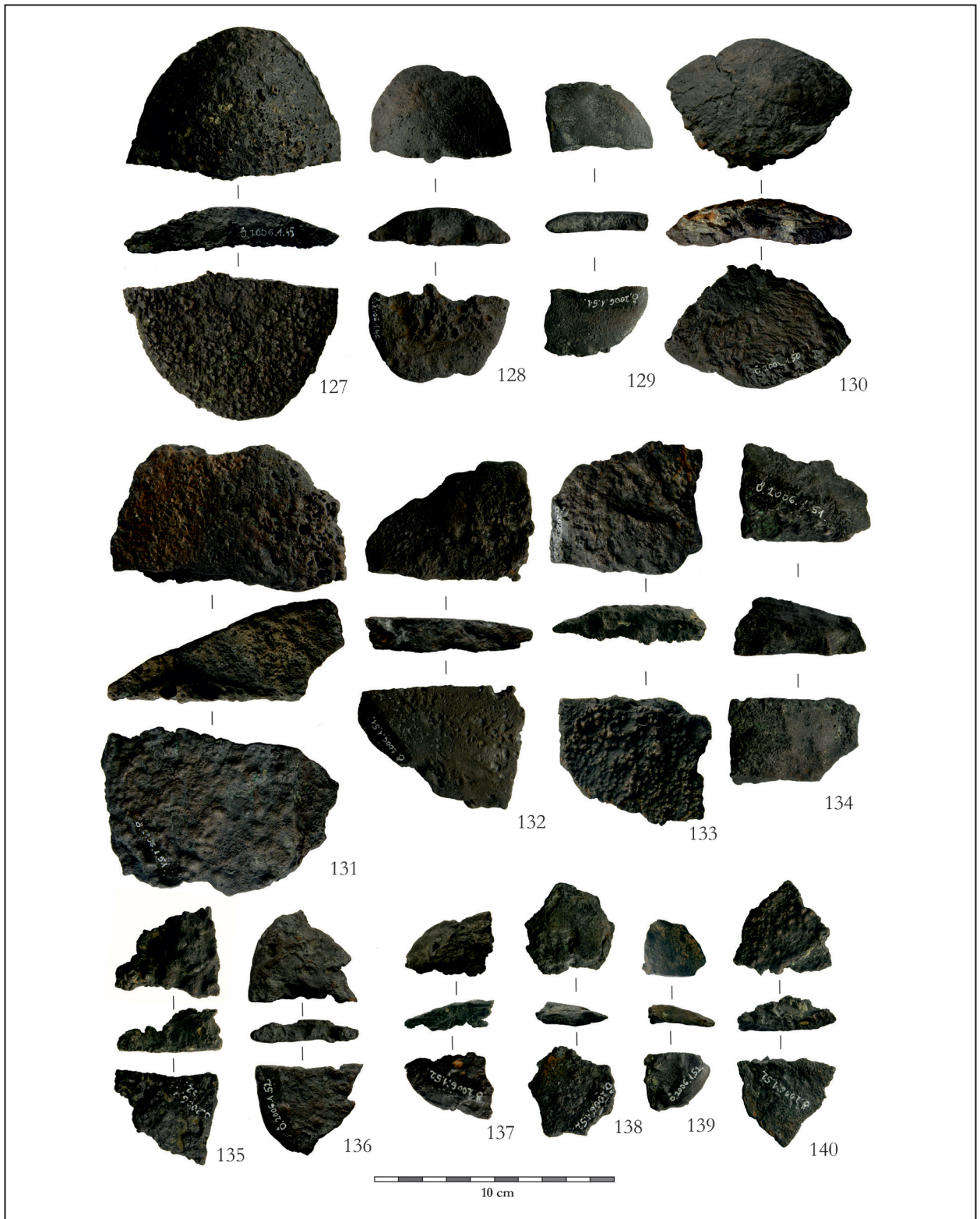


Fig. 22 Objects from the hoard. 127–140: Plano-convex ingots  
22. kép A bronzdepó tárgyai. 127–140: Öntőlepenyek

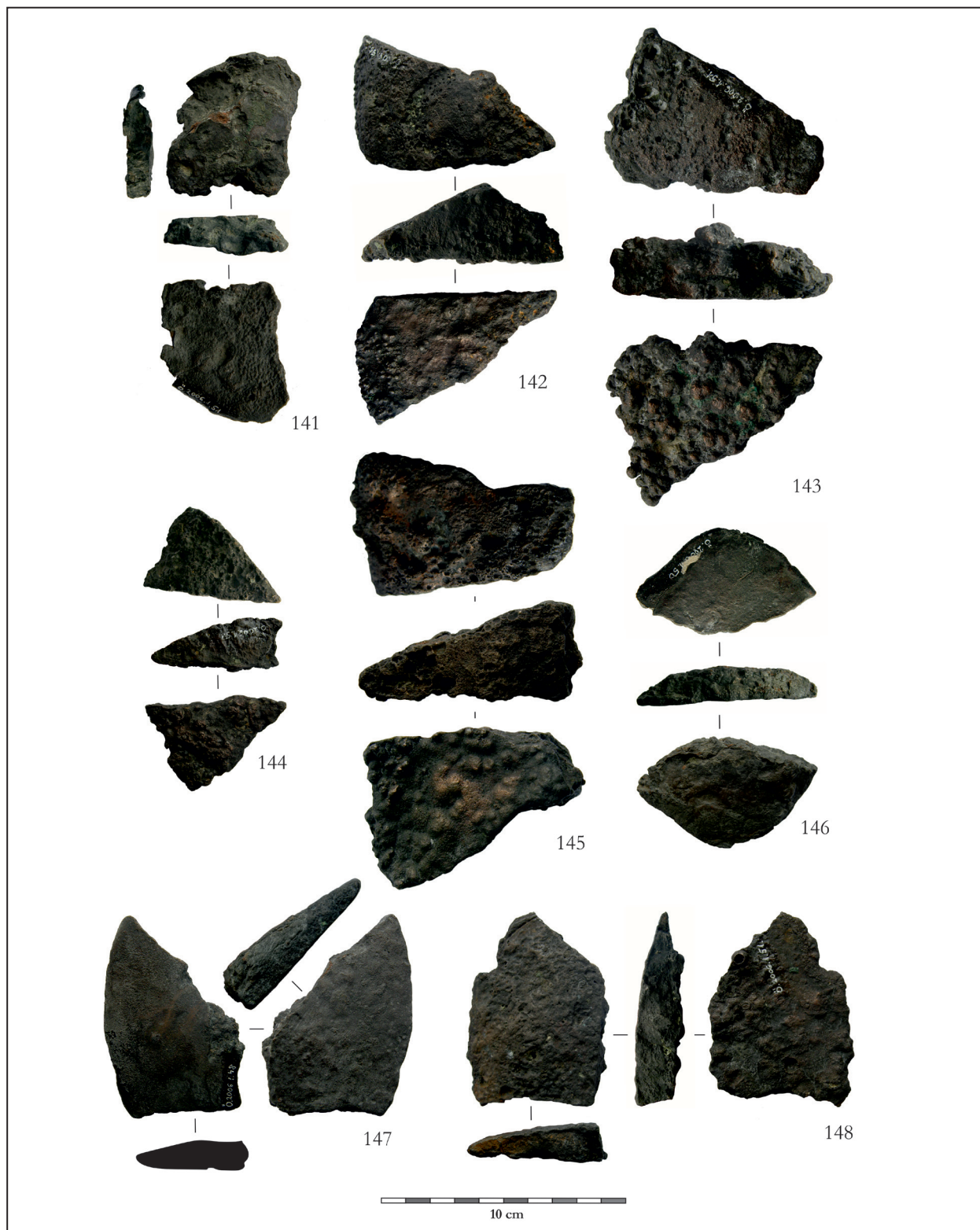


Fig. 23 Objects from the hoard. 141–148: Plano-convex ingots  
 23. kép A bronzdepó tárgyai. 141–148: Öntőlepenyek



Fig. 24 Objects from the hoard. 149–161: Plano-convex ingots  
24. kép A bronzdepó tárgyai. 149–161: Öntőlepenyek



Fig. 25 Objects from the hoard. 162–180: Plano-convex ingots  
 25. kép A bronzdepó tárgyai. 162–180: Öntőlepenyek

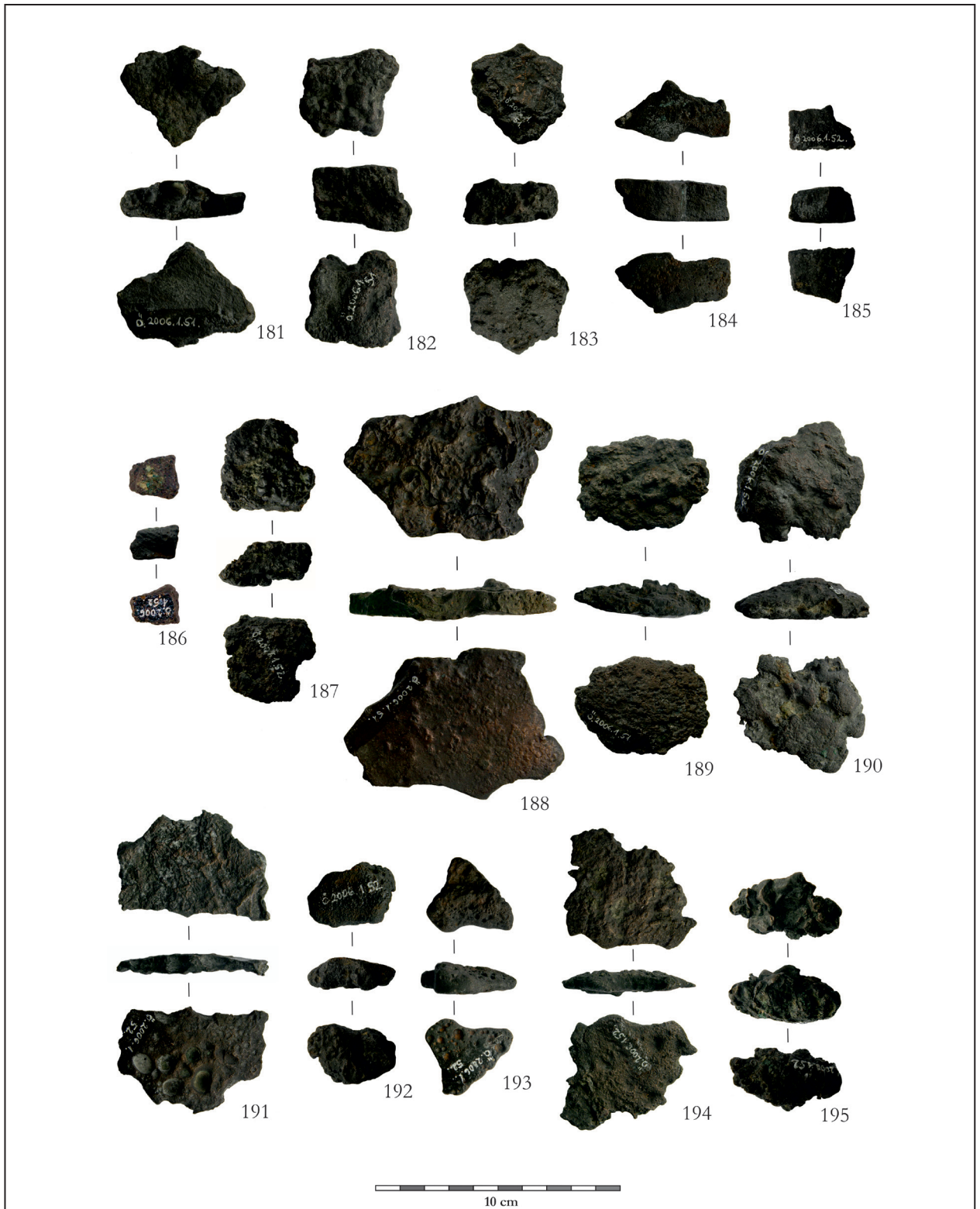


Fig. 26 Objects from the hoard. 181–187: Plano-convex ingots; 188–193: Plano-convex ingots or bronze lumps; 194–195: Bronze lumps  
 26. kép A bronzdepó tárgyai. 181–187: Öntőlepenyek; 188–193: Öntőlepenyek vagy bronzrögök; 194–195: Bronzrögök

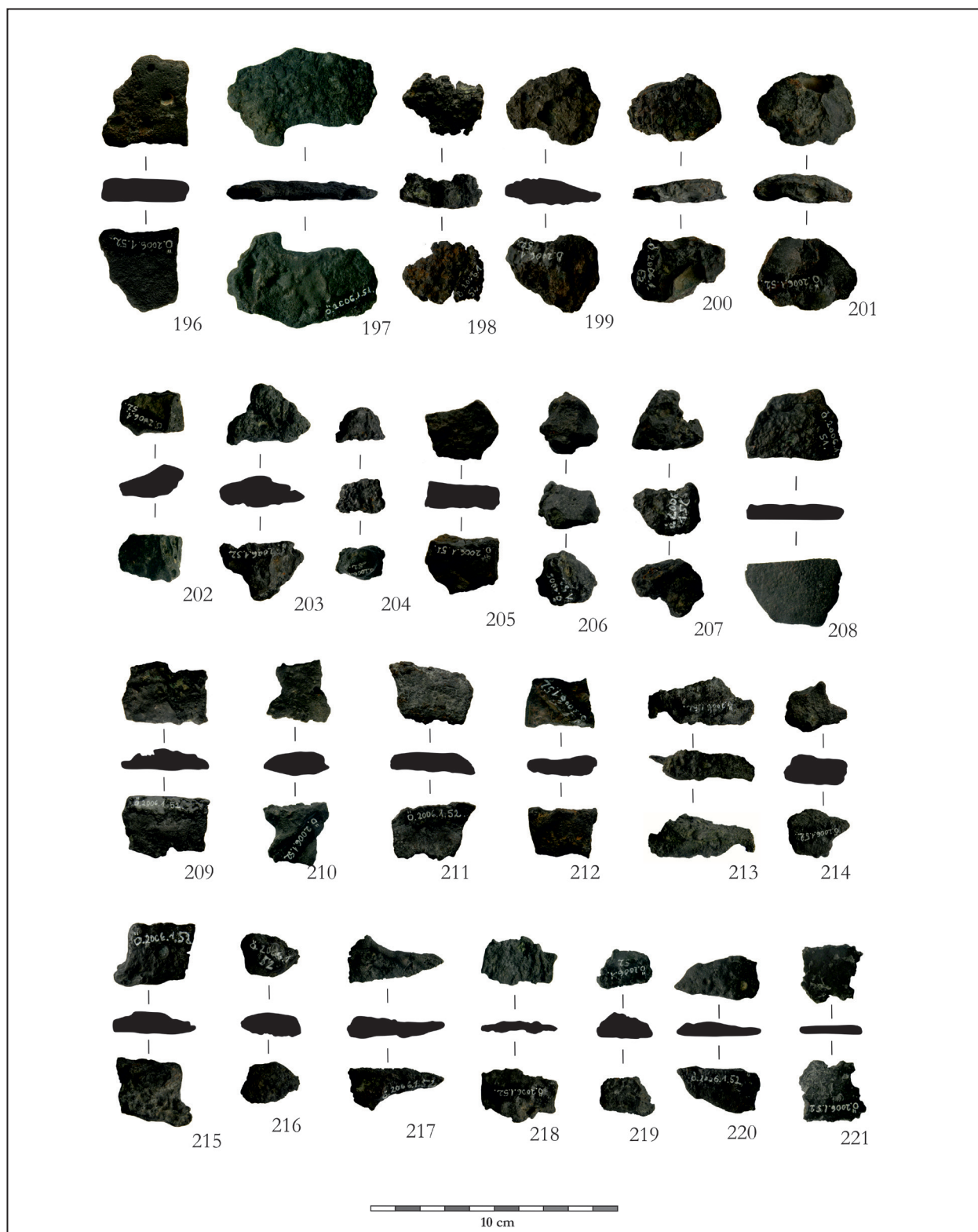


Fig. 27 Objects from the hoard. 196–221: Bronze lumps  
 27. kép A bronzdepó tárgyai. 196–221: Bronzrögök

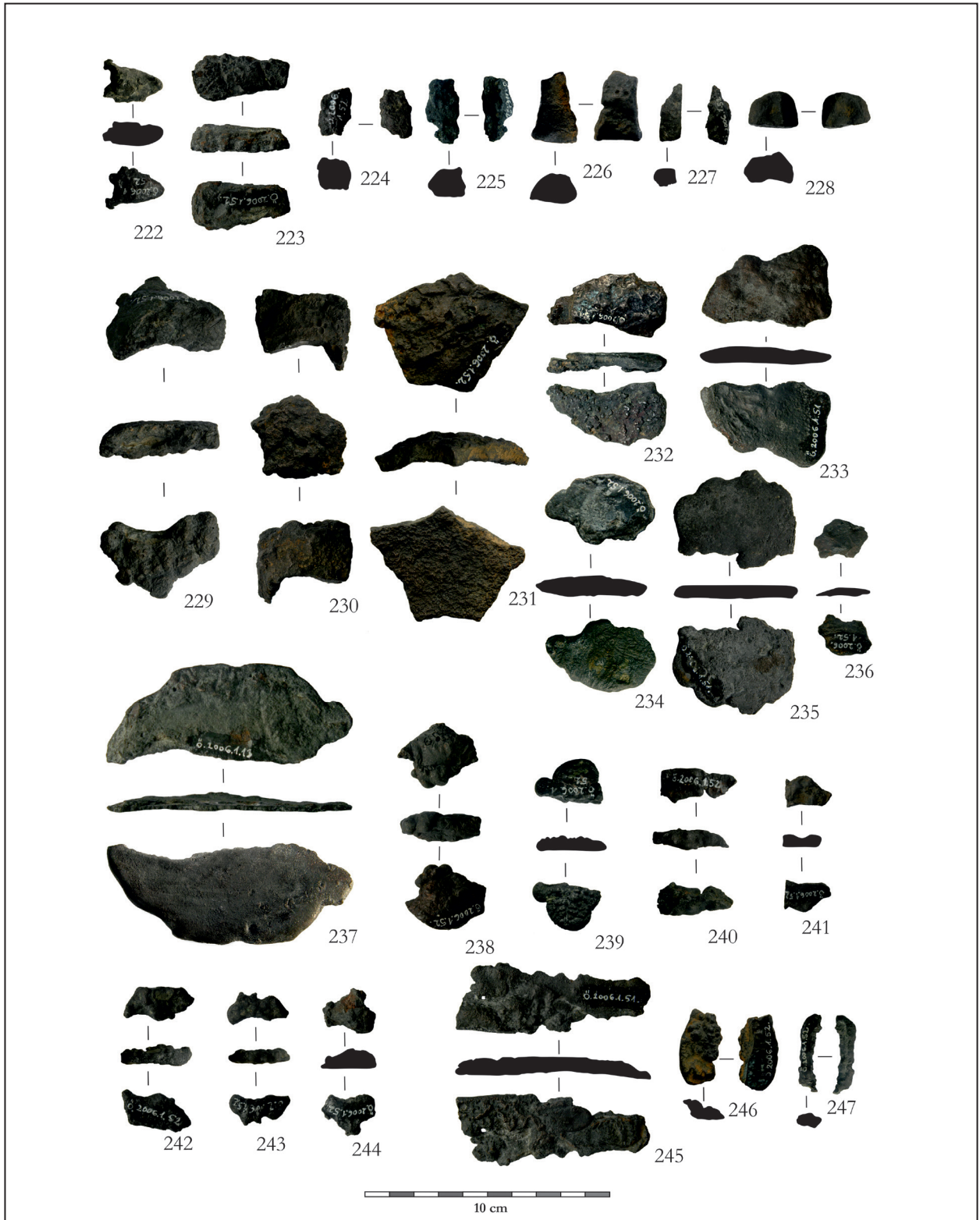


Fig. 28 Objects from the hoard. 222–247: Bronze lumps  
28. kép A bronzdepó tárgyai. 222–247: Bronzrögök

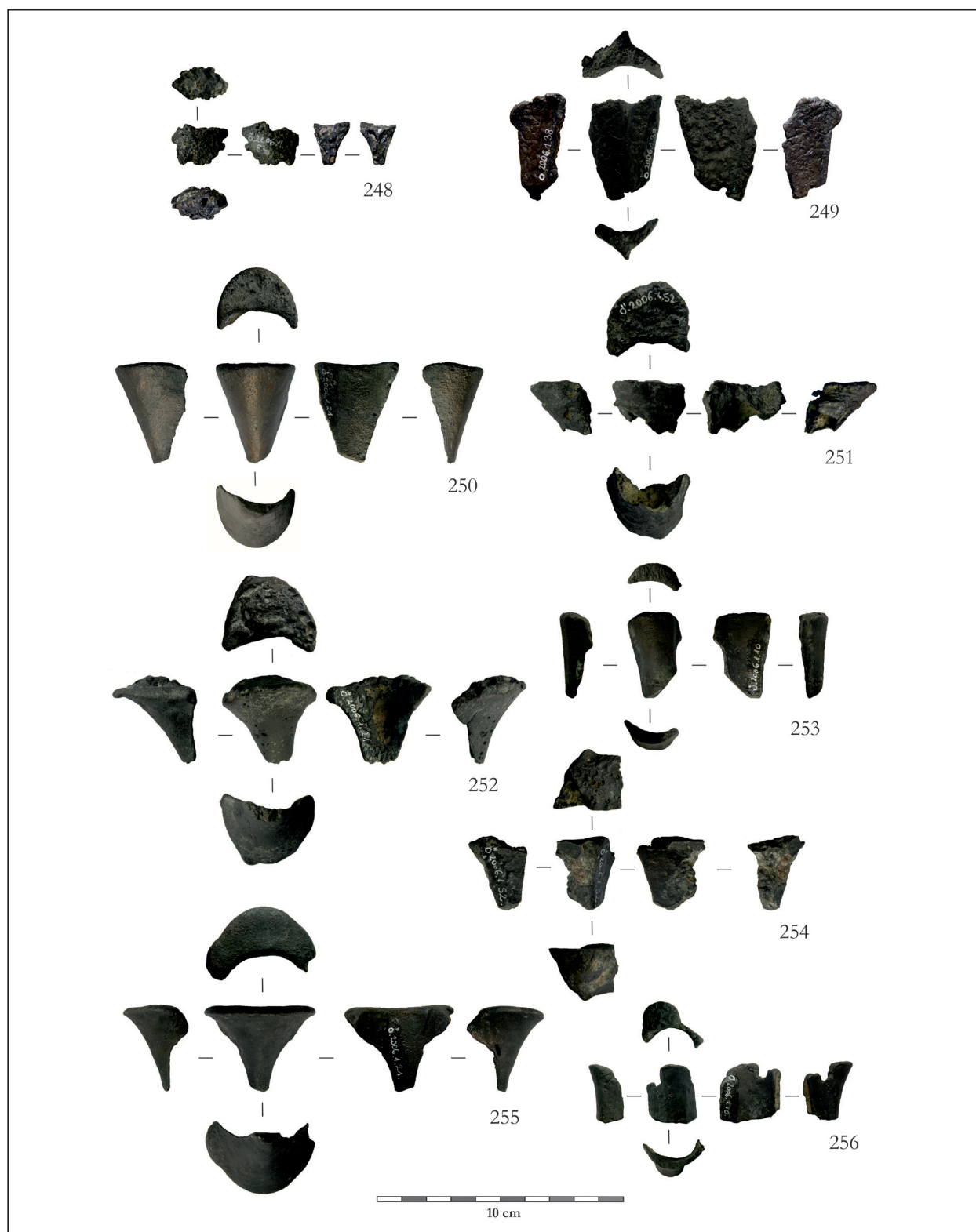


Fig. 29 Objects from the hoard. 248–256: Sprues  
 29. kép A bronzdepó tárgyai. 248–256: Fejtápok



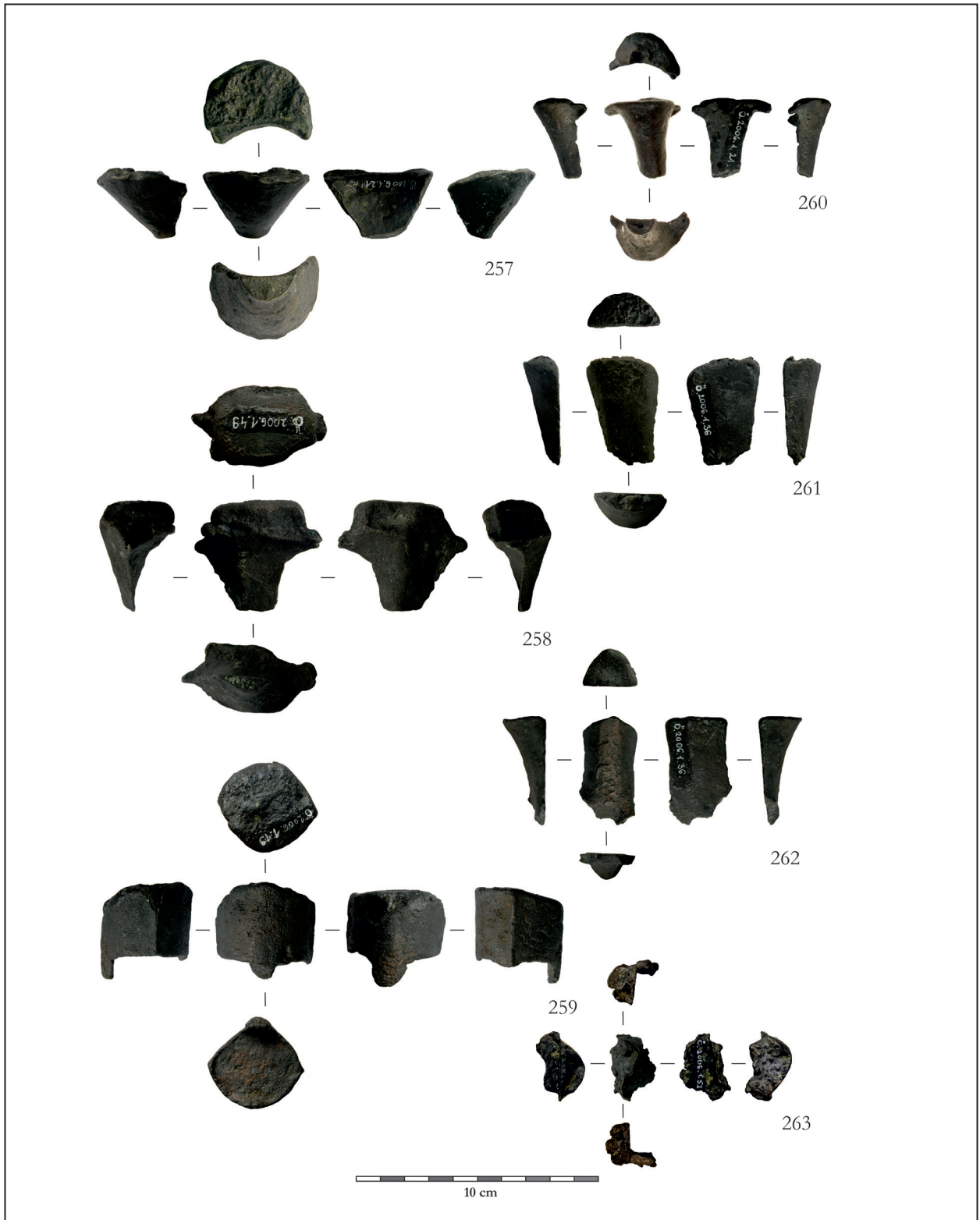


Fig. 30 Objects from the hoard. 257–263: Sprues  
30. kép A bronzdepó tárgyai. 257–263: Öntőcsapok

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## KÉSŐ BRONZKORI „FÉMHULLADÉK DEPÓ” NAGYDOBSZÁRÓL

## I. Rész

## Összefoglalás

A Nagydobsza Nyugati árkosi dűlőről származó depóleletet 1978 júliusában, véletlenül fedezték fel a Somogy megyei Növényvédelmi és Agrokémiai Állomás munkatársai földminta vételezésekor. Tímár Mihály, a munkálatokat végző egyik mérnök értesítette a pécsi Janus Pannonius Múzeumot, melyet követően Ecsedy István hitelesítő ásatást hajtott végre a lelőhelyen. Munkájának eredményeként nemcsak a depó pontos lelőhelyét sikerült lokalizálni, de ásatási szondájával annak előkerülési körülményeit is tisztázni tudta. A lelet egy 40x70 cm nagyságú gödör falába volt beásva, környezetében késő bronzkori telepnyomot vagy szörvány kerámia leleteket nem találtak.

A depó összesen 263 darab (összsúly: 19.053 g) tárgyból állt, melyek tipológiai szempontból öt csoportra különíthetők el: 1.: fegyverek (három kard töredéke egy lándzsa töredéke); 2.: eszközök (karikás végű kés vagy borotva töredéke, tokosbalták, tokoskalapácsok, nyélnyújtványos sarló töredékek, fűrész); 3.: ruházati elemek (karika és csüngő töredéke); 4.: félkész termékek (félforma öntvények, rúd alakú öntvények, ovális/vegni alakú öntvények, töredékes és intakt öntőlepenyek, bronz rögök, egyedi öntvény formák); 5.: fémműves melléktermékek: öntőcsapok, öntési cseppek.

A makroszkópikus vizsgálatok eredményeként, technológiai szempontból több csoportra oszthatjuk a kincslelet tárgyait. 1.: Kész termékek, melyeknél minden egyes esetben egyértelmű használatlaltal összefüggésbe hozható nyomokat láthatunk. 2.: Megmunkálatlan tárgyak, melyek felületén nem lehetett megfigyelni a kész termékekre jellemző technológiai jegyeket (pl.: kalapálás, élés és polírozás) vagy a használat során keletkező nyomokat (pl.: csorbulások, kopások). 3.: Öntési hibás és rontott tárgyak köre. Ezen csoport részben átfedésben áll a fenti két csoporttal. Jórészt

olyan tárgyakat sorolhatunk ide, melyek öntési hibái nem esztétikai, hanem a valódi használatot akadályozó szerkezeti hibaként határozhatók meg. A depó egyik szembetűnő jellemzője a töredékeség magas foka, mely mindegyik tárgycsoportra egyaránt jellemző volt. A félkész termékek esetén ezek szinte kivétel nélkül, használatukkal összefüggésbe hozható törésekként, vágásokként vagy darabolásokként értelmezhetők. Megítélésünk szerint a különböző balták szisztematikus, átgondolt módon történt felapritása mögött is hasonló motivációk állhattak, darabolásuk ez esetben nem értelmezhető votív törésként.

A nagydobszai kincsben található tárgyak jórésze szupraregionális típus, párhuzamaikat megtalálhatjuk a Kárpát-medence nyugati, keleti és déli felében egyaránt. Érdekesebb viszont, hogy megjelennek benne olyan példányok is (pl.: Prázmár típusú kard, 9. és 29. számú tokosbalta), melyek leginkább a Kárpát-medencei északkeleti zónájában jellemzők. Ez utóbbi indőrendi szempontból is érdekes, mivel ezen párhuzamleletek köre még a magyarországi kronológiai rendszerek szerint is egyértelműen a Ha B1-es Hajdúböszörményi horizonthoz köthető.

A jelen tanulmány eredményei alapján a nagydobszai kincslelet földbe rejtéséről összességében elmondható, hogy a lelet összetételében, tipológiai és technológiai jegyeiben egyaránt a klasszikus „fémhulladék depók” (scrap hoards) köréhez kapcsolható, mely esetünkben egy tudatos szelekciója a félkész termékeknek, hibás öntvényeknek, feldarabolt tárgyaknak és öntési melléktermékeknek. A kincsegyüttes végső interpretációjának szempontjából különösen nagy lehetőségeket rejt annak előkerülési helye, mely egy a bronzkori topográfia szempontjából kevésbé kutott, nedves környezetű lelőhely.

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