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ANCIENT WEAPONS

NEW RESEARCH PERSPECTIVES ON WEAPONS AND WARFARE

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PREFACE

A strong bond connects the Römisch-Germanisches Zentralmuseum and the research on ancient weapons and warfare. The study of defensive weapons, in particular, has become a sort of »speciality of the house« since the 1970s, as shown by many contributions dedicated to helmets and cuirasses, published as monographs or as papers in different volumes of the RGZM series.
An ideal turning point in the history of the research was represented by Markus Egg's monograph on Italic helmets in 1986 (Monographien des RGZM 11) and, two years later, by the almost encyclopaedic catalogue of the Berlin exhibition »Antike Helme« (Monographien des RGZM 14), dedicated to the helmets collection of the Berlin Museums, including the famous collection Lipperheide. This book in particular set a milestone not only for the investigation of this specific type of weapons, but also for ancient weapons in general.
While the typological method had been the main research approach for many scholars for a long time, the meticulous research carried out on helmets by different specialists certified that the study of weapons had definitely emerged from the narrow recess of enthusiastic collectors and cataloguers of rarities to reach a more complex dimension, in which weapons needed to be seen as active agents of the archaeological and historical debate. In this respect, modern archaeology goes beyond the interest in the exterior appearance of ancient weapons and focuses on the study of single objects to explore new research avenues. Technological transfer, social interaction and conflict dynamics of ancient societies can be investigated through the analysis of weapons and warfare, including considering their material and symbolic features.
Aspects like their ergonomic design, the finest selection of materials, and the highly developed technological background still make pre- and protohistorical, as well as classical weapons, some of the most appreciated items by warfare specialists all over the world. However, weapons gain a special interest with specific regard to the investigation of social phenomena, such as the mobility of individuals and the recruitment of mercenaries, in order to study some features of the past for which no information from written sources is available, or to reveal unexpected traces of their ancient biographies. It is not all about warriors and war: better than other ancient objects, weapons allow to reflect on cultural transfer, since they are often the expression of identities and the result of negotiation processes. Far from being objects for amateurs and collectors, ancient weapons become protagonists in historical and scientific reconstructions, with a huge potential as sources of knowledge.

Since 2014, the department headed by Markus Egg at the RGZM has taken part in the organisation of three conferences on ancient weapons: »Waffen für die Götter« (Innsbruck 2013), »Armas de la Hispania Prerromana« (Madrid 2016) and »Armi Votive in Magna Grecia« (Salerno-Paestum 2017). Colleagues from many different European countries have participated in these congresses and published their contributions in the respective proceedings (RGZM – Tagungen 24, 28, 36). These experiences represented more than an opportunity to expose new research results and have transformed these meetings into a very dynamic network for academic exchange between scholars. Beside offering extensive updates on complex subjects, the results of the conferences are now essential references for the advancement of weapons research, especially concerning the social, religious and cultural implications of ancient warfare.
Why another conference on ancient weapons then? Considering the very positive results of the previous three meetings and the wide impact of the following publications, we thought it was interesting to go beyond the thematic approach which characterised those conferences and to propose a meeting independent from any specific region or restricted chronological frame, focusing only on the comparison between dif-

ferent methodological approaches. For this purpose, we decided to invite some colleagues who have been dealing in recent years with the study of weapons from different archaeological perspectives.
As one can see, we have chosen the format of a small meeting with the idea to compare and discuss very concrete topics. Consequently, our personal research methods and strategies to investigate ancient weapons have been the common thread to stimulate the debate.
The research presented here derives from different projects, including the results of doctoral and post-doctoral programs, some of which are still ongoing. Some contributions deal with large series of weapons, while others focus on single case studies. We looked mainly at weapons from sanctuaries, graves, hoards, and iconographic sources, considering several archaeological sites as well as large areas and different chronological periods. The aim was to deliberately create a sort of controlled chaos.
The range of different situations, questions, and archaeological realities presented in this book is as wide as possible. Therefore, the title »Ancient Weapons« does not entail any spatial, chronological, cultural, or contextual limitation. The experiment was to test the potential of this research field, and how different methods can be applied to various topics in order to develop new questions for future research. The concrete result of this idea was immediately evident in the stimulating discussions that followed each talk and in the final debate. Although no detailed account of these can be presented here, we do believe that the author of each contribution learnt something and was inspired by unexpected ideas and advices.
Unfortunately, we could not include all the papers presented during the conference in this publication. Be that as it may, we prefer to blame it on the *annus horribilis*, 2020. As adequate compensation, we are pleased to present Joachim Weidig's paper, which was originally planned for the conference, but could not be presented in September of 2019.
The organisation of this conference was possible thanks to a funding of the Fritz Thyssen Stiftung. We would like to thank Christopher Pare and the department of Pre- and Protohistory of the »Institut für Altertumswissenschaften« of the Johannes Gutenberg University Mainz for having hosted our event in their conference room. Thanks also to the RGZM staff (Vera Kassühlke, Regina Molitor, Patrick Zuccaro) for the great assistance before and during both days of the conference. As always, this publication is the result of the meticulous work of the editorial staff of the RGZM: thank you Claudia Nickel and Marie Reiter; it was, as always, »einwandfrei«.
Finally, our deepest gratitude goes to Markus Egg. He inspired, funded, and encouraged much of our research, teaching us that, despite the love for weapons, »*nulla salus bello: pacem te poscimus omnes*«.

Mainz / Alicante, March 2021
Giacomo Bardelli
Raimon Graells i Fabregat

JÁNOS GÁBOR TARBAY

THE PATH OF A LATE BRONZE AGE »WARRIOR« – THE SELECTION OF WEAPONS IN TRANSDANUBIAN SCRAP HOARDS: RINYASZENTKIRÁLY (SOMOGY COUNTY / H) AND KESZŐHIDEGKÚT (TOLNA COUNTY / H)

Several biographical possibilities characterised the end of a weapon's prehistoric path of life in the Urnfield Transdanubia (Western Hungary) between the Ha A1 and Ha B2 periods[1]. A weapon could have been thrown into wetland areas like bogs and lakes, or to the probably sacred Danube River that connects a vast territory between Southern Germany and the western shores of the Black Sea in Romania. According to the seminal studies of A. Mozsolics and I. Szathmári, the hoarding of weapons was also prominent on the Transdanubian part of the Danube. Numerous swords, spearheads, daggers, and even a complete cuirass (Pilismarót, Komárom-Esztergom County/H) as well as cap helmets (Paks, Tolna County/H) were offered to this river[2]. By comparing to West Central Europe[3], the number of burials with weapons during the Ha A1-Ha B2 periods and even before (Rei. Br D, Rei. Br D/Ha A1) is insignificant. Perhaps the most representative example is the burial of a 23-25 years old man from Balatonfűzfő (Veszprém County/H) (Grave no. 6, Rei. Br D/Ha A1), which contained a sword, a winged axe, a bird-headed knife, a set of arrowheads, a pin, bronze rivets, and a ceramic banquet set[4]. In contrast, only a handful of burials with weapons were found in large Urnfield cemeteries like Szombathely-Zanat (Vas County/H) or Budapest-Békásmegyer (Municipality of Budapest/H)[5]. To make a journey to the afterlife with armoury elements during the Urnfield period was not typical of this region.

On the other hand, the number of bronze objects including weapons in dryland hoards reached enormous proportions. This is not surprising in the sense that through the Bronze Age, Transdanubia was one of the most innovative areas of the hoarding phenomenon. The different ritual practices are deep-rooted, and they have a long history here[6]. In the Ha A1 period, the deposition of metal objects has increased, but it gradually decreased and changed towards the Ha B2 period. During this time, offensive and defensive weapons were frequent elements in hoard assemblages, in which they were often found in a broken state[7]. The individual characteristics of hoards with broken weapons differ. Research is aware of pure weapon hoards, containing intentionally manipulated objects like the one from Gic (Veszprém County/H), which consisted of a broken sword and a damaged spearhead according to M. Novák and G. Váczi[8]. The possibility of funeral-hoard phenomena can also be assumed here, which may explain why weapons were rarely found in burials. The recently excavated Pázmándfalu hoards (Győr-Moson-Sopron County/H) should be highlighted from the known Transdanubian examples. They contained an exclusive set of metal armour and offensive weapons combined with tools, metal vessels and small ornaments. According to G. V. Szabó's interpretation, the elements of this elite hoard were deposited in a structured manner within the natural landscape far from habited areas[9]. Examples for less »heroic« weapon selections are also known. For instance, in the Nagydobsza hoard from Southern Transdanubia (Baranya County/H), an East Carpathian short sword fragment, a sword hilt part and an unfinished blade fragment were deposited to a pit along with several partitioned ingots, miscasts and unfinished products. The composition and treatment of this Ha B1 scrap hoard seems ordinary, as if someone would have selected the pieces of a metallurgist's recycling bin, where highly prized weapons would have been degraded to scrap. Nevertheless, I believe that this character may refine rather

than exclude ritual interpretations. It may have been a result of a metallurgist's life-cycle ritual or offering, who has taken out of circulation a part of his or her raw material stock[10].

The examples chosen for this study represent another biographical possibility. This is a more common hoard group, where composition and treatment are in many ways similar to the Western Central European scrap hoards. There are two previously found assemblages from Rinyaszentkirály (Somogy County/H) and Keszőhidegkút (Tolna County/H). Both hoards were assigned to the Kurd horizon (Ha A1) after A. Mozsolics's scheme[11]. The minimal information known about their context limits the choice of hoard analysis methods[12]. This kind of »limitation« exists in the majority of the Carpathian bronze hoards. As a result, local research has primary focussed on the relative chronological aspects and typology-based statistical analysis of these assemblages. However, the lack of context does not mean at all that the elements of the hoards should not be investigated by new methods, naturally within obvious limits. As the quantity of these hoards still outnumbers the assemblages from context, it is essential to overcome these obstacles while studying this territory. This paper follows theoretical-methodological approaches (*chaîne opértoire, object biography*) that are less embedded in local research, but they have been used for a long time in the Western European Bronze Age research. These approaches are suitable for a better understanding of the selection of objects like the different types of weapons in hoard assemblages[13].

The main goal of this study is to characterize the selection of weapons[14] in the Rinyaszentkirály and Keszőhidegkút hoards. The results described below are based on the evaluation of craft, use-wear and manipulation traces observed by macro-photographs and microscope-camera images (dnt DigiMicro Mobile Camera) and on the comparison of these observations with previous experimental, archaeometrical and use-wear data. The examination of visible marks on weapons provides some »fragments of information« on the object's »generalized« prehistoric (production, usage, destruction, final deposition) and modern biography (post-deposition phenomena). In certain cases, it is also possible to identify objects with potentially »specific« prehistoric paths of live (modification, reassembling, accumulation, manipulation) and to reflect on the shifting relationship between individuals (maker, owner, depositors) and violent objects before, during and after deposition[15].

CASE STUDY 1: RINYASZENTKIRÁLY-ÚJTELEP URADALMI SZŐLŐS

The hoard: »composition«, relative chronology

The hoard was found in the autumn of 1894 on the vineyard of the estate (Hung. uradalmi szőlős) of Rinyaszentkirály (former Rinya-Szentkirály; Somogy County/H). This site could have been situated in Újtelep, the northern part of the so-called Kohányi puszta[16]. The Rinyaszentkirály hoard consists of eight object groups (**fig. 1**): weapons (1 greave with a rivet, 1 sword, 1 spearhead), multifunctional tools (2 winged axes, 10 socketed axes, 1 knife), agricultural tools (11 flanged sickles), a metal banquet set (fragments of a Kurd type situla and a Zateč type cist), metallurgical tools (1 winged axe secondarily used as a hammer, 1 metal casting core, 1 socketed chisel), ornaments (2 rings, 1 torques), a possible wagon/chariot part (rivet with cast tube), raw materials and by-products (ca. 31 plano-convex ingots and 1 casting jet)[17].

The first periodization of the hoard was given by P. Reinecke, who associated it with the first phase (ca. 12th-11th centuries BC) of the Hungarian Bronze Age Period IV (12th-9th centuries BC) based on the greave which he interpreted as a »Villanovan import ware«[18]. The hoard was dated to the »ältere Urnenfelderzeit« (Ha A1) by G. Kossack based on the parallels of five objects: a hollow armring, a Kurd type situla, a sheet metal band with embossed ribs and dots (Zateč type cist), a cast tube (wagon part) and the greave and

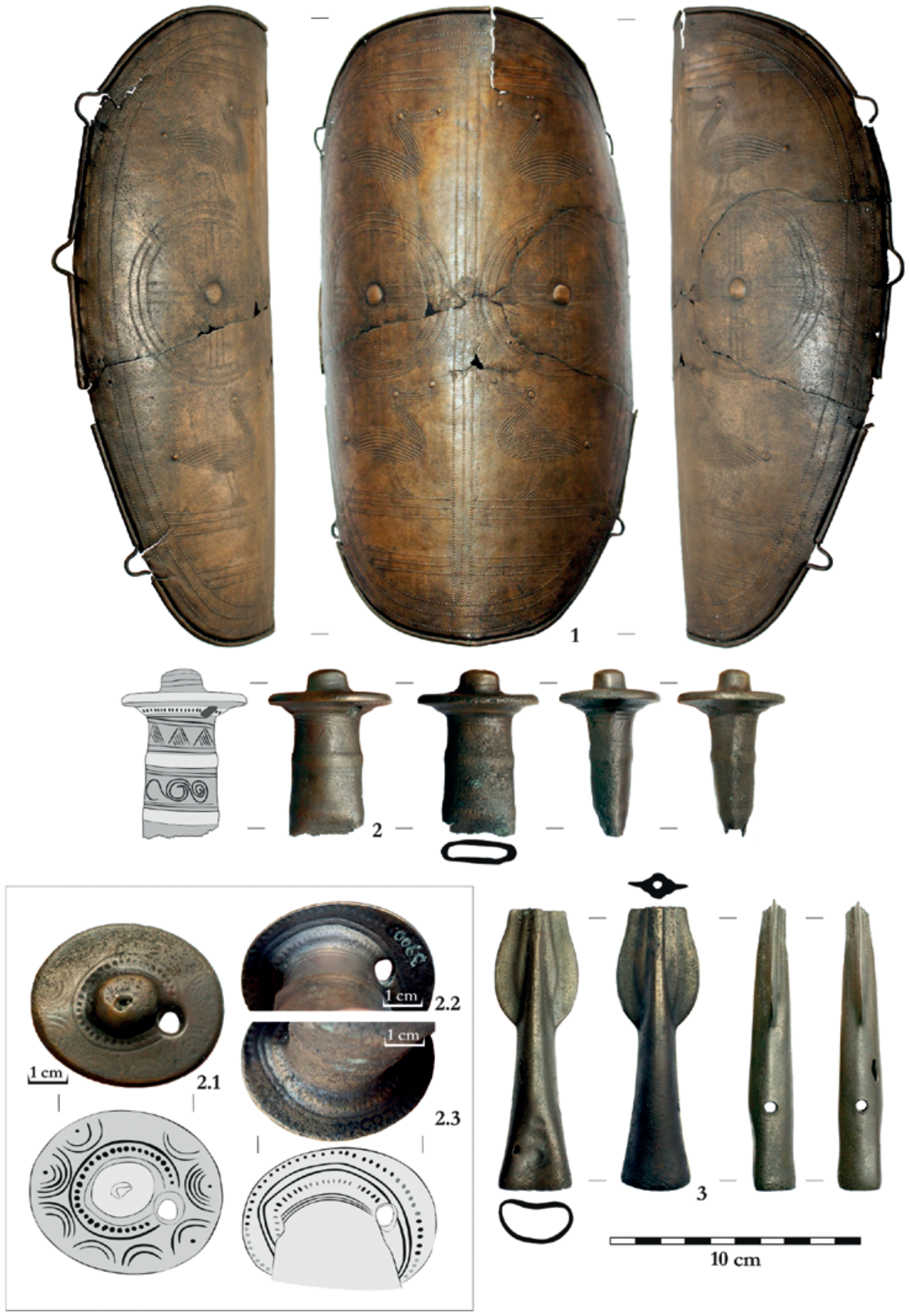

Fig. 1 Weapons from the Rinyaszentkirály hoard: **1** greave. – **2** metal-hilt fragment and details of the pommel. – **3** spearhead. – (Rippl-Rónai Megyei Hatókörű Városi Múzeum, Kaposvár; photos and graphic J. G. Tarbay).

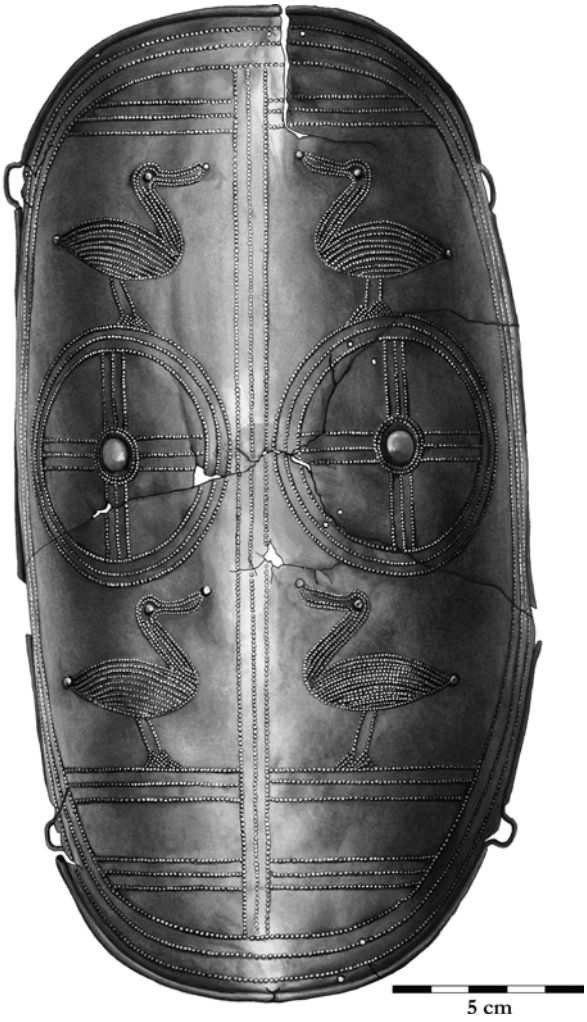

Fig. 2 The Rinyaszentkirály greave. – (Drawing A. M. Tarbay).

with spoke-wheel patterns[19]. G. von Merhart further refined his thoughts and identified more objects as representatives of this period. He also noted that the hoard could be related to the »mittlere Urnenfelderzeit« (Ha A2) based on a flanged sickle with curved inner rib and a violin bow fibula[20]. The idea of Ha A2 deposition was also proposed by Pál Patay based on a sickle and a winged axe[21]. W. A. von Brunn has also assigned the assemblage to the Ha A1 period (»Kisapáti-Lengyeltóti-Stufe«) and even highlighted some objects (the hollow armring and the sword) as the most characteristic artefacts of his phase[22]. In 1972 and 1985, A. Mozsolics has also argued for the time of deposition in the Ha A1 period, and she associated the hoard with the Kurd horizon, whose relative dating is still followed to this day in the Hungarian research[23]. I also share her idea, and consider the Ha A2 deposition unlikely because this period cannot be recognized as an independent horizon in the Hungarian material[24], and the composition of the hoard clearly represents the Ha A1 period.

The greave

The Rinyaszentkirály greave is an emblematic artefact that has been re-published multiple times and has been assigned to different typological groups through research history (**figs 1, 1; 2**)[25]. It is notable that P. Reinecke was the first who proposed the idea that the object is a greave at all. Moreover, he also emphasized its relations towards Italy that has been further discussed by other scholars[26]. The motif made by a repoussé technique is the most enigmatic element on the object. Within the frame, two spoke wheels and four »realistic« birds in antithetic position can be observed. The upper figures stand on the top of the wheels, while the other two were incised separately below it[27]. The motif is unmistakably symbolic. G. Kossack noted that such motifs were put on armours to increase their magical defensive capabilities[28]. Among the »realistic« full bird images, the Rinyaszentkirály greave's pattern is the oldest, as similar ones mainly appear on the Ha B or Early Iron Age metal products found mainly in Slovenia, Poland and Italy[29]. Recently the greave was attributed to the Lengyeltóti type by M. Mödlinger[30]. The stylistically related objects to the Rinyaszentkirály greave are distributed in the western and southern part of the Carpathian Basin. There are also some specimens, which were found in Austria, Italy, and Greece. It should be noted that none of them is decorated with realistic bird patterns[31]. The object was dated to the Ha A1 period based on the chronological position of its stylistically related specimens and by other items selected for this hoard[32].

The manufacturing technology of the object was discussed by M. Mödlinger in depth[33]. Thus, I will rather focus on its condition. According to the first study of J. Hampel, the greave was originally deposited in damaged state. It was flattened and broken into two pieces. Some of the greave's loops were missing or ripped

out. On the early drawings of the object even vertical and symmetric creasing marks are visible[34]. These can be well observed on the artefact in grazing light (**fig. 1, 1**). Similar creasing marks can be seen on greaves, which were deposited in a folded state. A fine example is the new greave from the Lengyeltóti 5 (Somogy County/H) hoard, which was folded lengthwise several times and flattened by hammering. According to K. Jankovits, this is a characteristic deposition treatment, especially in Transdanubia[35]. The current, almost complete state of the Rinyaszentkirály greave is a result of a comprehensive restoration and reconstruction that was carried out in the 1980s[36]. At that time, the specimen was probably restored by the same method as the Legyeltóti 5 greave, which includes heating and hammering of the object by wooden tools. On the backside of the greave even soldered copper bands made at the end of this process can be observed[37]. Prehistoric repair marks are also present on the object. These are much finer and only visible from the front side[38]. It is possible to conclude that the Rinyaszentkirály greave was deposited in a folded and damaged state. It was most likely ribbed out from its organic part, to which it was attached by nails[39]. Even though, the find was relatively complete, its selection has an obvious *pars pro toto* character since only one of the greave pair was chosen for deposition.

The sword

The metal-hilted sword fragment can be classified as an Illertissen type or first variant of T. Kemenczei's N type (»Erlach«). Stylistic parallels of these swords can be found between the Eastern Alpine area and the Western Carpathian Basin[40]. Researchers dated the Rinyaszentkirály sword to the Ha A1 period based on the chronological position of most Illertissen swords[41]. It is notable that the relative dating of the sword hilt does not rely on the Hungarian material, as they are stray or wetland finds[42]. Finding a precise stylistic parallel to this sword is a challenge, as its hilt patterns are a unique combination of cross-hatched triangles and spirals. While spirals are frequent, cross-hatched triangles only appear on some swords like the weapon from Donauwörth (Lkr. Donau-Ries/D). The combination of these two elements are only visible on Illertissen swords from the Ha A1 Martinček hoard (okr. Žilina/SK)[43].

The fragment shows the visual traces of a finished product. Moreover, there is no doubt that it was used for a long period of time before its deposition. Its hilt knob is worn and as a result the once disc-shaped pommel became oval-shaped. The elaborate pattern which once covered the reverse side of the pommel is also quite worn (**figs 1, 2; 3, F**). The deposition of metal-hilted swords with worn-out hilts are not a unique phenomenon. K. Kristiansen drew attention to such cases from the Ha B1 period. Similar traces were recently published on the swords from the Orosháza-Gyopárosfürdő hoard (Békés County/H)[44].

The number of metal-hilted swords in Transdanubia is rather low compared to the quantity of flange-hilted specimens. Between the Ha A1 and Ha B2 periods, only a few pieces are known, mostly in broken state from wetland areas or large scrap hoards (Lengyeltóti 5, Nadap, Nagydém, Románd and Szentgáloskér)[45]. The selection of broken metal-hilted swords in the Ha A-Ha B1 scrap hoards is also observable in the adjacent areas like the Northern Balkans[46]. It should be pointed out that the treatment of the Rinyaszentkirály sword is also somewhat unique. It is one part of a hilt that was broken into two. The socket of the selected fragment was crushed similarly to socketed axes (**fig. 1, 2**)[47]. In this regard, the lower hilt fragment from Nadap (Fejér County/H) is also noteworthy because the missing part of the Rinyaszentkirály sword could have been an identical piece[48]. The rarity of these metal-hilted swords in Transdanubia supports the hypothesis that the possession of these swords may have been considered a great prestige here[49]. Consequently, the intentional damaging of the object could have been a highly symbolic act.

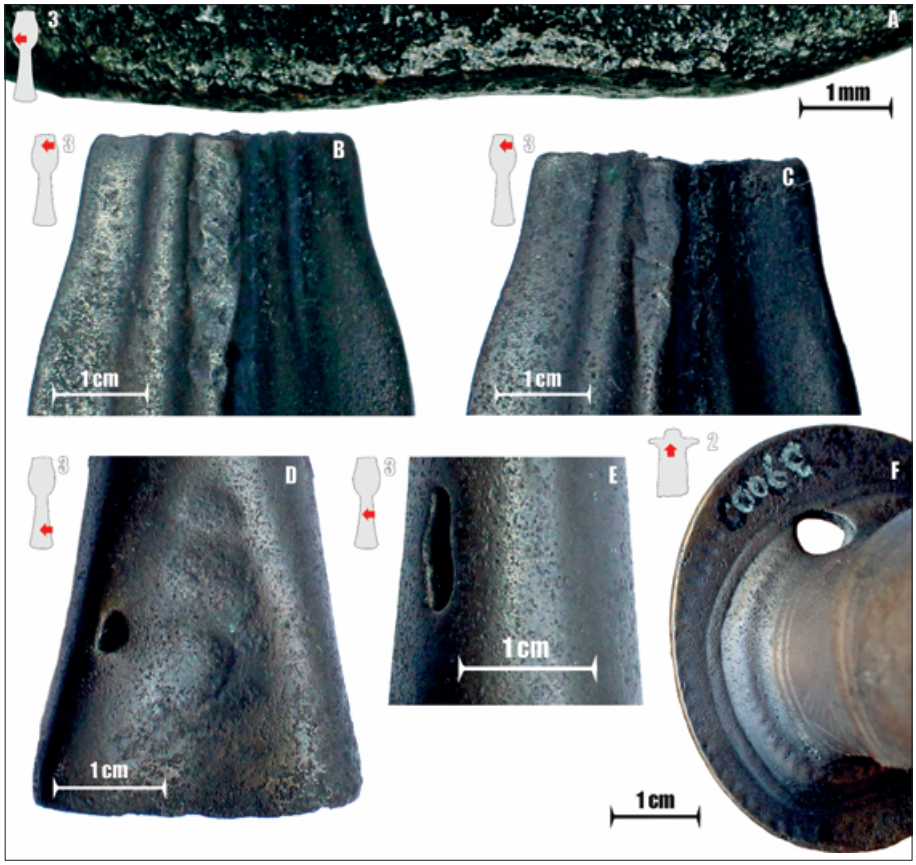

Fig. 3 Rinyaszentkirály, observed traces: **A** bow. – **B-C** hammer impacts on the spearhead's midrib near to the breakage surface. – **D** tool impacts on the crushed socket and a misrun casting defect. – **E** long misrun casting defect along the socket. – **F** worn patterns of the sword hilt. – (Photos and micrograph J. G. Tarbay).

The spearhead

The spearhead has a long socket and a stepped flame-shaped blade. The inner stepped part is slightly straight and does not follow the outline of the cutting edges. The cross-section of the midrib was originally slightly rhomboid, and it became circular as a result of hammer impacts. This weapon can be classified to T. Bader's Group B/6/b or to L. Leshtakov's »Shape K«[50]. The two sub-variants of T. Bader's Variant b were mostly deposited between the Rei. Br D and Ha A1 periods. These spearheads appeared in different regions of the Carpathian Basin and its adjacent areas. Several pieces were found in the territory of Transdanubia and Eastern Hungary, mostly in Ha A1 hoards. Also, numerous specimens were selected for Phase II (and Phase III) hoards in Northern Croatia and Phase II hoards in Northern Serbia. The easternmost distribution of parallels is in Transylvania. A considerable number of such spearheads were found in Moravian and Bohemian hoards dated between the Rei. Br C and Ha A1 periods. It is noteworthy that a handful of comparable spearheads were discovered in Germany, Transcarpathia and Poland[51].

The possible steps of Eastern European spearhead production were experimentally explored by F. Trommer and T. Bader in depth, which provides a framework to identify the manufacturing traits on the local material[52]. The Rinyaszentkirály spearhead is a finished product even though it showed casting defects (misrun) along its socket (**fig. 3, D-E**). It was completely manufactured, and the casting seams were removed from its narrow sides. Based on a large and shallow bow along its cutting edge (**fig. 3, A**), this object was probably used[53]. Different damage types can be identified on the item, its tip was removed and bent. The removal of spearheads' tips is a frequent treatment that can be observed in other contemporaneous material as well[54]. Impacts caused by a blunt object (probably by a hammer or hammer-like tool) were visible on both sides of the slightly bent tip (**fig. 3, B-C**). The socket is partly damaged. On one side, impacts were present (**figs 1, 3;**

3, D). Based on the experiments of M. Knight and N. Burridge, these tool marks may have been the results of plastic deformation[55].

Further objects

The weapon elements of the Rinyaszentkirály hoard are the fragments of three quality objects: a greave, a metal-hilted sword and a spearhead. The typo-chronological characters and parallels of the finds suggest that they were most likely of local origin and contemporaneous (Ha A1). One of the most important aspects of these weapons is the presence of use-wear traces. It should be emphasized that not only the »common« spearhead but also the »exclusive« objects were used. The greave was repaired by small wires, the sword hilt was worn-out due to continuous gripping. The extreme nature of these traces could mean that these deposited weapons had a long use-life. All weapons selected for this hoard were deliberately damaged. The greave was ripped off from its organic part and folded, the sword hilt was broken into two parts in an unusual way, and its socket was crushed. The tip of the spearhead was removed, and its socket was crushed, too. As a result, none of them were recyclable and suitable for further use. Significant and meaningful parts (another greave; hilt and blade of the sword, spear tip) are missing, which reflects on the *pars pro toto* concept of selection.

To interpret the presence of weapons in a hoard, the whole assemblage should be examined. Below, the main aspects of the other components will be summarized with special emphasis on their relation to the selected weapons, based on a preliminary analysis carried out with the same method. The interpretation of the obtained patterns will be discussed at the end of the study.

The most dominant group of the Rinyaszentkirály hoard (**fig. 4**) is the raw material, which consists of a lost casting jet and plano-convex ingots. The macroscopic traces on the ingots (e. g. multiple hammer impacts, cut marks, blade impacts, edge chipping) suggest the application of different partitioning techniques that were carried out in a half-melted state after casting or later in a pre-heated state (**fig. 5, 6**)[56]. This component weights ca. 15 kg, but it is important to highlight that it is mainly composed of small quarter and edge fragments of plano-convex ingots[57]. With a rough estimation the original raw material amount could have been at least three or four times heavier. Consequently, the selection of ingots has also followed a *pars pro toto* concept, small parts were deposited, the larger pieces were most likely used for casting.

The selection of sickles shows a uniform pattern. All of them were finished products with observable traces of use in four cases. Except a single specimen, each of them was broken, some even showed bending traces (**figs 4; 5, 7**). The axes had analogous treatment to weapons as several were exposed to different manipulations beside breakage. Like the sword and the spearhead, hammer impacts and the crushing of sockets or wings are observable on these tools (**fig. 5, 2-5**). In one case, even the phenomenon of objects combination can be described, as another object – probably a sickle blade – was hammered into the axe (**fig. 5, 3**). Only one complete axe was selected. As axes, especially the winged ones could have been used as weapons, similarities in treatment with weapons is not so surprising. Among the metallurgical tools, only the reworked winged axe was intact (**fig. 5, 4**). The chisel was broken, as well as the metal casting core used for high precision casting (**fig. 5, 1**). The intact state of the heavily used winged axe/hammer is particularly interesting because most of the breakages in this hoard were probably done by a hammer. It cannot be ruled out that perhaps this was the destructive tool.

The vessels of the banquet set deserve special attention, not simply because their value and is similar to those of sheet metal weaponry, but because of their well-comparable damages. The cist was deposited in two fragments, one of them was folded[58]. The Kurd type situla was treated in the same way, and originally three pieces were deposited, two of them in folded state[59]. Ornaments has also showed a personal

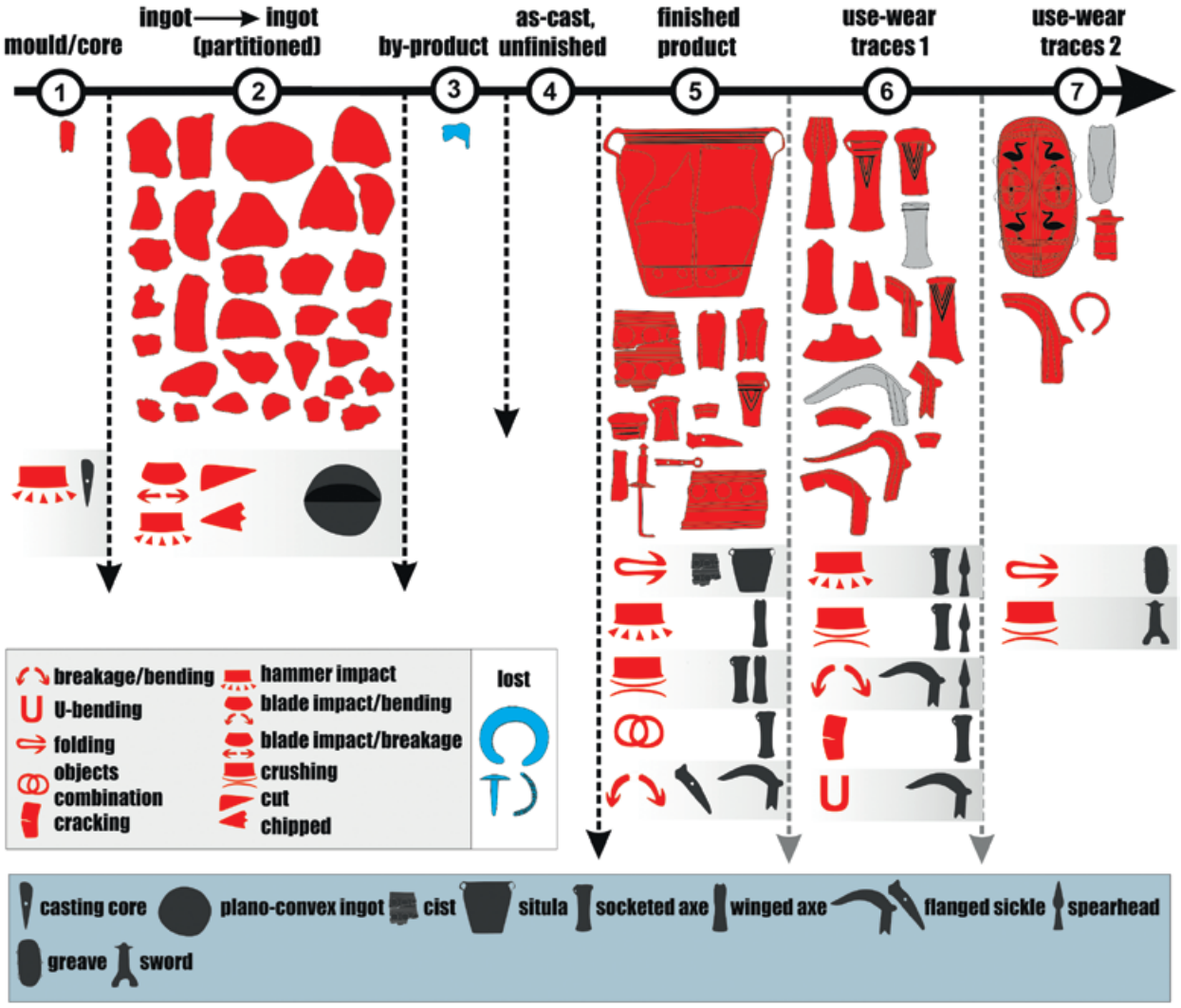

Fig. 4 Preliminary selection model of the Rinyaszentkirály hoard. – (Graphic and analysis J. G. Tarbay).

set-like selection. This group consists of a large hollow ring, a broken torques and a ring with tapering terminals and worn patterns, like the worn-out hilt sword. If the rivet with a cast tube was in fact the part of a wagon/chariot[60], then this object had important relations with weapons. The wagon or chariot is also depicted as two spoke wheels on the greaves, as the central motif. The selected object could have been the *pars pro toto* representation of this prestigious vehicle.

In general, the assemblage primary contains raw materials and finished products. As-casts, semi-finished products and defective casts are completely missing. The hoard is also heavily fragmented and several phenomena can be observed that are related to the breakage and/or manipulations of the objects: bending, folding, objects combination, cracking, hammer and blade impacts, crushing of parts, cut marks, etc. Only three objects were intact, a narrow socketed axe with one rib, a flanged sickle and a winged axe/hammer. Traces of use, even extreme ones were observed on several finds. By comparing to other pieces of the Rinyaszentkirály hoard, the selected weapons have no special character. They fit into the general pattern of this assemblage, such as the selection of finished and used products, heavy fragmentation, *pars pro toto* selection, applied manipulation techniques. However, the fine comparison of weapons within the hoard material is possible. The spearhead and the sword were similarly fragmented and manipulated to the multi-

Fig. 5 Objects from the Rinyanszentkirály hoard: **1** broken casting core. – **2** broken axe with crushed wings. – **3** flattened socketed axe with an addition fragment inside. – **4** broken winged axe re-used as a hammer. – **5** twisted socketed axe. – **6** quarter fragment of a plano-convex ingot partitioned in a heated state by a bladed tool. – **7** over-used broken flanged sickle. – (Rippl-Rónai Megyei Hatókörű Városi Múzeum, Kaposvár; photos J. G. Tarbay).

functional socketed and winged axes. The greave can be well compared to other prestigious sheet metal products, namely the two metal vessels that were broken and folded. The links between weapons support the idea that they could have been closely connected to other elements of the hoard. This idea will be further explored in the last section of this article.

CASE STUDY 2: KESZŐHIDEGKÚT

According to the inventory book of the Hungarian National Museum, the hoard was bought from F. Mohai in 1926 as one assemblage originating from Keszőhidegkút village (Tolna County/H). No additional records have been preserved on the circumstances of discovery or about the exact find-spot of the assemblage. Since F. von Tompa, many researchers attempted to describe the content of this large hoard. In these works, the hoard was selectively published, and only the objects that were considered as significant from a typo-chronological point of view were discussed or included on plates[61].

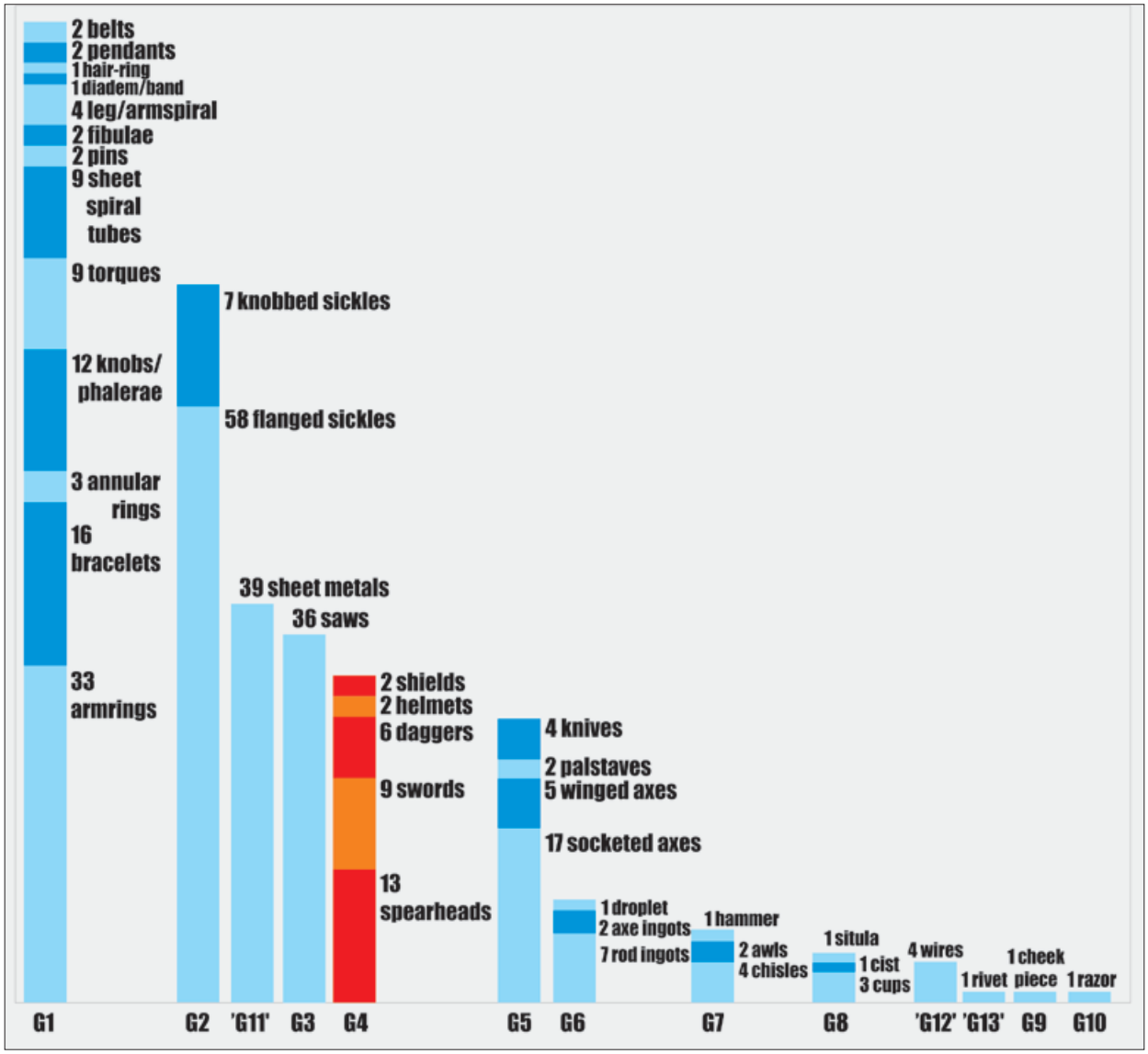

Fig. 6 The composition of the Keszőhidegkút hoard based on personal examination of the finds. – (Graphic J. G. Tarbay).

The Keszőhidegkút hoard is one of the largest (324 pieces) from Transdanubia dated to the Late Bronze Age (**fig. 6**)[62]. It contains nine swords, thirteen spearheads and six daggers, as well as two shield fragments and at least two helmets (**figs 6, G4; 8-9**). However, these are not the main components of the hoard. The assemblage is dominated by different ornaments, mostly rings of all functional types, with even »foreign« fashion elements like the Eastern Carpathian legspiral and the folded sheet metal belt decorated with repoussé patterns (**figs 6, G1; 7, 5**). The agricultural tools (flanged and knobbed sickles) form the second largest group with 65 objects, which is enough to equip an entire group of farmers (**figs 6, G2; 7, 16-17**). Scrapped sheet metal artefacts are also dominant. They include fragments of saws (36 pieces), ornaments (belts, different types of armrings and bracelets, tubes, knobs, diadem/band) and metal vessels (**figs 6, G1. G3. G8. G11; 7, 7. 9. 14-15**). The metal banquet set is analogous to the Rinyaszentkirály hoard, as this set contains a situla, a cist and three bronze cups (**fig. 7, 4**). The other large group of the hoard is represented by multifunctional tools: socketed axes, winged axes, palstaves and four knives (**figs 6, G5; 7, 1-3. 8. 10. 13**). The raw material component, which was prominent in the previous assemblage is in much smaller number here. It simply means a droplet, two axe ingots and seven rod ingots (**figs 6, G6; 7, 18**). The set

Fig. 7 Objects from the Keszőhidegkút hoard: **1** broken socketed axe with V-ribs. – **2** multi-part fragments of an Eastern Carpathian socketed axe with beaked-shaped mouth. – **3** broken palstave. – **4** Hajdúböszörmény style metal vessel fragment. – **5** folded sheet belt. – **6** chisel. – **7** legspiral fragment. – **8** broken palstave. – **9** diadem/belt fragment. – **10** as-cast axe fragment. – **11** razor. – **12** cheek piece. – **13** fragment of a socketed axe with beaked-shaped mouth. – **14** half-melted bracelet. – **15** half-melted torques. – **16** over-used flanged sickle. – **17** flanged sickle with curved inner rib. – **18** hammered rod ingot with flash. – (Hungarian National Museum, Budapest, photos J. G. Tarbay).

of specialized metallurgists' tools (1 socketed hammer, 2 awls, 4 different chisels) are also worth to note (**figs 6, G7; 7, 6**). In addition to these tools, individual elements are also present like a rivet, a cheek piece, a razor, and some unclassifiable wire fragments (**figs 6, G9-10. G12-13; 7, 11-12**).

Researchers proposed various options on the relative chronological position and even on the absolute dates of the Keszőhidegkút hoard without any radiocarbon data: Rei. Br D-Ha A1; Rei. Br D/Ha A1, »Kisapáti-Lengyeltóti-Stufe«/Kisapáti type bronze industry/Kurd horizon (Ha A1); Ha A1 and partly Ha A2; Ha A1-Ha A2; Ha A2; 1200-1050 BC[63]. Since the entire content of the hoard has never been published and analysed in detail, this confusion is not surprising at all. A separate study with fine typological analysis on all artifacts would be necessary to define the relative chronology of the Keszőhidegkút hoard. Here only the main arguments on the relative chronological assignment of the assemblage will be addressed, which should be later refined by further research.

The hoard contains mainly Ha A1 objects. However, there are also some older and younger artefacts in the assemblage. The presence of these finds suggests a long and complex chronological sequence, which roughly lasts from the Rei. Br B2/C period to the Ha B1 period. The oldest object of the hoard is a dagger (**fig. 9, 24a-24b**) with parallels from the Rei. Br B2/Rei. Br C period of the Tumulus culture (see below). The two palstaves also represent the older types (Rei. Br D, Rei. Br D/Ha A1). These tools were rarely selected for the hoards of the Ha A1 period when socketed axes became much more dominant among the Transdanubian material (**fig. 7, 3. 8**)[64]. Some unpublished Eastern Carpathian objects like a Salgótarján type armspiral fragment (**fig. 7, 7**), a folded sheet belt with repoussé patterns (**fig. 7, 5**) as well as knobbed sickles with one inner rib are also characteristic of the Rei. Br D/Ha A1 period[65]. The majority of the objects, including the spearheads, swords and armours, indeed belong to the Ha A1 horizon as A. Mozsolics already pointed out in 1985[66]. In addition to these finds, there are also several types that were used for a longer period of time starting from the Ha A1 period[67]. The youngest objects can be dated to the Ha B1 period. P. Patay was the first who drew attention to a metal vessel fragment with embossed bird motif, which was fabricated in a characteristic style that recalls the metal vessels of the Hajdúböszörmény horizon (Ha B1) (**fig. 7, 4**)[68]. A small sickle with curved inner rib and one spur is also typical in this period (**fig. 7, 17**)[69].

In short, the hoard's first object can be dated to the period of the Tumulus culture. Many of the finds belonged to the Ha A1 period. The final deposition of the assemblage can be a *terminus post quem* dated to the Ha B1 period. The complete relative chronological range covers roughly 400-500 years. This relative chronological sequence suggests that the Keszőhidegkút assemblage may have been a »multi-period hoard«, a phenomenon known from secure context in Central and Western Europe during the Late Bronze Age[70]. Different scenarios can be proposed for the formulation of this pattern: 1. The mixing of finds before museum acquisition, which is always a plausible scenario, when the assemblage context is unknown[71]. 2. A long-time accumulation starting from the Tumulus culture[72]. 3. Objects and styles existed for multiple periods (Rei. Br D/Ha A1 objects) and elongate the relative chronological pattern. 4. Selection of »out-of-time« objects (dagger) and manipulation for a long period[73]. If we exclude the idea that the content of the Keszőhidegkút hoard was manipulated in modern times, a combination of the last three scenarios could explain this pattern.

Spearheads

Overall, 13 spearheads can be identified in the Keszőhidegkút hoard (**fig. 8, 1-13**)[74]. Four of them are small variants with leaf-shaped blades (nos 3-5. 10; **fig. 8, 3-5. 10**), which are quite common during the Ha A period in the Western Carpathian Basin and the Northern Balkans. One has a flame-shaped blade and it falls into the same group as the Rinyaszentkirály spearhead (no. 12; **fig. 8, 12**). The rest of them can be classified as spearheads with willow-shaped blades (nos 7-9; **fig. 8, 7-9**) or spearheads with long and narrow (nos 1. 11; **fig. 8, 11**) or slightly willow-shaped blade (no. 2; **fig. 8, 2**). Considering its size, the socket

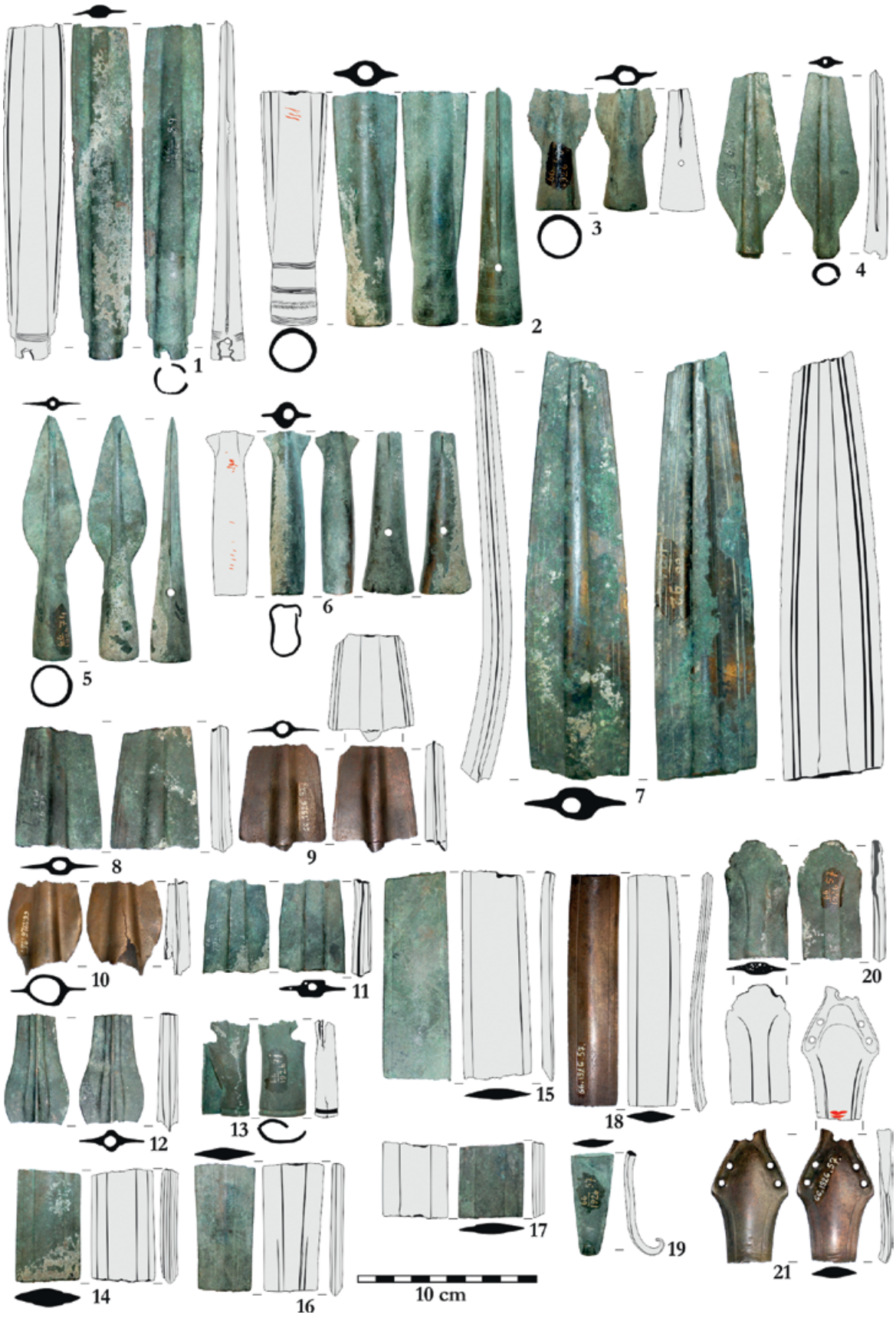

Fig. 8 Fragmented weapons from the Keszőhidegkút hoard: **1-13** spearheads. – **14-21** swords. – (Hungarian National Museum, Budapest, photos J. G. Tarbay).

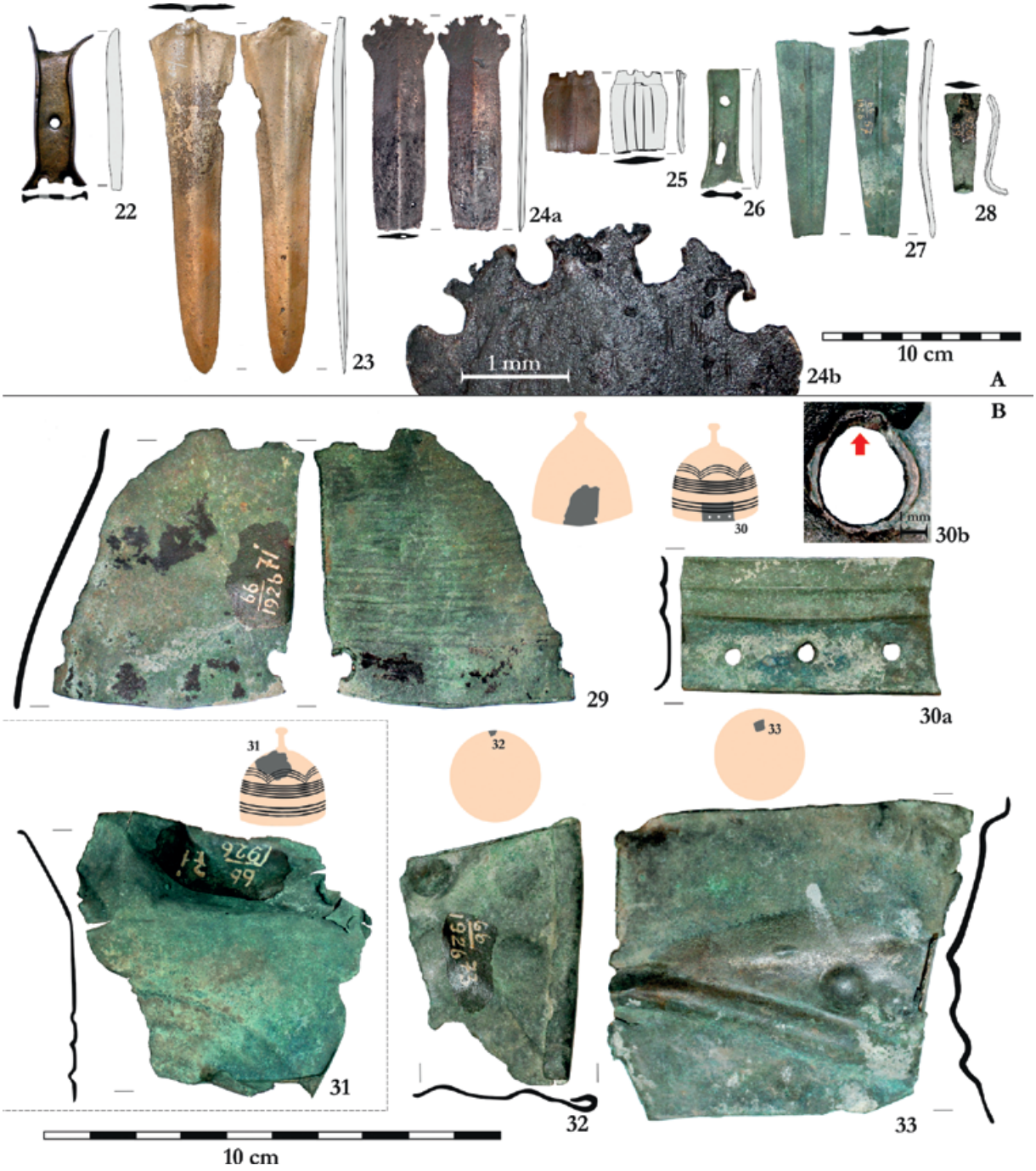

Fig. 9 Fragmented weapons from the Keszőhidegkút hoard: **A 22** sword; **23-28** daggers; **24b** worn peg holes. – **B 29-30a** helmet fragments; **30b** worn peg hole; **31** uncertain helmet fragment; **32-33** shields' fragments. – (Hungarian National Museum, Budapest, photos J. G. Tarbay).

fragment no. 13 may have been a large spearhead (no. 13; **fig. 8, 13**). From a typo-chronological point of view, large spearheads deserve special attention.

According to the study of P. Turk, spearheads with willow-shaped blades usually have a short socket and their length is above 20 cm (nos 7-9; **fig. 8, 7-9**). Most of them were found in assemblages dated around the Ha A period. Only a handful of them were recovered from Ha B1 hoards (e. g. Miljana). These spearheads are scattered between the territories of Northern Italy, Austria, Transdanubia, Southern Germany and

the Northern Balkans. Some comparable spearheads are also known from Greece[75]. A fine example is an unprovenanced stray find from the Diakata (Kefalonia Island/GR) 1/K burial, which R. A. J. Avila interpreted as a weapon derived from »Central Europe«[76]. The best parallels of the Keszőhidegkút specimens could be mentioned from Western Hungary, Moravia, Austria, Italy, Croatia, Serbia and Slovenia. Chronologically they represent the main periodization trend of this weapon group. Many of these spears were broken like the Keszőhidegkút finds[77].

Two specimens belong to the distinct group of Central European spearheads, of which the main typological characteristics are the long and narrow blade, the relatively short socket, and the rectangular/circular-shaped midrib (nos 1. 11; **fig. 8, 1. 11**). Following P. Schauer's idea, the sub-variants of this spearhead group can be mainly differentiated by the presence of ricasso, which can be interpreted as an important functional feature[78]. The main distribution area of these spearheads corresponds to the Western Carpathian Basin, the Northern Balkans and the region of the Alps towards France. From a chronological point of view, they can be dated mainly to the Rei. Br D/Ha A1 and Ha A1 periods. Later deposited (Ha B1) specimens are also known[79], but they are rare and in case of the Mezőkövesd hoard (Borsod-Abaúj-Zemplén County/H), whether the spearhead belongs to the assemblage is uncertain[80]. Spearhead no. 1 from Keszőhidegkút can be linked to the variants with ricasso. The pieces of this variant are often richly decorated with individual forms. Only a few spearheads are known from France, Germany, Austria, Bohemia, Slovakia, and Eastern Hungary[81]. The small blade fragment with rectangle-shaped midrib (no. 11; **fig. 7, 11**) could have been a similar spearhead with or without ricasso. Several comparable decorated or undecorated fragments are known from the southwestern part of the Carpathian Basin. A fine example is the intentionally bent and broken spearhead blade from Mohács-Csele creek (Baranya County/H; **fig. 10, 2**)[82]. Undecorated fragments like the one from Keszőhidegkút are known in large numbers in Transdanubia and its adjacent areas around the Ha A1 period[83]. An impressive example of how a complete specimen could have looked like is a 52 cm long, decorated spearhead from »Hungary« (**fig. 10, 1**). This masterfully crafted specimen was most likely used for cutting/slashing movements, as shown by microscopic damages, which relate to edge-on-edge contact (**fig. 10, A-C**)[84].

The original shape of spearhead blade no. 2 is hard to reconstruct, as it was most likely re-shaped several times because of continuous maintenance (see below). It represents a rare form (short decorated socket, circular-sectioned midrib and elongated willow-shaped blade) in the Carpathian Basin of which only a few well-comparable parallels are known: a stray find from Simontornya (Tolna County/H), an unprovenanced fragment from the »D. Savo collection«[85]. S. Pabst proposed the idea that this spear ans spearhead no. 1 were part of the same group that appeared in the Carpathian Basin as a result of Aegean influence, and also excluded the possibility of Northern European influence (Ullerslev type)[86]. I do not share this hypothesis completely. Typological similarities with the Aegean material can be observed in case of spear no. 1, but no. 2 and its rare parallels are quite different. Spearheads with richly decorated short socket, circular-sectioned midrib and an elongated and narrow willow-shaped blade are known in large numbers from Northern Europe (Northern Germany, Denmark, Sweden and Northern Poland). Among these, the overall characteristics of the already mentioned Ullerslev type (Period II-Period III) are quite similar. This type has also reached the borders of the Carpathian Basin (e. g. Hulín [okr. Kroměříž/CZ])[87]. The whole design of spearhead no. 2 is quite »Nordic«, the main difference consists in the simpler motif that rather represents the Carpathian style. The Northern European spearheads could also have influenced the development of these new spear types in the Br D/Ha A1, Ha A1 Carpathian Basin. The reciprocal influence between Northern Europe and the Carpathian Basin is a long-known phenomenon, which is indicated by emblematic objects (e. g. Lommelev-Nyírtura type shields, miniature swords, metal vessels, the belt plate from Dunaföldvár [Tolna County/H], the »throne« from Haschendorf [Bez. Oberpullendorf/A], etc.) and also supports the

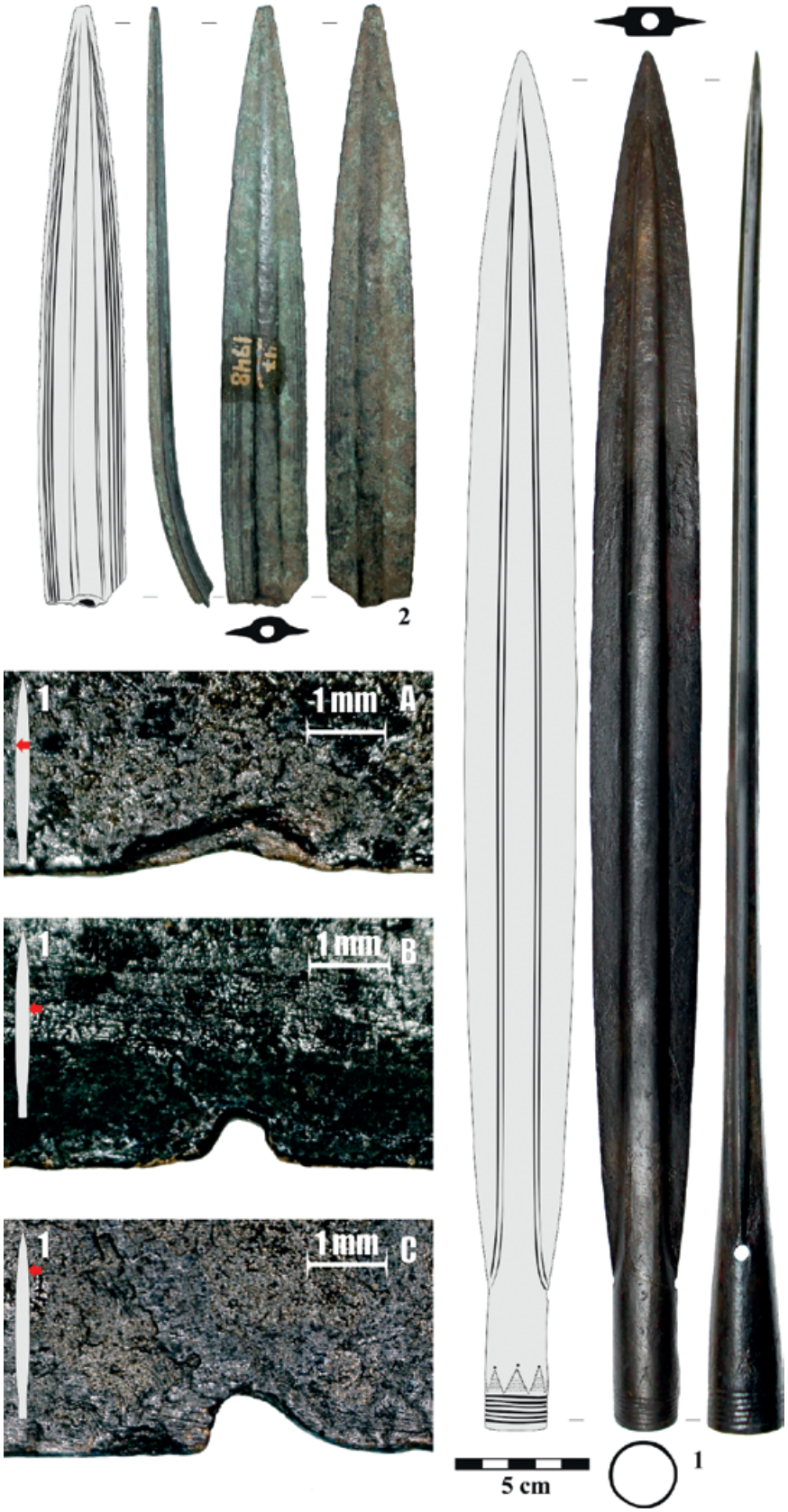

Fig. 10 **1** the spearhead from »Hungary« (L. 52 cm, W. 23.24 mm × 23.09 mm, 39.09 mm × 10.19 mm, Wt. 541.6 g): **A** bow; **B** U-shaped notch; **C** asymmetrical dent. – **2** the bent spearhead fragment from Mohács-Csele creek (Baranya County/H) (L. 22.7 cm, W. 32.33 mm × 9.39 mm, Wt. 188.1 g). – (Hungarian National Museum, Budapest, photos, drawings and micrographs J. G. Tarbay)

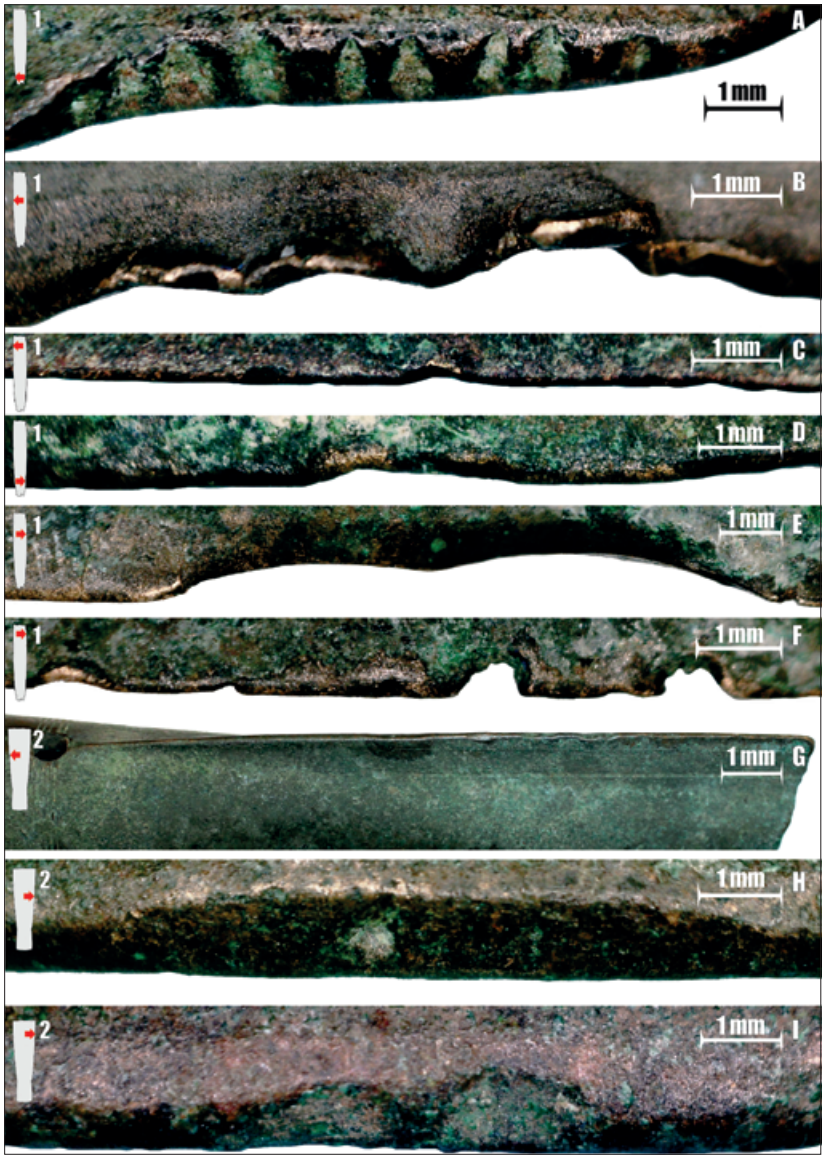

Fig. 11 Keszőhidegkút, combat traces on spearheads: **A** worn ricasso. – **B** bows. – **C-D** dents. – **E** bows. – **F** U-shaped notches. – **G** dull cutting edge. – **H** flattening. – **I** flattening damage and worn dents. – (Micrographs and photos J. G. Tarbay).

existence of long-term elite contacts between these regions[88]. Therefore, a northern influence on the development of these new spearheads during the Br D/Ha A1, Ha A1 period in the Carpathian Basin is a plausible scenario.

As for the topic of northern relations, socket fragment no. 13 is an interesting object. Its socket mouth is ribbed (»gerippter Tüllenmund«), which is an uncommon feature in the Carpathian Basin (no. 13; **fig. 7, 13**). Spearheads with such typological marks are known from Northern Europe, between the Period III and Period V[89]. Due to its fragmentary state, a comparative elemental-composition analysis is needed to support any connections.

From a technological point of view, all spearheads can be determined as finished products since they show characteristic macroscopic traces (e. g. removed casting seams, sharpening, cold hammering and/or annealing of the cutting edges, grinding traces, incised patterns) that experimental archaeological research related to the post-casting phase of these weapons (cf. **fig. 15, D**)[90]. Some of them have casting defects like mismatch (nos 3. 6-7), which was later modified by removing the seams and shifted parts along the socket. Minor porosity (nos 7. 11) could only be observed along the breakage surfaces. Core shift was also visible

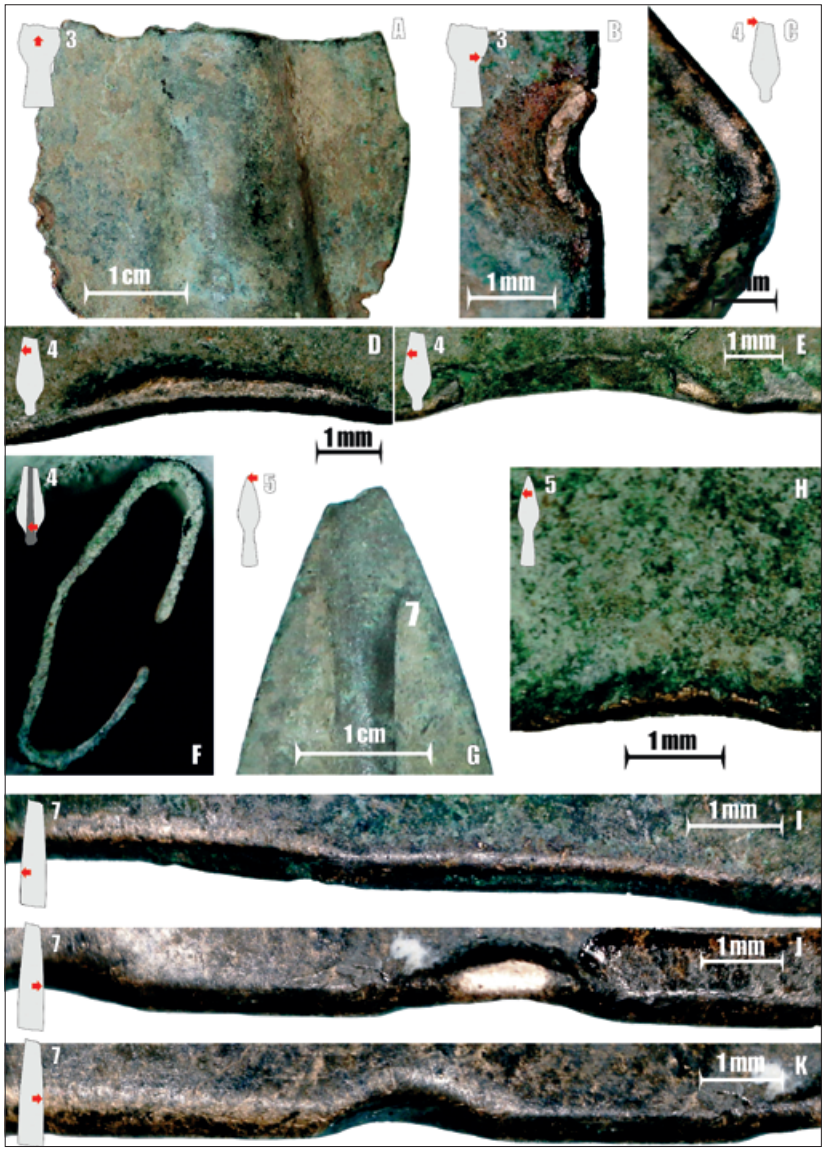

Fig. 12 Keszőhidegkút, post-depositional and combat traces on spearheads: **A** crushed midrib. – **B** modern damage. – **C** worn breakages surface. – **D** bow. – **E** shallow dent. – **F** a sheet metal tube inserted into a spear's socket. – **G** re-shaped and damaged tip with damage. – **H** dent. – **I** worn cutting edge. – **J-K** worn cutting edge and dents. – (Micrographs and photos J. G. Tarbay).

on one specimen (no. 6). The presence of post-casting treatment traces and use-wear (see below) suggests that these were defects ignored or tolerated by the metalworker and by the owner of the weapons.

All analysable spearheads showed different traces of use (**appendix 2**)[91]. These traces varied between the different types of shallow dents (**figs 11, G-D; 12, E. H. K; 13, A. D**), bows (**figs 11, B. E; 12, D. J**) or U-shaped notches (**fig. 11, F**)[92]. It should be noted that several damages seem to have worn surfaces (**figs 11, I; 12, I-K**). Flattening traces caused by edge-vs-flat collisions (sword flat, shield, etc.) were also observed on larger specimens (**fig. 11, G-H**) based on the spear combat experiment of K. Anderson and sword experiments of V. Gentile and A. van Gijn[93]. Curvatures with large material displacements can be the result of similar collisions, but can also be intentional (**figs 11, E; 13, B-D**)[94]. A minor tip damage (fissure) that may have been the result of stabbing/throwing action was only present on one specimen (**fig. 12, G**). It is notable that this spearhead had only minimal damages along the cutting edges, which support this function[95]. The phenomena of dull cutting edges are quite important, especially on long sword-like specimens (nos 2. 11; **figs 11, G-H; 12, I-K; 13, E**). These highly worn surfaces show a long and intense use-life. A particularly good example is spearhead no. 2, which does not only have a blunt edge, but also narrow blades due to re-

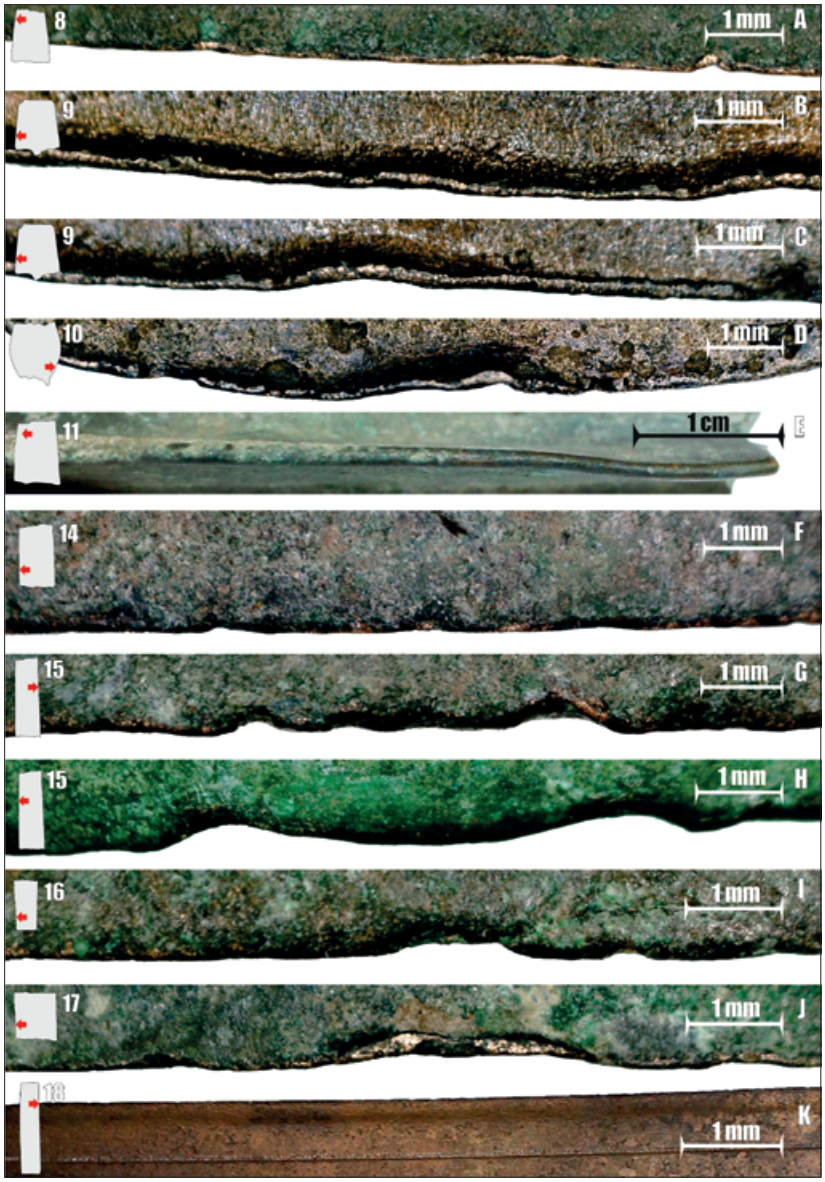

Fig. 13 Keszőhidegkút, traces on swords and spearheads. – Spearheads: **A** shallow dents; **B-D** curvatures and dents along the cutting edge; **E** dull cutting edge of a spearhead. – Swords: **F-I** dents; **J** bows; **K** hammered cutting edge. – (Micrographs and photos J. G. Tarbay).

shaping (**fig. 11, G-I**)[96]. Other intensive traces can also be noted like the completely worn ricasso (**fig. 11, A**) or worn midribs (nos 2. 4. 7. 12). I find it likely that some of the notches are also worn, since they show a rounded surface. Three different repair/maintenance marks were also identified: 1. re-shaped blades (see above), 2. a shortened tip (**fig. 12, G**), and 3. a shortened socket (no. 1; **fig. 15, B**).The second one is undoubtedly the result of a previous tip damage caused either by impact of throwing or thrusting actions against a durable target (e. g. armour, shield). The third one can also have technological causes: if the socket cast was incomplete, the craftsmen removed the defected parts. The technological solution for a broken socket was also the same[97].

Most combat marks on the studied spearheads, especially on the long ones were identical to the deflective and offensive damages observed on swords. Thus, these long specimens were obviously not simply thrusting weapons as it has been proposed recently[98]. Bronze Age spearheads had no uniform function, they were suitable to perform various combat movements. The observations on the long spearheads of Keszőhidegkút seem to match well with the previous observations on Western Central European and Northern European Bronze Age spearheads, too[99]. Among these, the idea of P. Schauer deserves special attention. He was

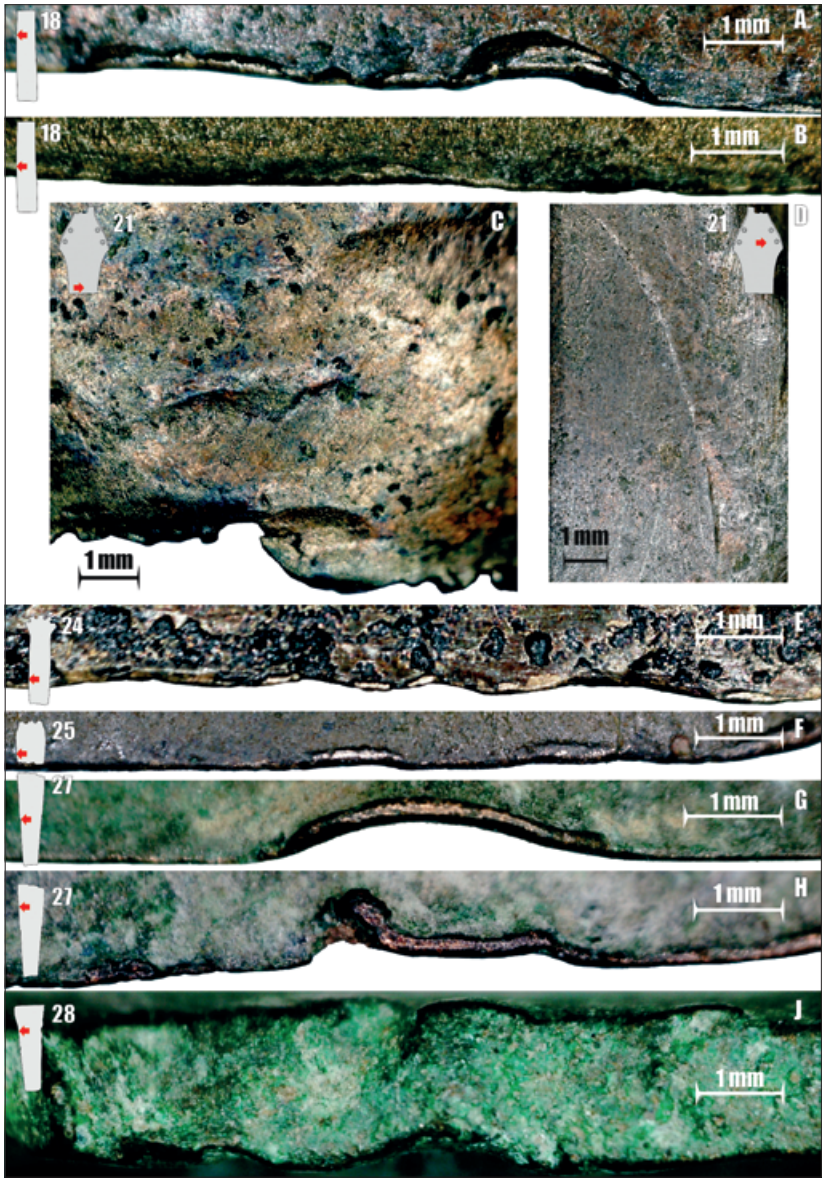

Fig. 14 Keszőhidegkút, traces on swords and daggers. – Swords: **A-B** bows; **C** tool impacts near to the breakage point; **D** organic hilt imprint. – Daggers: **E** dents; **F-G** bows; **H** curved notch; **J** intentionally damaged edge. – (Micrographs J. G. Tarbay).

the first to recognize that long spearheads like no. 1 from Keszőhidegkút may have been used as halberds (pole arms), considering the presence of notches and the length of the wooden shaft from Gau-Algesheim (Lkr. Mainz-Bingen/D). These long spears can be hafted in several ways also as melee weapons like the one in K. Anderson's experimental archaeological study. Both hafting variants can show combat traces similar to swords[100].

As of the fragmentation of the spearheads, except the one with use-wear damage (no. 5) all of them were deliberately destroyed and deposited in a state beyond repair. Overall, five fragmentation form groups can be separated, displaying a range from intact to small fragments[101]: intact (no. 5), tip of the spearhead is missing (nos 1-3), middle or lower blade fragments (nos 7-12), socket fragments (nos 6. 13), missing tip and socket (no. 4). In addition, various damage traces can be identified which are comparable with previous archaeological and experimental observations[102]: bending (nos 1. 3-4. 6-9. 11), hammer (nos 3-4. 10-11) and blade impacts (nos 2. 6), crushed sockets (nos 6. 13) or midrib (nos 3. 10; **fig. 12, A**), objects combination (no. 4; **fig. 12, F**), cracks associated with the removal of shaft (no. 1; **fig. 15, A**). As I have mentioned already, the curvatures may also be the result of intentional damaging.

Fig. 15 Keszőhidegkút, traces on swords and daggers: **A** crack caused by the removal of the shaft. – **B** shortened socket. – **C** tool impacts near to the breakage surface. – **D** hammered cutting edge of a spearhead. – **E** swords that showed several manufacturing traces (hammered flanges, perforated rivet holes, hammered cutting edge) and manipulation (blade impacts). – (Micrographs and photos J. G. Tarbay).

Swords

The Keszőhidegkút hoard contains nine sword fragments (nos 15-22; **figs 8, 15-21; 9, 22**). Their current state does not allow a precise classification. Two of them were classified to local Ha A1 flange-hilted sword types (no. 21: C4; no. 22: A3), the rest was interpreted as atypical fragments by T. Kemenczei[103]. Since none of the fragments is suitable for an in-depth characterization, I will concentrate my attention on their technological traits.

Like the three hilt pieces (nos 20-22), it is likely that the blades were originally part of flanged-hilted swords, which is more common in Transdanubia during the Urnfield period. Like spearheads, these swords are also finished products. Characteristic traces that prove the above mentioned conclusion were observed on all pieces. The cutting edges of these fragments are sharpened. Some of them even show traces of macroscopically visible hammering along the edges (nos 17-21) that may relate to cyclic cold-working and/or annealing based on experimental archaeological studies and metallographic analyses on Late Bronze Age swords from Eastern and Western Europe (**figs 13, K; 15, E**)[104]. In addition, hammer impacts that belong to the post-casting treatment were also visible between the flanges (nos 21-22). Some specimens that had a more suitable surface for study, showed microscopic traces of grinding (nos 18. 22), which is a finishing process of sword making that provides a weapon with smooth surface[105]. Traces related to hafting were also observed like the imprint of an organic hilt (**fig. 14, D**) or perforated rivet holes (nos 21-22; **fig. 15, E**). It is notable that gas porosity was also noticeable along the breakage surfaces of three specimens (nos 15-16. 20), but like spearheads it did not affect the usage of these swords significantly (see below)[106].

The fragmentary condition of the studied weapons limited the possibilities to analyse the original combat style since the crucial morphological elements and dimensions (e. g. the exact shape of the blade, the overall weight, the hilt shape, the point of balance) remained unknown[107]. Thus, the analysis focused on the observation of micro use-wear traces on the preserved blade parts. Of the known damage types caused by blade-on-blade contact, mostly shallow dents (**fig. 13, F-I**) and bows (**figs 13, J; 14, A-B**) were present along the cutting edges of the studied sword fragments[108]. Like the spearheads' edges, damages on the swords seem to show worn surfaces, too (**fig. 14, H**). Some of the traces indicated densification, which can be associated with the rippling phenomenon[109].

Based on stylistic and size differences, most of the sword fragments belonged to individual weapons. Refitting along the breakage surfaces of the objects was not possible. Only two pieces (nos 18. 21) may have belonged together based on their correlating style and sizes, but this should be confirmed by a comparative elemental-composition analysis in the future. The selected sword fragments represent the low variability of the known fragment shapes from Transdanubia[110]: hilt fragments (no. 22), hilt and blade fragments (nos 20-21), blade fragments (nos 14-15. 17-18), a lower blade fragment (no. 16), and a tip fragment (no. 19). Like in case of the spearheads, bending is often correlated with the breakage (nos 14-15. 18-22). One of the fragment's tip was bent backwards (no. 19), an intentional damage that was also observed on the Dolwyddelan (Wales/GB) fragment by B. T. Quilliec[111]. Cutting edge damages were also visible on a specimen (no. 20). Several chisel edge impacts were seen near to the breakage surface of another fragment (no. 21; **figs 14, C; 15, E**).

Daggers

The Keszőhidegkút hoard contained six dagger fragments (nos 23-28). Their fragmentary state did not allow the classification of all specimens. The oldest object is specimen no. 24 (**fig. 9, 24a**). This dagger was interpreted by T. Kemenczei as a unique second variant of the local long daggers, which has no connection to the former dagger that was used before the Urnfield period[112]. In contrast, F. Kőszegi linked this dagger to the finds of the Tumulus culture period (Rei. Br B2-Br D)[113]. Regarding the periodization of this find, I share his idea. New parallels can be mentioned from the territory of Czech Republic. These daggers were attributed to the Chramostek type by P. Novák, and belonged to the period of the Tumulus culture[114]. This dagger is most likely an »out-of-time« artefact based on its relative chronological position.

Two finds (nos 25-26) represent the supra-regionally distributed Peschiera daggers, which distribution covers the territory from the Italian Peninsula to Scandinavia and several regions between the Alps and the Eastern Carpathian Basin (**fig. 9, 25-26**). Most of these daggers were deposited between the Rei. Br D and Ha A1 periods[115]. However, only fragment no. 25 has classifiable traits: it has a leaf-shaped blade, rounded shoulders, two peg holes and its blade part is decorated with four grooves (**fig. 9, 25**). Identical daggers were found in Lengyel (»Zsibrák«/»Zsibrik«; Tolna County/H) and in the Ha A1 hoard of Nadap (Fejér County/H)[116]. Its parallels are also known from the Phase II Northern Croatian hoards: Pričac (Brodsko-posavska žup./HR) and Otok-Privlaka (Vukovarsko-srijemska žup./HR)[117]. Blade fragment no. 27 with an emphasized midrib may have belonged to a larger dagger variant similar to the Pamuk find (Somogy County/H) (**fig. 9, 27**)[118]. Similar blade fragments were discovered in the Simonfa (Somogy County/H) and in the Brezje pri Poljčanah hoards (obč. Poljčane/SLO)[119].

The daggers deposited in the Keszőhidegkút hoard are all finished products. From a technological point of view, their manufacturing traces are identical to swords. Hammered cutting edges (nos 23. 25), hammering traces on the flanged (no. 26), sharpening (nos 23-24), perforated peg holes (e. g. no. 25) can be observed.

Defects like porosity (no. 24) and mismatch (no. 27) could also be present. A new type of misrun, which results from the miscast of a peg hole was visible on hilt fragment no. 26.
Use-wear traces were observed on three daggers (nos 24-25. 27)[120]. These marks were similar to the ones that were visible on swords and spearheads: shallow dents (**fig. 14, E**), bows (**fig. 14, F-G**). On dagger no. 27 a curved notch was identified (**fig. 14, H**) which could have been caused by an impacting edge[121]. Again, dagger no. 24 deserves special attention. As it has already been observed for other »out-of-time« objects[122], it did not only show dents, but intense use-wear traces like thickening rivet holes (**fig. 9, 24b**).
The six dagger fragments can be sorted into five fragmentation shape groups: broken handle (no. 23), broken tip (no. 24), broken hilt and tip (no. 25), hilt fragment (no. 26), and lower blade fragments (nos 27-28). Bending is visible on several of them (nos 23. 25. 27-28). Tool impacts related to intentional damaging were also present on the studied daggers: some grouped near to the breakage surface (no. 23; **fig. 15, C**), other were located on the cutting edge (no. 28; **fig. 14, J**)[123]. The hilt of dagger no. 24 was torn, according to the damages around the rivet holes (**fig. 2, 24b**).

Shields and helmets

The Keszőhidegkút hoard contains two metal shield fragments (nos 32-33; **fig. 9, 32-33**) and three potential helmet pieces (nos 29-31; **fig. 9, 29-31**)[124]. The shield fragments were classified as a Lommelev-Nyírtura type by P. Patay. This group includes a handful of Carpathian specimens from Transdanubia (Nadap), Croatia (Otok-Privlaka) and Eastern Hungary (Bodrogkeresztúr [Borsod-Abaúj-Zemplén County/H]; Nyírtura [Szabolcs-Szatmár-Bereg County/H]) which were deposited as fragments in large Ha A1 and Phase II hoards. The most significant specimen was found in Lommelev Mose (Zealand/DK). This is a relative large metal shield (Di. 69 cm, Wt. ca. 2 kg) with rich embossed patterns, a shield boss, and a rolled-over rim. As B. Molloy has suggested, the possibility should not be excluded that the Delphi (Greece) shield fragment with V-notch was probably also influenced by this group[125].
Specimen no. 29 is a slightly curved metal sheet with two perforations (**fig. 9, 29**). On the inner surface vertical embossing traces are visible, the rim part is smooth. Its dimensions and manufacture technology are different from the rest of the sheet metal objects in the hoard. A. Mozsolics suggested that this piece could have belonged to a helmet (probably to a cap or bell helmet). However, further comparative elemental-composition analyses are needed to confirm this classification[126]. The other two fragments can be interpreted as a rim and a body fragment of a cap-helmet or helmets with star-shaped patterns. This helmet type is mainly characteristic in Transdanubia and in the Northern Balkans. It also sporadically appears in the northern and eastern part of the Carpathian Basin, as well as in the territories of Austria and Germany. Regarding the chronological position of the type, it was mostly found in hoards deposited during the Ha A1 period. Several pieces were deposited in large scrap hoards as fragments, while the more intact specimens were derived from rivers or acquired by museums as stray finds[127].
There is no doubt that these armours were finished products, which may have been used in combat. However, the identification of traces related to manufacture and use in case of such small pieces is quite unlikely. Thus, our observations are limited to a few phenomena: 1. embossing traces on the inner surfaces (no. 29; **fig. 9, 29**), 2. perforated rivet holes (nos 29-30), 3. a worn rivet hole (no. 30). The traces on the inner surfaces of the cap helmet fragment are the characteristic signs of this type of manufacture, since the body of the armour is built up by cyclic hammering from a flat cast disc. Similar traces are often visible on technologically comparable objects like a situla. The hammering traces inside the well identifiable situla pieces in the Keszőhidegkút hoard differ completely. The perforated rivet holes were used to attach the organic parts of

the weapons. Wear traces on the rivet hole suggest an abrasion by the rivet and the organic part. Based on TOF-ND (Time-of-Flight Neutron Diffraction) data, the two shield fragments were annealed tin objects that belonged to different shields like the ones in the Otok-Privlaka hoard[128].
Shields and helmets were broken into small, almost unrecognisable pieces. Some of the fragments were bent and folded (nos 29-31), which supports the idea that these armours may have been treated similarly to the Rinyaszentkirály greave. Identical treatments of shields and helmets are known from the contemporary hoard materials of the Carpathian Basin[129].

Further objects

The weapon component of the Keszőhidegkút hoard shows a uniform picture. Except the »out-of-time« dagger, all objects are contemporaneous from a relative chronological point of view. Each of them are finished products with average casting and technological defects. From a macroscopic point of view, these are well crafted weapons, which were maintained, and most of them were deposited without removing any traces of use. The largest group consists of spearheads, which were suitable as specialized weapons for different fighting styles, as shown by the use-wear traces. The maintenance traces and intense use-wear marks are important features that suggest a long-term usage. All spearheads were intentionally damaged and broken. Except one, their state became irreversible. Some damages can be interpreted as extra manipulations (e. g. combination of objects, crushing of sockets). The sword fragments were also completely manufactured, finished products showing microscopic traces of use. Most fragments belonged to separate swords which were broken into small pieces. The technologically »aimless damages« were also present in this group. The phenomena observed on the daggers correspond with the swords. All of them are finished products with traces of use, as visible on the analysed specimens. Their fragmentation shapes match with the swords, while extra manipulation (edge notching) was only detectable on one specimen. In addition, at least three potential helmet fragments and two metal shield fragments were selected for the hoard. These are rare and technologically high-quality objects, which were broken and folded. Only a small part of them was selected to the hoard, which has analogues in the contemporaneous Carpathian material.
In case of the Keszőhidegkút hoard, it is important to examine the characteristics of the weapon component in the context of the deposited finds (**figs 16-17**). In contrast to the Rinyaszentkirály hoard, there is a new hoard component including as-casts, unfinished objects and miscasts (1 flanged sickle, 1 socketed axe, 2 saws, 1 knife, 6 ring fragments; **fig. 7, 10**). The raw material component of the assemblage is insignificant. It consists of a small droplet, a broken axe, and a rod ingot. The hoard is dominated by finished products, of which the analysable pieces showed use-wear traces in a significant number and in almost all functional-typological groups. Particularly intensive wear traces can be seen on the sickles (notches, abrasion, narrow edges; **fig. 7, 16**) and saws (worn and dull teeth). Ornaments typically showed abrasion traces (e. g. worn surfaces and patterns) like the spearheads. Axes and chisels had asymmetrical edges or microscopic notches were present along their cutting edges. Even a worn edge damage was observed on one of the winged axes. Intensive traces of use identical to those of the weapons were visible on twelve sickles, a socketed hammer, two knives, and three bracelets. The blades of these sickles and knives were extremely narrow because of their continuous maintenance. The decorations of the rings were heavily worn. The crease of the hammer's face can also be considered extreme.
The condition of the other objects in the hoard correlates with the results on the weapons. Almost all objects are fragmentary[130], only 36 specimens are intact (7 flange sickles, 7 sheet metal tubes, 5 phalerae, 3 knobbed sickles, 3 knobs, 3 rings, 2 chisels, 1 cast funnel-shaped pendant, 1 cheek piece, 1 annular ring, 1

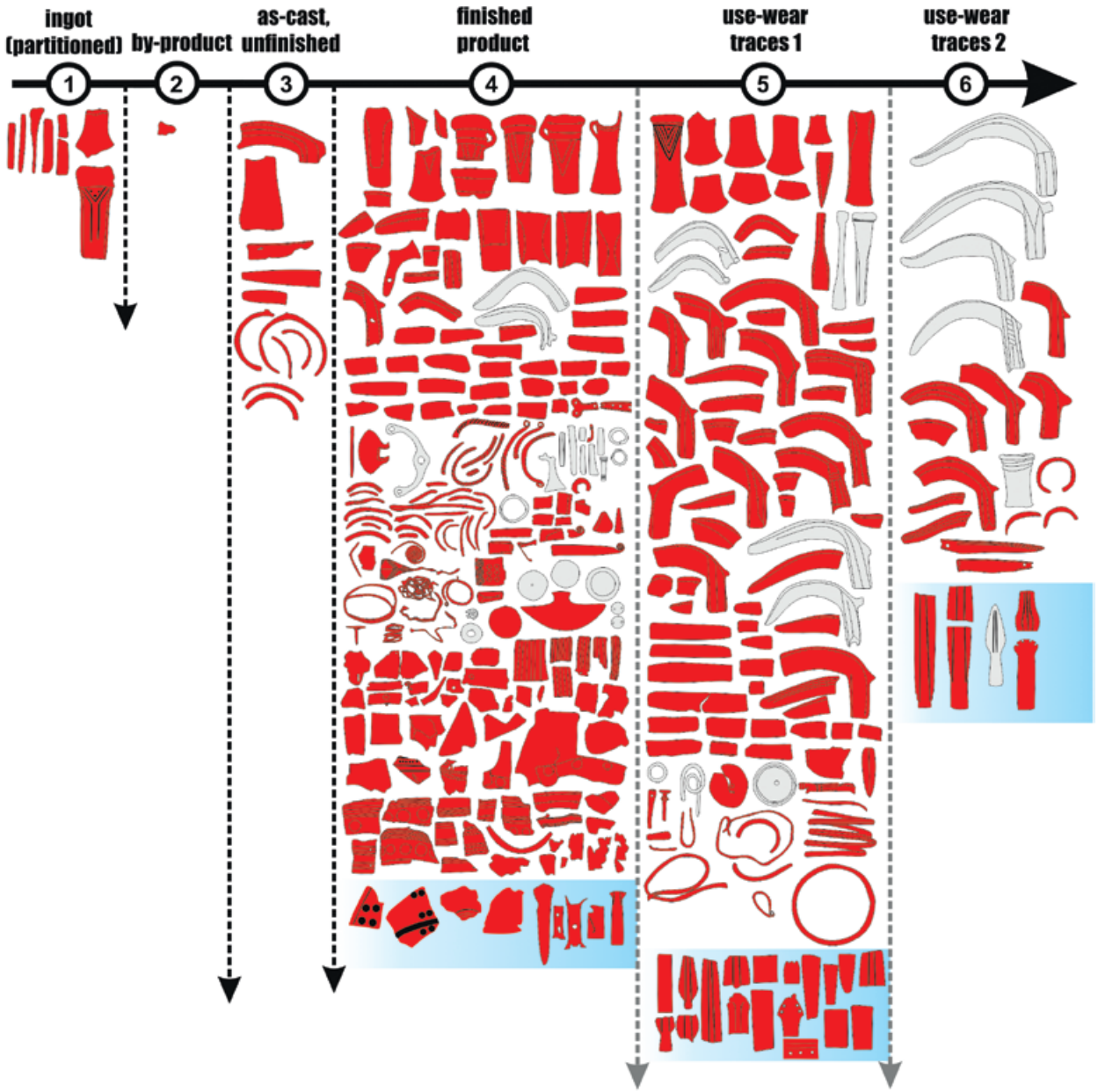

Fig. 16 Preliminary selection model of the Keszőhidegkút hoard 1. – (Graphic and analysis J. G. Tarbay).

awl, 1 spearhead, 1 socketed hammer; **fig. 16**). The intact artefacts were finished products with no observable traces of use or any use-wear traces with various intensities. Smaller and larger fragments can be found, in addition to the almost complete specimens. Some of the fragmented objects could still be used in this state after reparation or modification. Thus, it can be concluded that their condition is irreversible in most cases. Fragmentation covers nearly all technological groups. Particularly common phenomena are the various bending types that occur in combination with or without breakage (e. g. U-shaped bent awl). Extreme folding techniques are visible on metal vessels, armspirals, tubes, sheet metal belts, knobs/phalerae, saws, and rings. As for the Rinyaszentkirály hoard, the best parallels for the destruction of armours can be seen on the bronze vessels. The *pars pro toto* principle of fragmentation is also reflected in sheet metal ornaments. For instance, only a small folded part of the original, large decorated sheet belt was deposited (**fig. 7, 5**). Hammer-related breakage types, impacts and edge damages associated with some kind of bladed tools (axe or chisel) are

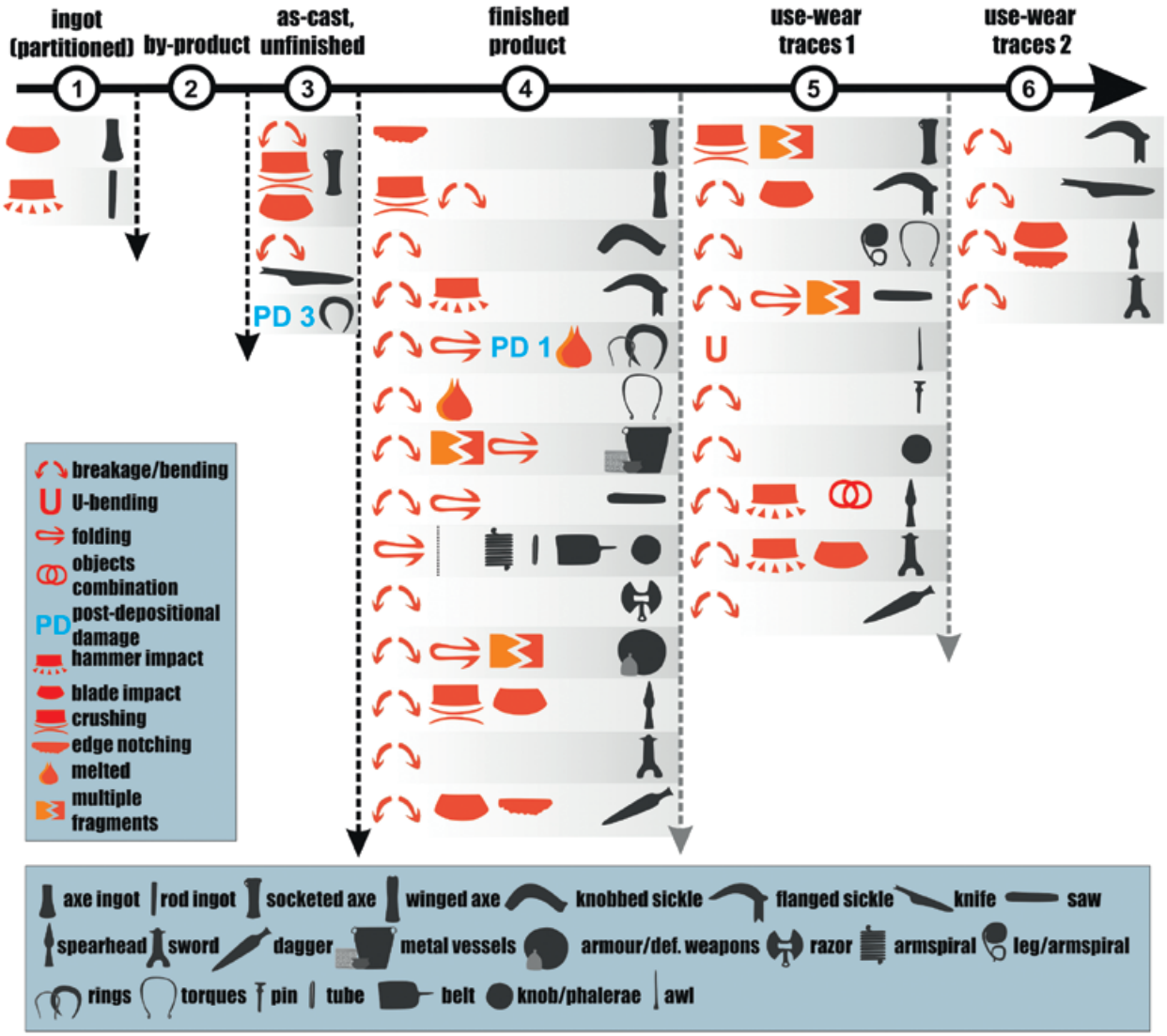

Fig. 17 Preliminary selection model of the Keszőhidegkút hoard 2. – (Graphic and analysis J. G. Tarbay).

common phenomena. Rod ingots were partitioned by the aid of a hammer. On several axes, blade impacts at the breakage surfaces and the socket crushing can be detected just as by the spearheads (**fig. 7, 10**). The phenomenon of multi-part deposition was also observed on saws, axes and especially bronze vessels. A special feature of the hoard is the presence of melt traces on some bracelets and torques (**fig. 7, 14-15**). This type of damage is not related to heat fragmentation, and its best parallels can be observed in cremation burials or »funeral hoards«. It should also be noted that the character of the whole assemblage fits well into the long accumulation model supported by the typo-chronological position of the objects. Among the deposited finds clear differences can be detected in the use-life of the objects (e. g. as-cast, used, intensively used) and even in some intentionally broken artefacts with worn breakage surfaces (e. g. armspirals).

To sum up, the hoard mainly consists of finished products. A few ingots, as-casts and unfinished objects are also present. The amount and intensity of use-wear traces are high. The hoard can be characterized by heavy fragmentation, only 36 objects of the 324 items are intact. Different phenomena related to the breakage and manipulation of the objects were identified: bending, blade impacts, hammer impacts, edge damaging, heat-damage, folding, object combination, multiple-fragments, crushing, U-bending. Manipula-

tion has occurred in all technological groups. Based on a preliminary study, the weapon component of the Keszőhidegkút assemblage fits well into the trends of the hoard. The observed phenomena (intensity of use-wear traces, *pars pro toto* selection, manipulation types) have numerous analogies among the other object types. In particular, the treatment of sheet objects (vessels, ornaments) is the same of helmets and shields. As in case of the Rinyaszentkirály hoard, the treatment of offensive weapons resembles that of tools, especially of axes.

BIOGRAPHICAL POSSIBILITIES: THE SELECTION OF WEAPONS IN THE RINYASZENTKIRÁLY AND KESZŐHIDEGKÚT HOARDS

Weapons as a hoard component

In both case studies, the results of observations made on weapons and other elements in hoards were presented with a detour into the cultural and relative chronological background of the objects and assemblages (fig. 18). These were raw patterns and results that could be obtained from an in-depth examination of weapons and a preliminary analysis of a large number of artefacts that were selected to these hoards. The interpretation of patterns is another step, in which a few issues need to be addressed, several of which are strongly »biographical«. To understand weapon selection in the Keszőhidegkút and Rinyaszentkirály metal hoards, the results will be discussed from two viewpoints. Firstly, hoarded weapons will be discussed. Secondly, the connection of this component to the entire hoard will be analysed. Starting with the first point, the characteristics of the hoard component are the followings:

1. Selection of finished products. Based on the results of macroscopic observations, the hoards contained weapons that can be interpreted as finished products from a technological point of view as all of them showed visually observable traces of manufacture. Their post-casting treatment was comprehensive, especially along their edge parts, which made them effective weapons[131]. The presence of visible casting defects was low and »aesthetic« only to modern eyes. Considering use-wear traces, these obviously did not affect the weapon's functional features during their use-life as weapons[132]. Contrary to what we might expect, the selection of finished products is not an evident pattern in the Late Bronze Age. A fine example is the unfinished sword from Werkhoven (prov. Utrecht/NL), bent into an L-shape and deposited to a wetland area[133]. In Transdanubia, the elements of weapon components can be as-casts, unfinished objects and miscasts, too. For instance, such swords and spearheads are known from the Biatorbágy (Pest County/H), Lovasberény (Fejér County/H), Siklósnagyfalu (»Beremend«; Baranya County/H), and the Nagydobsza (Baranya County/H) hoards. It is notable that all of them have a strong metallurgical character as well, which is clearly connected with the selection of these unfinished and miscast weapons[134].

2. Selection of used weapons. A finished product selected for a hoard can show different levels of usage[135]. Several researchers have called attention to the methodological fact that the lack of use-wear traces on an object does not mean that it was not in use. Some fragments are unsuitable for use-wear analysis (e. g. socket fragments). The intentional removal of traces before deposition is also a possibility. Taphonomy and corrosion processes may affect the object's surface. Finally, damages could be done by the finders during discovery as well (fig. 12, A-B)[136]. The analysis of weapons was performed by taking these source-critical factors into consideration. Use-wear analysis has revealed combat damages and repair/modification on most of the weapons. The rest was either unsuitable for analysis or no traces were visible on them. An important result is that many traces were remarkable, referring to a long period of use: e. g. a sword with

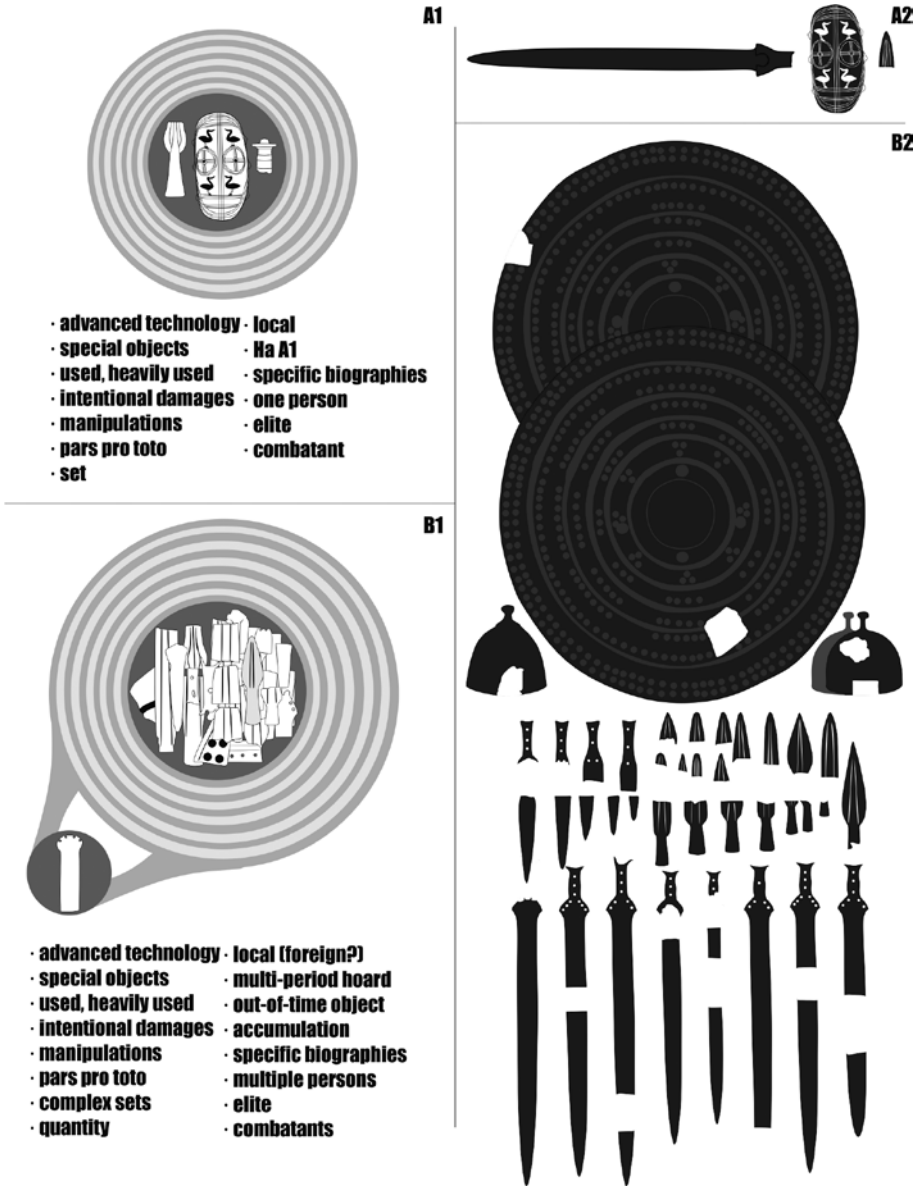

Fig. 18 The selection of weapons: **A1** Rinyaszentkirály. – **A2** »missing fragments« from Rinyaszentkirály. – **B1** Keszőhidegkút. – **B2** »missing fragments« from Keszőhidegkút. – (Graphic J. G. Tarbay).

worn-out hilt; spearheads with dull edges and re-shaped tips, blades and sockets; worn peg holes on the »out-of-time« dagger; a repaired greave. These are the potential biographical objects, which may have been used and circulated for a couple of decades or longer. During this period, they interacted with different people, perhaps owned by several individuals through inheritance, loot or exchange. Judging by their condition, these »interactions« were evidently related to violent acts, stories of personal »glory«, life-or-death scenarios and even atrocities rather to be forgotten. During their long use-life, they could accumulate several individual symbolic meanings (favoured weapon, bringer of good luck, a feared object, panoply of a hero, etc.). It could also be argued that possibly some even have gained their own »personality« during various processes[137]. Among the studied finds, it is important to highlight two objects to show how special their biographies could have been[138]:

a) The Rinyaszentkirály greave is undoubtedly a highly aesthetical and unique object which has no exact parallel in Central Europe so far. It clearly stands out from the stylistically related greaves, as it depicts a symbol of exclusive value (spoke-wheeled chariot) and otherworldly powers (»realistic« mythical birds). Since

zoomorphic depiction in the Transdanubian Urnfield culture is quite rare and typically stylized, the creation of this object could not have been an ordinary event, nor the person who made it and the one who first owned it. At a certain point of its use-life, this greave was broken into pieces, most likely because of continuous wearing or serious damage to its owner's leg. The object was so important to someone that he/she ordered it to be reassembled from pieces by a specialist who understood well the sheet metal techniques of that time. At least two biographical possibilities can be theorized for what has happened after reparation. It could have been proudly worn like a permanent scar on human body, the »stitches« on the greave could be carrying the fearful message that its owner is a »battle-hardened warrior«. This message is even more important, if the greave was damaged by continuous wear and not in battle[139]. There is also a possibility that it may not have been used as a weapon in the biographical phase after repair. It could have become an object of memory to someone, to whom it originally belonged to and even a highly valued ceremonial weapon endowed with ancestral power[140]. After these possible biographical stages, the artefact was broken into pieces, this time intentionally, and selected for a hoard along with other used weapons. The full biography of the object did not end because it was reassembled again after its discovery and now it is on display as a prized artefact, attracting visitors and researchers alike.

b) The Keszőhidegkút dagger (if it indeed belonged to this hoard) was an »out-of-time« artefact, an object that had an extremely extended, at least 400-500 years long life-path before its deposition[141]. Unlike the greave, there is nothing special about this object. It is a common dagger in the Tumulus culture, made by simple techniques from a small amount of metal. However, the average look does not mean that this could not have been an object with a specific biography. Its importance may derive from one of its owners (e. g. ancestor)[142]. Based on the analysis, it is certain that the dagger was used for a long time. After its use-life as a functional object, a different and mysterious phase has started. Several biographical explanations can suggest how it could have been preserved until the Ha B1 period, including accidental finding, intentional removal from original context (e. g. burial, hoard), continuous manipulation, etc. The relative typo-chronological character of the assemblage supports the latter. Based on ethnographic analogies, A. Davies has suggested that such artefacts can be supernatural objects that belonged to ancestors or mysterious creatures. They are malicious and often feared, but at the same time these objects were collected to harness their supernatural powers[143]. Since the metallurgical and cultural tradition of the Tumulus and Urnfield periods are continuous, this dagger was not seen as »otherworldly« in the Ha B1 period. But it rather was an object that represented a link with the past or to someone special. Due to its strong symbolic meanings, unlike its contemporary parallels from the Tumulus period, it was taken out of »normal« circulation and followed a unique pattern of life-path until its final prehistoric deposition[144].

As J. Joy has noted, full biographies with certainty of prehistoric objects are almost impossible to give[145]. Though, these two examples illustrate what kind of biographical possibilities can be given for an object considering »information fragments« mainly obtained by use-wear patterns. In addition, further conclusions can be drawn from the rest of the weapons from the use-wear results: a) The »reminders« of the last violent act that was committed with these weapons are still visible on them because they were not removed before deposition. Thus, these weapons were taken out of circulation after such an event. This does not necessarily mean that they were deposited right after the last battle. b) Except the dagger from Keszőhidegkút (and the possible »Northern European« spearhead socket fragment), the selected weapons seem to be similar regarding their cultural background, chronological position, and use-wear traces. This correlation could raise the possibility that most of the deposited weapons belonged together as personal sets (e. g. Rinyaszentkirály) and were owned by a group of people (Keszőhidegkút) who lived, acted and interacted at the same time (see **4. Combination of weapons**). Thus, the selection of different weapons may have happened at once. c) The last conclusion is that the presence of use-wear traces, especially the ones referring to intense

and long use, support the idea that these weapons most likely belonged to individuals who actually practiced combat as a full or a part-time profession and not only displayed themselves as »warriors«[146]. These combatants could master higher level and various fighting techniques with swords, slashing/cutting and thrusting/throwing spears, defensive weapons (shields), and finally close combat weapons (daggers). The presence of metal armour is also notable, which refers to the possession of an above-average equipment. Obviously, the people who deposited the objects were not necessarily the same who fought. During the hoarding act, the objects could have interacted with others (e. g. ritual specialists, relatives) as it certainly happened in the case of the »out-of-time« dagger.

3. Intentional breakage and manipulation of weapons. The intentional breakage and the manipulation of objects in Bronze Age scrap hoards is a long-known phenomenon, which was interpreted in different ways, emphasizing either its ritual or its economic/mundane nature[147]. Among the different biographical possibilities for a weapon in Transdanubia, the studied objects were selected for such hoards. Only one spearhead from the Keszőhidegkút hoard was not damaged, but as a composite weapon an intentional damaging of the wooden part cannot be excluded. (It is notable that a trace related to the removal of the shaft was observed in case of spearhead no. 1 from Keszőhidegkút.) The characteristics of the fragmented weapons selected for these hoards are the following: a) a general selection of individual fragments; b) *pars pro toto* selection of objects (different parts, different sizes); c) intentional damage (defunctionalisation); d) the presence of unnecessary damages and manipulations (e. g. objects combination, socket crushing, edge damaging, folding). All these actions suggest that the objects were intentionally fragmented and damaged[148].

The fragmentation of bronze objects can be achieved in two ways according to the destruction experiments on swords and spearheads carried out by M. G. Knight and N. Burridge. The first, more effective way is hot-shorting, when the bronze objects are broken in a pre-heated state. This method allows to control the fragments' sizes, and the partitioning tools (hammers, chisels) barely leave any traces on the objects' surfaces. The second way is the plastic deformation without pre-heating, which is a more time-consuming process that leaves well-recognizable tool marks and macroscopic traces, usually of bending, edge or hammer face impacts[149]. A third way is not proved and consisted in damaging and manipulating objects in a half-melted state[150]. In light of M. G. Knight's and N. Burridge's experiments, the violent destruction of objects proposed by L. Nebelsick in his seminal studies seems to be challenged[151]. If plastic deformation was only one way for object partition, then the violent traces are no longer ritualistic, but simply the marks of this type of partitioning process (e. g. socket crushing – interrupted breakage, bending – side effects of the technique). On the other hand, plastic deformation could have been an intentional choice for ritual manipulation precisely because of these properties. To determine exactly which method was used in case of the Keszőhidegkút and Rinyaszentkirály weapons, the analysis of their microstructure will be essential in the future. Based on macroscopically visible damage traces (bending, crushing, tool marks), I think that plastic deformation was most likely the technique of destruction.

A fine example for symbolic manipulation is spearhead no. 4 from Keszőhidegkút. The object's wooden shaft was removed, its tip and socket were broken and, after that, a sheet metal tube was inserted inside it. This is a physical and symbolic »chaining« of artefacts which is a Pan-European deposition phenomenon that has clearly no mundane purpose. Practically all objects (e. g. rings, socketed axes, winged axes, spearheads, sheet products, gold finds) can be subjected to this practice[152]. In the Carpathian Basin, examples for such a manipulation with spearheads can be mainly mentioned from hoard assemblages among which the most important is the Ha A1 Nagyvejke (Tolna County/H) hoard, as it also contains a sheet metal tube[153]. As sheet metal tubes may have been part of clothing or composite ornaments, it is likely that not simply bronze with bronze was bonded in these cases[154]. The Keszőhidegkút spearhead is also particularly important in a

way that it shows a worn breakage surface (**fig. 12, C**), which supports the idea that the fragment had its own biography after breakage and manipulation (see **Time, deposition, accumulation**).

The causes for deliberate destruction of used weapons like the ones in the Rinyaszentkirály and Keszőhidegkút hoards can be explained in various ways based on historical and anthropological parallels, some of which will be emphasised below. a) Weapons as every other object in hoards may have been the substitutes for their owners. Therefore, the breakage and manipulation of these personal objects can symbolize the end of a fixed or temporary identity and the threat and authority that a combatant that may represent for the society. According to D. Fontijn and H. Fokkens, combatants surrendered their weapons through life-cycle rituals as a closure of warrior identity. In this case, the intentional manipulation of weapons may amplify the message of this symbolic transition[155]. b) We should not forget the importance of mental factors. The deposition and destruction of a »polluted« weapon provide a psychological framework for the warriors, who are in a constant liminal state and want to distance themselves from traumatic actions and experiences by conducting post-conflict cleansing rituals[156]. c) According to a popular theory, the defeated enemy's weapons were destroyed after warlike events in the framework of public ceremonies. This practice still exists today, and its common element is the manipulation of weapons by various methods[157]. Many objects are local, based on a typo-chronological analysis. Therefore, this kind of explanation is only possible if there were local conflicts within the Western Carpathian Basin between the Urnfield groups that shared the same metallurgical tradition. d) The funeral-hoards theory, which hypothesize a close ritual connection between burial and hoarding practices may also explain the presence of manipulated weapons in large Transdanubian hoards, recalling the treatment of the deceased himself. The small number of burials with weapons and the presence of hoards like Pázmándfalu (Győr-Moson-Sopron County/H) in Transdanubia could support this theory. A link between the two phenomena could be represented by those partly-melted and manipulated objects that were similarly treated as the finds and selected for burials[158]. Such objects are present in the Keszőhidegkút hoard, although these are ornaments, a torques and an armring. Regarding the above described explanation, a connection to some extent can be seen in case of the weapons selected for both the Rinyaszentkirály and Keszőhidegkút hoards. However, none of them are suitable for an accurate description, as I have mentioned, since the treatment of the selected weapons relates to other components of the hoard. In other words, the cause of the damages can only be explained by interpreting the hoard's entire fragmentation and manipulation patterns (see **Connection of hoard components**).

4. Combination of weapons. The Rinyaszentkirály hoard includes the combination of a greave, a spearhead, and a sword. The Keszőhidegkút hoard contains 13 spearheads, 8/9 swords, six daggers, 2/3 helmets and two shields. It is highly possible that these combinations could have corresponded to sets (weapon equipment of the warrior), but it is not possible to determine exactly in what combination and to how many people they have belonged[159]: a) It is unlikely that a complete warrior equipment was deposited. An obvious example can be found in the Rinyaszentkirály hoard, for which only one greave was selected[160]. b) Multiple weapons could have also belonged to one person (e. g. set of spears and arrowheads). c) The deposition of organic weapons (leather/wooden shields, composite shields, wooden clubs and bows) is also a possibility as they were more common than their metal counterparts. However, these are rarely tangible in the archaeological record due to preservation issues[161]. d) A combatant could not exclusively represent himself/herself by weaponry. Looted foreign goods, prestige objects (e. g. metal vessels) as well as artefacts representing other identities could also be selected[162]. e) »Out-of-time« objects were accumulated for a long period of time and possessed by several persons. At the time of their deposition, their original owner was physically absent, and the object was not necessarily part of weaponry[163]. The same is valid for half-melted objects collected from the pyres or from graves (*post mortem* manipulations) or from hoards.

The following reconstructions could be given for the weapons sets in both hoards. These should obviously be treated with reservations because of the above mentioned factors. Except the »out-of-time« dagger, the weapons of both hoards were typo-chronologically contemporary. In most cases, similarities can be observed regarding their possible origin (local objects), technological features, use-life as a weapon, and treatment.

Based on the arguments described above, it can be assumed that most of the selected weapons do not form random combinations. The Rinyaszentkirály hoard seems to be a *pars pro toto* selection of quality weapons which may have belonged to one person (weapons set)[164]. In addition to quality (shields, helmets), the Keszőhidegkút hoard amplified its message through the quantity of weapons, which belonged to several individuals (complex sets). Such collections are often interpreted as objects possessed by a »warrior band« or fraternities. As it has already been referred to, the exact number of these combatants cannot be calculated. If the weapons that are considered were used only by one person (assuming that swords and long spears were used in a sword-like manner), the objects may have belonged to at least 14/15 people[165].

Hoard component connections

The weapons as components of the hoards were described above in four points. I will now discuss the connections of the components to the general character of these hoards. This topic will be addressed within three main points (see below). Obviously, the considerations regarding other components of the hoards are preliminary and the conclusions should be refined later.

1. Time, deposition, accumulation. The temporal aspect of a hoard is crucial for the interpretation of hoard components and their treatment. The main question concerns the duration of the accumulation and the treatment of the objects. a) The content of the hoard could have been manipulated and deposited during a single event, which is the traditional interpretation of this phenomena in the Bronze Age. b) The objects can be accumulated at the place of hoarding, which can be literally the spot where the objects were placed or a larger structure or the natural landscape. During this time, new elements that belonged to different individuals or group of individuals have been added to the hoards. The objects could have been manipulated once, as in the exemplar case of the irreversible wetland hoarding sites. Another possibility is the continuous manipulation, exhibition, re-deposition, which can be illustrated by the well known example of Greek sanctuaries. Thus, fragmentation may not occur at first. As R. Bradley has suggested, it is important to note that not only manipulation, but the removal of elements could also be a possibility over this period of time[166]. c) It is highly probable that accumulation and fragmentation were done by different individuals in a household or in a workshop before the event of hoarding[167]. In terms of fragmentation, the best example for this is the breakage of ingots, which is a phenomenon more likely related to the processing of raw material than to ritual breakage[168]. d) On the basis of mathematical models, R. Wiseman recently reproposed the »old theory« of a recycling economy that could stand behind the scrap hoard phenomena[169]. Recycling is an essential part of any metallurgical workshops. It could not have been otherwise in the Late Bronze Age. Material evidence for its existence is known in the Carpathian Basin. Even the smallest pieces of by-products were collected after casting (e. g. Nagydobsza hoard)[170]. Ingots show the imprints of objects (Kesztölc [Komárom-Esztergom County/H]) and heavily partitioned objects were cast together as ingots (e. g. Bodrogkeresztúr [Borsod-Abaúj-Zemplén County/H], Crăciuneşti [jud. Mureș/RO]), indicating complete recycling[171]. Casting is a physical and also a symbolical act of transformation. It is arguable that it could have been ritualized in prehistory[172]. Thus, giving up fragments in this kind of »transformation«, including the valuable and highly symbolic ones like weapons, may have been equally symbolic and ritual as their

deposition itself. From this point of view, recycling is a very probable biographical possibility, which may have formed a coherent system with various other ritual activities, such as the selection and the manipulation of grave goods and hoard elements[173]. The biography of weapons in Greek sanctuaries is an excellent example for the coexistence of ritual and metallurgical activities[174]. e) Individual biographical scenarios are also possible. After the breakage of an object, the fragments could have several life-paths, and not all of them ended up with deposition. A broken object can be modified, re-built, manipulated individually or exchanged, and circulated for a long period of time. These are all plausible scenarios that are causing the »missing fragment« phenomenon[175]. To illustrate the existence of manipulated fragments, the joining parts of a single sword from Staffordshire (GB) can be mentioned, which were deposited 3 km apart. One part was heavily worn, which supports the idea that the two fragments had different biographies after breakage, and one of them has circulated longer[176]. Spearhead no. 4 from Keszőhidegkút may have been such an object, since it shows a worn breakage surface, which refers to a longer life-path as a fragment. In case of the »out-of-time« dagger, it is also questionable when it was broken during its long life.

The above described scenarios provide excellent examples of how complex the formulation and temporality of the fragmentation as well as manipulation phenomena in a hoard could be. Of course, considering the little archaeological information, it is difficult to decide what could have been the original cause. The selected weapons are typo-chronologically contemporaneous. The observed breakage shapes/types, methods of destruction as well as the concept of fragmentation (*pars pro toto*, defunctionalisation) are similar. I consider it more likely that the selection and manipulation of most weapons could have been done at once before or during their deposition. Of course the fragmentation pattern of special cases (e. g. the »out-of-time« dagger, a spearhead with worn breakage surface) can be interpreted in a broader perspective. Simultaneous deposition is more likely in the case of the Rinyaszentkirály hoard. However, different accumulation mechanisms can be proposed for the Keszőhidegkút multi-period hoard, which was deposited at the Ha B1 period. Anyway, it appears that even in this case the weapons could have been removed from circulation at the same time, except for the special cases.

2. Recurring patterns. The scrap hoards deposited in Transdanubia and the Northern Balkans, especially in the territory of Croatia are closely linked, considering their relative chronological and typological combinations, as well as the connection network[177]. At first, the typological composition of these hoards may seem to be confusing, but in fact it shows regularities in several aspects, which is the main argument for their ritual interpretations. Recurring selection patterns were first »unconsciously« recognized by the researchers W. A. von Brunn and A. Mozsolics, when they proposed time horizon models based on the combination of stylistically related objects in hoards[178]. S. Hansen has developed this concept further by summarizing a large database of hoards in an enormous chronological and geographical scale. This approach allowed him to distinguish certain regional selection trends based on typological combinations and on the ratio of intentional fragmentation, which served as a basis for votive interpretations[179]. The weapon components of large scrap hoards between the Ha A1-Ha B1 periods in Transdanubia, Slovenia, Northern Croatia, Serbia are a fine example for identical typological patterns and combinations[180]. In this territory weapons are present in different quantity and recurring combinations like spearhead-sword-dagger. The selection of an almost complete range of weapons (sword-spearhead-dagger-armour/defensive weapon) in large quantities, similarly to the Keszőhidegkút hoard is also known from several assemblages: e. g. Bonyhád (Tolna County/H), Brodski Varoš (Brodsko-posavska žup./HR), Esztergom-Szentgyörgymező (Komárom-Esztergom County/H), Hočko Pohorje (Spodnja Štajerska/SLO), Markovac-Grunjac (Južnobanatski okr./SRB), Nadap (Fejér County/H), Pázmándfalu (Győr-Moson-Sopron County/H), Poljanci 1 (Brodsko-posavska žup./HR), Veliko Nabrđe (Osječko-baranjska žup./HR), Podcrkavlje-Slavonski Brod (Brodsko-posavska žup./HR)[181]. In these hoards, weapons were selected in a similar ratio based on fragmentation shapes (identical or com-

plementary fragments) and most likely in similar condition. The accompanying elements in the individual assemblages also show correlations. A particularly important research goal in this area would be the in-depth modelling of these hoards to find out whether their technological traits, treatments, manipulations, and use-wear could also show correlation. Based on these characteristics, it is possible to differentiate finer groups and to recognize within the material. By the re-examination of these finds, connections beyond typological combinations could be discovered. A systematic approach for hoard component characterization has been carried out so far on the Central Transylvanian finds by Botond Rezi and for the Transdanubian/East Hungarian »Gyermely hoards« by the author[182]. The two hoards presented here were new examples for these kinds of approaches in this research territory.

3. Connection of hoard components. In the last section, arguments were given for the intentional nature of Southwestern Carpathian scrap hoards. If the elements of these hoards were deliberately selected, then the act of hoarding could have served representative and symbolic purposes. Therefore, the community who carried out the deposition may have constructed some symbolic identities like warriors, farmers, craftsmen, ancestors (»out-of-time« objects) in the hoards[183]. Within obvious limits, these »constructed identities« could be archaeologically interpreted as »components« or »sets«. Based on available data, the composition of the Transdanubian scrap hoards is quite diverse[184]. As it can be seen in case of the Rinyaszentkirály and Keszőhidegkút hoards, weapons consist only of a small part of the big whole. The main question is what relationship could have existed between the weapons and other components that are linked together through hoarding practice.

It is quite likely that these components are more significant than it is archaeologically tangible. This issue can be approached from a pragmatic and a theoretical point of view. a) Some objects may belong together, but their non-metallic part has perished. Fine examples are the organic belt from Ilija-Sitno (okr. Banská Štiavnica/SK) or the scabbard parts (rings, knobs) discussed by T. Mörtz[185]. As it has been referred to, the repoussé decorated rivet and the greave from Rinyaszentkirály may have belonged together. Small knobs and rings can be found in the Keszőhidegkút hoard, but as objects they could have been used for various purposes. Therefore, it is hard to associate them convincingly. b) The function as weapons in case of some of the tools is also plausible. Especially for axes, which were certainly applied as melee weapons during the Early and Middle Bronze Ages[186]. In the Late Bronze Age, axes were present in some burials together with weapons like Bakonyszűcs-Százhalom Mound 8 – palstave (Veszprém County/H), Balatonfűzfő Grave 6 – winged axe (Veszprém County/H) or the lavish burial from Čaka 2 – winged axes (okr. Levice/SK), and Velika Gorica – socketed axe (Zagrebačka žup./HR)[187]. The third argument for their weapon function is their analogous treatment, particularly to spearheads, of which some examples can be seen in the Rinyaszentkirály and Keszőhidegkút hoards. c) As it has already been mentioned, it is also possible that one individual represented multiple identities at once in the hoard (warrior/farmer, warrior/chief, warrior/craftsmen, etc.)[188]. This concept gives a plenty of opportunities of how different hoard components can be connected, or how the hypothesized sets could expand beyond weapons[189]. d) P. Treherne's beautiful warrior concept also provides good arguments to »expand« the weapon component's connection network. Objects that are symbolizing special lifestyles, fashion, power of acquisition (war booty, special goods) or control over society (metal stock) may also belong to those who endowed themselves with this identity. Lavish burials illustrate that this concept has certainly existed in Central Europe during the Late Bronze Age (e. g. Hart an der Alz [Lkr. Altötting/D]). Hoarding could have also been used to express these elite ideologies. Symbolic elements that support this possibility are present in both hoards: e. g. metal vessels – feasting/alliances; chariot/wagon part, cheek piece – mobility; razor – fashion. When this concept is included in the hoard analysis, the possibility should always be considered to overemphasize the importance of »warrior identity« within the assemblage[190]. e) If the weapons formed sets with other objects, it could be assumed that their

treatment may be similar. In case of these two hoards, the overall character of the weapons fits well into the general trends observed in these assemblages (heavy fragmentation, *pars pro toto*, main technological and use-wear classes). In terms of treatment, weapons have mostly shown correlations with tools (e. g. axes) and prestige sheet metal objects (vessels, ornaments). These similarities could raise a probability for the extension of weapon components, and they can be well related to any of the above discussed possibilities. Obviously, a more systematic analysis will be needed on a larger material to decide, whether these similarities form recurring patterns.

Regardless »how much we expand« the relations of weapons to lavish sets, they will only be a minority compared to the other contents of the hoard. Thus, it is possible that other, different identities presented themselves in these assemblages[191]. I find it highly unlikely, especially in case of the Keszőhidegkút hoard that a warrior band whose members are full or part-time specialists, or a warrior-chief owned, used, and controlled all the objects that were found in these assemblages. This is well-illustrated by the many used sickles, which were selected for the assemblages after several harvest seasons. Ornaments and representative jewelleries are the other examples, which could have been worn by both sexes. The metalworking tools (socketed hammer, 2 awls, 2 chisels, 2 socketed chisels) in the Keszőhidegkút assemblage show a speciality level that may refer to a full-time metalworker. The representative feasting set was most likely owned by someone special within the Late Bronze Age society, but the feasting itself is always a community event, and the participants were not limited to warriors. The symbolic presence of multiple individuals in large scrap hoards was recently hypothesized by T. Vachta on the basis of the Bohemian hoard from Rýdeč (okr. Ústí nad Labem/CZ). Considering the preliminary analysis of the two hoards, he proposed a scenario that is in many ways analogous to the Transdanubian material[192].

Hoards like the Rinyaszentkirály and particularly the Keszőhidegkút somehow reflect the Bronze Age society. These hoards were intentionally constructed and assembled by the performers of hoarding who represented individuals, ideologies and symbolic meanings through the objects and sets. The intentional removal and deposition of such object collections can be the result of life-cycle rituals on a community level when identities were offered during the final closure of the hoard[193]. This concept also resonates well with the »egalitarian nature« of local Transdanubian Urnfield cemeteries, in which objects that symbolizes a special identity are usually missing. In this regard, the multi-period nature of the Keszőhidegkút hoard is also interesting as it may connect some long-dead members of the society (dagger) to a community of people (Br D/Ha A1, Ha A1 objects) and to the newcomers, who fragmented the symbols of a new era (Hajdúböszörmény style metal vessels). The past and present appear in the hoard at the same time. These huge scrap hoards can also be seen as invisible monuments of remembrance built by objects[194]. This analogy is even more evident when the intentional arrangement of the objects is documented during the excavation or it can be reconstructed from the context reports. The arrangement of artefacts shows in many cases a close relationship with other characteristics of the objects (technological class, use-wear, treatment) that refer to a highly structured intentional deposition and selection[195].

A biographical possibility

Only three weapons were selected into the Rinyaszentkirály hoard, two of them belong to the most exclusive category of Late Bronze Age equipment: a greave with unique patterns and a metal-hilted sword. The weapon component of the hoard can be interpreted as a personal set (armour-sword-spearhead), which stands out through quality rather than quantity. This equipment was certainly not owned by a common individual, but by someone with a higher social status. All objects were used and at least two of them (sword,

grave) could have had a specific biography. The use-wear traces on these objects could refer to the possibility that a true »warrior« equipment that was used in combat has been selected and not just a mere collection of objects representing warrior identity. All weapons were intentionally destroyed and manipulated, so that none of them were suitable for further use any longer. It can be hypothesized that the weapons were part of a larger representative set of an individual based on the symbolic links and identical treatments to other objects. Other potentially related elements are the sheet metal vessels, the axes and the wagon/chariot parts selected as *pars pro toto* (fig. 17, A1-A2).

The weapons in the Keszőhidegkút hoard could represent complex sets that belonged to multiple local individuals who were part- or full-time combatants. The selected weapons (long/short spearheads, swords, daggers, shields, helmets) included a wide range of types, suitable for specific combat styles. Combat marks referring to unique techniques were also preserved. Longer spearheads may have been used as slashing/cutting weapons. The use-wear analysis has also revealed that these weapons were indeed used in combat. Some were intensively used, repaired, and maintained for a long period of time. In this regard, the »out-of-time« dagger is a unique object, which may have had a specific life during which it was accumulated or inherited as a special object of memory. The broken spearhead no. 4 may have also been a special object, since it showed a worn breakage surface, which supports the possibility that it was further circulating as a fragment. Furthermore, at one point of its life an organic object was inserted into its socket. Like in case of the Rinyaszentkirály hoard, selected elements of exclusive combat equipments (shields, helmets) are also present. The co-appearance of these objects with other more exclusive finds (metal vessels, cast cheek piece) raise the tempting idea that some of the individuals with weapons had a higher social status. The treatment of weapons followed the same pattern in this hoard. The traces of the last combat were not removed from them, and they were broken into pieces, probably by plastic deformation. Several artefacts showed traces of intentional manipulations (edge damage, socket crushing, object combination, folding). Mostly individual fragments were selected for the hoard. The overall technological character of the weapons fits well into the main trends of the hoard. As in the case of the Rinyaszentkirály hoard, parallels for the treatment can be found among metal vessels, ornaments, and tools, especially axes. Due to its multi-period nature, different accumulation mechanisms can be assumed for the Keszőhidegkút hoard before its final deposition during the Ha B1 period. Except for the »out-of-time« dagger, the weapon set forms a chronologically coherent group (fig. 17, B1-B2).

Several biographical possibilities were proposed to explain what kind of life-paths the weapons could have had before their final deposition in the hoards known as Rinyaszentkirály and Keszőhidegkút today. Weapons like the Rinyaszentkirály greave or the »out-of-time« dagger from Keszőhidegkút could have a specific and long biography, others probably had a more generalized one. At the end of their prehistoric life-path, weapons could have been selected for wetland sites, became grave goods or recycled as raw material. Hoarding is one of the main aspects of selection in Transdanubia. They could become parts of pure weapon hoards, funerary hoards, hoards with strong metallurgical components and finally large scrap hoards. In this article, the last type was discussed. These large scrap hoards followed a clear *pars pro toto* concept and they were most likely part of a more complex selection system, where missing elements were manipulated in various ways (recycling, selection for other hoards, etc.). As for their interpretation, I share the idea that these hoards were intentionally assembled in a highly structured way regarding the types, technological traits, treatment, and symbolic meaning. These assemblages were possibly deposited as ritual offerings by several persons or even by an entire community during some crucial life-cycle events. As I have mentioned above, the elements of the hoards were filled with symbolic contents, which could have been reflected to certain identities or group of identities (community – Keszőhidegkút). The combatants represented by a set or sets of weapons and associative objects were part of the entire society.

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APPENDIX

1. Catalogue of the studied weapons[196]

Weapons from the Rinyaszentkirály hoard

1 **Greave** (RRM 3948/exhibited at the HNM): Oval-shaped greave with rolled edges. It is decorated with embossed and repoussé patterns that depict two spoke wheels and four birds. The greave had 8 loops before its deposition. S. restored, reconstructed (folded out and broken parts fixed by soldered copper sheet bands on the reverse), probable heated, T. finished product, U. small perforations for repair are visible along the broken parts, D. originally deposited in broken, and most likely folded state. L. 256.73 mm, W. 135.74 mm, Th. (rim) 2.12 mm, Th. (wire) 1.36 mm, Wt. 125 g (with modern copper bands).

2 **Sword** (RRM 3900): Upper hilt fragment of a solid-hilted sword with a disc-shaped pommel, cast ribs and chased patterns. S. restored, T. finished product, D. shrinkage defect (pommel's knob), U. it shows abrasion on its entire surface (on the pommel and at its lower and upper parts, hilt's body), M. the hilt has been crushed from both sides. L. 66.99 mm, Di. (disc) 48.53 mm × 41.24 mm, W. (hilt) 30.06 mm, Wt. 153.6 g.

3 **Spearhead** (RRM 3902): Spearhead with a long socket, two peg holes and a short, leaf-shaped, stepped blade. S. restored, T. finished product, D. misrun on the socket, U. bow on the edge, M. broken tip, several impacts on both sides of the midrib, crushed socket with impact marks. L. 113.47 mm, W. (rim) 29.10 mm × 16.6 mm (crushed), W. (b/mr) 33.65 mm × 13.56 mm, Th. (b) 1.34 mm, Wt. 104.1 g.

Weapons from the Keszőhidegkút hoard

1 **Spearhead** (HNM 66.1926.89): Long spearhead with a willow-shaped straight blade, two peg holes and a short ricasso. The socket is decorated with bundles of lines, outline grooves run along the cutting edges. S. unrestored, T. finished product (sharp cutting edge, removed seams), U. modification (shortened socket), used (dents, bows, U-shaped notches, worn midrib), M. tip is broken by bending, impacts on the cutting edge, breakages on the socket, crack associated with the removal of the shaft. L. 188.42 mm, Di. (r) 19.44 mm × 17.31 mm, W. (b/mr) 34.09 mm × 10.29 mm, Th. (b) 1.21 mm, Wt. 191.2 g.

2 **Spearhead** (HNM 66.1926.89): Long spearhead with a short socket, a willow-shaped blade and two peg holes. The socket is decorated with bundles of lines and fish-bone-shaped pattern. S. unrestored, T. finished product (removed seams), U. used (dull worn cutting edge, flattening damages, dents, short blade due to re-shaping), M. half of the blade is broken, blade impacts are visible near to the breakage surface. L. 130.89 mm, W. (r) 25.98 mm × 26.70 mm, W. (b/mr) 38.03 mm × 15.59 mm, Th. (b) 4.22 mm, Wt. 227.3 g.

3 **Spearhead** (HNM 66.1926.43): Spearhead with a short conical socket, a leaf-shaped blade. S. unrestored, T. finished product (removed seams), D. mismatch defect, U. used (wavy blade), M. half of the blade is broken by bending (its socket is crushed near to the breakage surface), P. modern bow along the cutting edge. L. 68.63 mm, W. (r) 25.04 mm × 25.06 mm, W. (b/mr) 35.56 mm × 12.08 mm, Th. (b) 2.15 mm, Wt. 69 g.

4 **Spearhead** (HNM 66.1926.89): Spearhead with a leaf-shaped blade and peg holes. S. unrestored, T. finished product (removed seams, hammered cutting edge), U. used (dull cutting edge, bows and dents [showing concentration on one side]), M. worn breakage surface, the socket and the tip is broken by bending (bent to the same direction), midrib is hammered, small metal sheet tube is

inserted to the socket. L. 104.64 mm, W. (r) 15.56 mm × 12.87 mm, W. (b/mr) 38.28 mm × 10.19 mm, Th. (b) 1.35 mm, Wt. 64 g.

5 **Spearhead** (HNM 66.1926.74): Spearhead with a leaf-shaped blade, two peg holes and a long socket. S. unrestored, T. finished product (removed seams, hammered edge), U. modified (re-shaped tip), wavy blade, dents, tip damage, worn midrib. M. no manipulations visible on the metal part, P. modern notches. L. 286.30 mm, W. (r) 22.65 mm × 22.63 mm, W. (b/mr) 33.24 mm × 11.33 mm, Th. (b) 2.87 mm, Wt. 91.1 g.

6 **Spearhead** (HNM 66.1926.89): Spearhead fragment with a long socket, two peg holes. S. unrestored, T. finished products (removed seams), D. mismatch, U. cannot be determined due to fragmentation, M. blade is broken by bending, impacts on the midrib, smashed socket. L. 91.73 mm, W. (r) 18.59 mm × 30.78 mm, W. (b/mr) 27.71 mm × 14.41 mm, Wt. 97.3 g.

7 **Spearhead** (HNM 66.1926.92): Spearhead blade fragment with grooves along the cutting edge. S. unrestored, T. finished product (hammered edge), D. mismatch, porosity, U. used (dull edge, dents, bows, worn damages, worn midrib), M. broken by bending, hammer impacts near to the broken parts on the midrib. L. 240.76 mm, W. (b/mr) 34.85 mm × 10.96 mm, W. (b) 2.43 mm, Wt. 146.5 g.

8 **Spearhead** (HNM 66.1926.92): Blade fragment of a long spearhead. S. unrestored, T. finished product (hammered cutting edge, sharpened), U. used (micro dents, worn midrib), M. broken by bending. L. 68.92 mm, W. (b/mr) 49.96 mm × 11.78 mm, W. (b) 2.93 mm, Wt. 82.7 g.

9 **Spearhead** (HNM 66.1926.92): Blade fragment of a long spearhead with two outline grooves along the cutting edge. S. restored, T. finished product (sharpened edge, polishing traces), U. used (dents, bows), M. broken by bending (creasing), M./U. flattening along the cutting edge. L. 60.07 mm, W. (b/mr) 48.96 mm × 12.00 mm, W. (b) 2.16 mm, Wt. 58.8 g.

10 **Spearhead** (HNM 66.1926.98): Fragment of a small spearhead with a leaf-shaped blade. S. restored, T. finished product (hammered cutting edge, grinding traces, sharpened), U. micro dents and bows, M. vertical crack on the midrib, U./M. material displacement. L. 53.15 mm, W. (b/mr) 42.97 mm × 13.68 mm, W. (b) 1.66 mm, Wt. 33 g.

11 **Spearhead** (HNM 66.1926.92): Blade fragment of a long spearhead. S. unrestored, T. finished product, D. mismatch, porosity, U. used (dull cutting edge, wavy cutting edge, worn midrib), M. broken by bending, hammer impacts on the midrib. L. 57.24 mm, W. (b/mr) 40.25 mm × 10.90 mm, W. (b) 2.54 mm, Wt. 67.8 g.

12 **Spearhead** (HNM 66.1926.12): Blade fragment of a short spearhead with a stepped and flame-shaped blade. S. unrestored, T. finished product, U. used (dull cutting edge, worn midrib), M. broken. L. 62.16 mm, W. (b/mr) 36.83 mm × 11.36 mm, W. (b) 1.80 mm, Wt. 55 g.

13 **Spearhead** (HNM 66.1926.71): Socket fragment of a spearhead. It is decorated with grooves above the socket's rim. S. unrestored, T. finished product (completely removed seams), U. cannot be determined due to breakage, M. broken and smashed. L. 54.25 mm, W. (r) 32.29 mm × 15.49 mm, Wt. 41 g.

14 **Sword** (HNM 66.1926.57): Stepped middle blade fragment of a sword. S. unrestored, T. finished product (sharpened), U. used (dents), M. broken by bending. 63.54 mm × 35.71 mm, Th. 9.45 mm, Wt. 95.8 g.

15 **Sword** (HNM 66.1926.57): Lower sword fragment with grooves along the cutting edge. S. unrestored, T. finished product (sharpened), D. porosity, U. used (dents, bows, slightly dull edge). M. broken by bending. 648.31 mm × 37.55 mm, Th. 6.28 mm, Wt. 118.6 g.

16 **Sword** (HNM 66.1926.57): Lower blade fragment of a sword with four grooves. S. unrestored, T. finished product (sharpened), D. porosity, U. bows, dents, M. broken. 71.80 mm × 34.09 mm, Th. 6.66 mm, Wt. 71.6 g.

17 **Sword** (HNM 66.1926.57): Middle fragment of a sword blade. S. unrestored, T. finished product (hammered edge, sharpened), U. bows, M. broken. 42.11 mm × 35.58 mm, Th. 5.64 mm, Wt. 40.9 g.

18 **Sword** (HNM 66.1926.57): Middle fragment of a sword blade with grooves along the cutting edge. S. restored, T. finished product (hammered cutting edge, grinded, sharpened), U. bows, dents, M. broken, bending. 129.62 mm × 28.26 mm, Th. 5.56 mm, Wt. 102.6 g.

19 **Sword** (HNM 66.1926.57): Tip fragment of a sword. S. unrestored, T. finished product (hammered cutting edge), U. dents, bows, M. broken by bending, hammer impacts on the tip. 58.24 mm × 25 mm, Th. 4.94 mm, Wt. 32.5 g.

20 **Sword** (HNM 66.1926.57): Upper blade fragment of a flanged-hilted sword with two peg holes. S. unrestored, T. finished product (hammered edge), D. porosity, U. dents, M. broken by bending, flattening damages on the cutting edge. 67.38 mm × 36.32 mm, Th. 6.72 mm, Wt. 61.1 g.

21 **Sword** (HNM 66.1926.57): Upper blade fragment of a flanged-hilted sword with five peg holes and grooves along the cutting edge. S. restored, T. finished product (hammered edge, perforated rivet holes, hilt imprint, sharpened, hammering traces on the flanges), U. dents, M. broken by bending, bladed tool impacts visible near to the breakage surface. 75.24 mm × 43.89 mm, Th. 6.10 mm, Wt. 70.7 g.

22 **Sword** (HNM 66.1926.57): Hilt fragment of a flanged hilted sword with three peg holes. S. restored, T. finished product (hammering traces on and between the flanges, perforated peg holes, grinding traces), U. cannot be determined due to breakage, M. broken by bending. 83.43 mm × 32.64 mm, Th. 7.06 mm, Wt. 33.1 g.

23 **Dagger** (HNM 66.1926.50): Flange-hilted dagger with at least one peg hole and a midrib. S. restored, T. fin-

ished product (hammering traces along the blade, sharpened), U. cannot be determined due to corrosion, M. hilt is broken by bending, impacts visible near to the hilt. L. 180.30 mm, W. 36.27 mm × 4.68 mm, Wt. 60.3 g.

24 Dagger (HNM 66.1926.51): Flanged-hilted dagger with four peg holes and a long blade. S. restored, T. finished product (sharp cutting edge), D. porosity, U. dents, worn peg holes (blade is damaged by corrosion), M. tip is broken. L. 109.67 mm, W. 36.29-26.47 mm, Th. 3.40 mm, Wt. 40.1 g.

25 Dagger (HNM 66.1926.52): Flanged hilted dagger fragment with four grooves on its leaf-shaped blade. S. restored, T. finished product (hammered blade, perforated peg holes), U. bows, M. blade and hilt is broken by bending (S-shaped). 42.38 mm × 28.88 mm, Th. 3.42 mm, Wt. 185 g.

26 Dagger (66.1926.63): Terminal fragment of a flanged dagger. S. unrestored, T. finished product (perforated peg hole, hammered flange), D. misrun casting defect, U. cannot be determined due to breakage, M. breakage. 60.89 mm × 21.18 mm, Th. 4.04 mm, Wt. 13.2 g.

27 Dagger (HNM 66.1926.57): Lower blade fragment of a dagger with a midrib. S. unrestored, T. finished product (hammered cutting edge), D. mismatch, U. bows and curved notch, M. broken by bending. 100.85 mm × 29.98 mm, Th. 4.21 mm, Wt. 36.2 g.

28 Dagger (HNM 66.1926.78): Lower blade fragment of a dagger without a tip. S. unrestored, T. finished product, U. cannot be determined due to corrosion, M. broken by bending, the edge is notched. 50.78 mm × 18.67 mm, Th. 4.09 mm, Wt. 13.5 g.

29 Helmet (HNM 66.1926.71): Helmet fragment. S. unrestored, T. finished product (hammering traces inside, perforated edge), U. cannot be determined, M. bent and folded. 61.46 mm × 57.46 mm, Th. 1.66 mm, Wt. 26.2 g.

30 Helmet (HNM 66.1926.73): Rim fragment of a cap helmet with three perforated peg holes. It is decorated with ribs. S. unrestored, T. finished product, U. used (worn rivet hole), M. bent and folded. 57.36 mm × 28.64 mm, Th. 0.59 mm, Wt. 10.7 g.

31 Helmet [?] (HNM 66.1926.71): Upper body fragment of a cap helmet, decorated with circle ribs. It is also possible that the fragment belongs to a bronze cup. S. unrestored, T. finished product, U. cannot be determined, M. bent and folded. 59.77 mm × 50.96 mm, Th. 0.22 mm, Wt. 5.8 g.

32 Shield (HNM 66.1926.73): Type Lommelev-Nyírtura shield fragment, decorated with embossed dots. S. unrestored, T. finished product (annealed tin bronze)[197], M. folded, bent. 58.69 mm × 42.15 mm, Th. 0.51 mm, Wt. 15.8 g.

33 Shield (HNM 66.1926.73): Type Lommelev-Nyírtura shield fragment, decorated with a embossed rib and dots. S. unrestored, T. finished product (annealed tin bronze)[198], M. folded, bent. 79.84 mm × 68.25 mm, Th. 0.84 mm, Wt. 33.7 g.

2. Results of the use-wear analysis of the spearheads, swords and daggers from the Keszőhidegkút hoard

		use-wear traces									repair			modern use-wear/manipulation				
		damages				worn surfaces												
	No.	notch	dent	bow	flattening	tip damage	dull edge	damage	ricasso	midrib	tip	socket	blade	curvatures	wavy edge	notch	dent	
spearheads	1	×	×	×	0	0	×	0	×	×	0	×	0	×	0	0	0	used
	2	0	×	0	×	0	×	0	0	×	0	0	×	0	0	0	0	used
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	×	×	×	used?
	4	0	×	×	0	0	×	0	0	×	0	0	0	0	0	0	0	used
	5	0	×	0	0	×	0	0	0	×	×	0	0	0	×	×	0	used
	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	cbd (fr.)
	7	0	×	×	0	0	×	×	0	×	0	0	0	0	0	0	0	used
	8	0	×	0	0	0	0	0	0	×	0	0	0	0	0	0	0	used
	9	0	×	×	0	0	0	0	0	0	0	0	0	×	0	0	0	used
	10	0	×	×	0	0	0	0	0	0	0	0	0	×	0	0	0	used
	11	0	0	0	0	0	×	0	0	0	0	0	0	0	×	0	0	used
	12	0	0	0	0	0	×	0	0	×	0	0	0	0	0	0	0	used
	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	cbd (fr.)
swords	14	0	×	0	0	0	0	0	0	0	0	0	0	0	0	0	0	used
	15	0	×	×	0	0	×	0	0	0	0	0	0	0	0	0	0	used
	16	0	×	0	0	0	0	0	0	0	0	0	0	0	0	0	0	used
	17	0	0	×	0	0	0	0	0	0	0	0	0	0	0	0	0	used
	18	0	×	×	0	0	0	0	0	0	0	0	0	0	0	0	0	used
	19	0	×	×	0	0	0	0	0	0	0	0	0	0	0	0	0	used
	20	0	×	0	0	0	0	0	0	0	0	0	0	0	0	0	0	used
	21	0	×	0	0	0	0	0	0	0	0	0	0	0	0	0	0	used
	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	cbd (fr.)
daggers	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	cbd (co.)
	24	0	×	0	0	0	0	0	0	0	0	0	0	0	0	0	0	used
	25	0	0	×	0	0	0	0	0	0	0	0	0	0	0	0	0	used
	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	cbd (fr.)
	27	×	0	×	0	0	0	0	0	0	0	0	0	0	0	0	0	used
	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	cbd (fr.)

Abbreviations: cbd. cannot be determined, fr. Fragmentation, co. Condition

Notes

1) Kopytoff 1986, 66-67. – Joy 2019, 543.

2) Mozsolics 1975. – Gaál 2001. – Szathmári 2005. – Petres/Jankovits 2014.

3) Clausing 2005.

4) Ilon 2015.

5) Kalicz-Schreiber/Kalicz/Váczi 2010, 86-87. 270. – Ilon 2011, 153-159.

6) Hansen 2016a, 186-191.

7) Mozsolics 1985. – Hansen 1994a, 357. – Mozsolics 2000. – Váczi 2014.

8) Novák/Váczi 2010.

9) Fontijn 2002, 229-230. – Tarbay 2015. – V. Szabó 2019, 61-71.

10) Tarbay 2015/2016.

11) Mozsolics 1985.

12) Fontijn 2005, 148-149. – Anderson 2018, 220.

13) Leroi-Gourhan 1943; 1945. – Kopytoff 1986. – Dobres 1999. – Gosen-Marshall 1999. – Dobres 2000. – Fontijn 2002. – York 2002, 79-91. – Quilliec 2007. – Harding 2016. – Joy 2019.

14) By weapons I mean objects that were primarily or exclusively used in combat: swords, spearheads, daggers, defensive weapons, armours. Naturally, the definition of a weapon may include a wider range of objects (e. g. axes, organic weapons), but these could have been equally used for other purposes or they were simply not preserved in Transdanubian metal hoards. Fontijn 2005, 145.

15) Kopytoff 1986, 66-68. – Fontijn 2002, 23-36. – Quilliec 2007, 404-405 figs 3. 17; 2008, 68. – Melheim/Horn 2014, 17-21. – Dolfini-Crellin 2016. – Harding 2016, 6. – Crellin et al. 2018. – Molloy 2018, 200-201 fig. 10, 2. – Joy 2019, 543. 545.

16) Hampel 1895, 101-104; 1896, pls 214-215.

17) Due to selective publication, loss, and possible mixture of objects in the museum's collection, the number of ingots in the Rinyaszentkirály hoard is uncertain (Hampel 1895; 1896, pls 214-215; Mozsolics 1985, 182-183 pls 96-98; Patay 1990, 35-36).

18) Reinecke 1899, 316-318.

19) Kossack 1954, 27 note 1. – Clausing 1996.

20) Objects related to the Ha A1 period according to G. von Merhart: winged axes, socketed axes with V-shaped ribs, a knife with ring terminal, flanged sickles with straight inner ribs, a metal-hilted sword, sheet metal bands decorated with embossed ribs and dots [Zateč type cist], Kurd type situla (von Merhart 1956/1957, 115-117. 132. 134).

21) Hampel 1896, pl. 214, 7. 27. – Patay 1990, 39.

22) von Brunn 1968, 40. 44. 72 tab. 1 fig. 2, 18.

23) Mozsolics 1972, 386-390; 1985, 13. 20. 22. 25. 27. 30-31. 33. 35. 38-39. 41. 44-45. 49. 65. 74. 80. 182-183.

24) Hansen 1996. – Tarbay 2018.

25) Reinecke 1899, 318 pl. 1, 6. – Åberg 1935, 91-92 fig. 168. – Foltiny 1955, 110 pl. 72, 5. – Kossack 1954, 26-28 pl. 8, 10. – von Merhart 1956/1957, 92 fig. 2, 2. – Mozsolics 1972, 387. 390 fig. 3, 1. – Petres 1982, 58-60 fig. 6a. – Schauer 1982, 134 fig. 1. – Mozsolics 1985, 27. 182-183 pl. 98. – Hansen 1994a, 15-16 fig. 4, 5. – Jankovits 1997, 12 fig. 1, 1. – Clausing 2002, 151 list 1, A 1 no. 12 fig. 2, 3; 2003, 63-65 no. 12. – Honti/Jankovits 2015/2016, 78 figs 6, 1; 7. – Mödlinger 2017, 229-230 pl. 35, 168.

26) Reinecke 1899, 318 pl. 1, 6. – von Merhart 1956/1957, 102. 105. 107. 115. – Mozsolics 1972, 386-390; 1985, 27.

27) Hampel 1895, 108-109. – von Merhart 1956/1957, 101-102. 115-117.

28) Kossack 1954, 46. – von Merhart 1956/1957, 102.

29) Kossack 1954, 48-49. – Clausing 2002, 151-152.

30) Mödlinger 2017, 227-233. 254-264.

31) Persy 1962, 41-43. – Petres 1982, 59-60. – Mozsolics 1985, 27. – Jankovits 1997, 12. – Clausing 2002, 150-151. 158 list 1, A1 fig. 4; 2003, 63-65 list 2 fig. 4. – Mödlinger 2017, 228-229 fig. 4, 5.

32) Kossack 1954, 27 note 1. – von Merhart 1956/1957, 115-117. – Mozsolics 1972, 387. 390. – Schauer 1982, 134. – Mozsolics 1985, 27. – Hansen 1994a, 16. – Clausing 2002, 151. – Mödlinger 2017, 229.

33) See Mödlinger et al. 2014; Mödlinger 2017, 227-233. 254-264.

34) Hampel 1895, pl. 2, 1.

35) Jankovits 2015, 402. – Honti/Jankovits 2015/2016, 78 figs 4-5.

36) Mozsolics 1985, 27.

37) Horváth 1997, 143-144 figs 1-3. – Mödlinger et al. 2014, 795. – Mödlinger 2017, fig. 4, 16 (below left).

38) Mödlinger 2017, fig. 4, 16 (above left).

39) Hampel 1895, pl. 2, 1. 5a-b. – Honti/Jankovits 2015/2016, 72 figs 3. 5.

40) Müller-Karpe 1961, 18-21. 98 pl. 15, 4. – Patay 1990, 36. – Kemenczei 1991, 29-30 pls 16, 84; 17, 84.

41) Müller-Karpe 1961, 19-20. – Stockhammer 2004, 62-63. 179 list 20, 299 KII84.

42) Kemenczei 1991, 29-30.

43) Müller-Karpe 1961, 20-21. – Hansen 1994b, 551. – von Quillfeldt 1995, 153-155 pl. 51, 150a-b. – Stockhammer 2004, 206. 279-280. – Novotná 2014, 43-46 pl. 7, 36-37.

44) Kristiansen 2002, 330 fig. 7. – Molloy 2011, 72. – Kristiansen 2008, 47 fig. 3. – Tarbay 2016, 10-14 figs 4. 9-10. – Bunnefeld 2018, 200 fig. 13, 2.

45) Hampel 1896, pl. 195, 12-14. – Németh/Torma 1965, 61 pls 1, 1-1a; 2, 1b. – Mozsolics 1985, 13 pl. 113, 4. – Makkay 2006, pl. 10, 46-47. – Honti/Jankovits 2015/2016.

46) Vinski-Gasparini 1973, pls 27, 1; 77, 10; 84, 1. 3; 112, 1. – Harding 1995, 75 pl. 30, 235. 238.

47) Turner 1998, 81-82. – Dietrich/Mörtz 2019.

48) Makkay 2006, pl. 10, 47.

49) Kristiansen 1984, 203-204.

50) Bader 2015, 382-384. – Leshtakov 2015, pl. 161, 7.

51) Bader's sub-variants are difficult to identify based on literature data due to its poor quality of illustrations and certain technological factors (abrasion, damages) that affect the shape of the midribs. Examples for potential parallels: Hampel 1896, pl. 186, 4; Jósa/Kemenczei 1963/1964, pl. 8, 82; Mozsolics 1967, pl. 58, 10; Kemenczei 1968, pl. 3, 5; Patek 1968, pls 65, 4; 66, 1; Foltiny 1969, pl. 15, 18-19; Mészáros 1971/1972, pl. 8, 2; Vinski-Gasparini 1973, pls 31, 15; 37, 13; 57, 15; 61, 21; 76, 14; 97, 12; 107B, 2; Petrescu-Dîmbovița 1977, pls 56, 27; 156, 22; 169, 15; 251, 5; Stein 1979, pl. 122, 8; zu Erbach 1985, pls 80, 3. 5; 81, 1. 4-5; Mozsolics 1985, pls 3, 9; 4, 1-2; 5, 6; 36, 3; 47, 5; 61, 7; 118, 12; 124, 4; 130, 5-6. 9; 131, 1. 3; 146, 2. 4; 233, 16; zu Erbach 1986, 26. 67. 178-179. 182-183; Hansen 1994b, pl. 20, 4; Soroceanu 1996, pls 10, 3; 11, 4; 12, 3-4; 13, 3-4; 14, 4; Salaš 1997, pl. 21, 521-526; Hellebrandt 1999, fig. 5, 1-3; Kobal' 2000, pl. 63, 24; Dankó/Patay 2000, fig. 19, 5; Windholz-Konrad 2004, pl. 7, 2; Salaš 2005, pls 94B, 6; 130, 393. 405; 162, 246; 177A, 2; 211, 143; 212, 145; 280B, 9; Ciugudean/Luca/Georgescu 2006, pl. 30, 1; Makkay 2006, pl. 11, 69; Kytlicová 2007, pls 6b, 5; 37, 12; 56b, 3; 160d, 5; Váczi 2006, fig. 6, 4; Gedl 2008, pl. 23, 263; Novák/Váczi 2010, fig. 1, 2; Lauermann/Rammer 2013, pl. 99, 2; Bader 2015, 382-384 tab. 1, 44-45; Vasić 2015, pl. 12, 159. 162-165. 167; Tarbay 2017, fig. 3, 1; Bejinaru 2018, pl. 11, 1; V. Szabó 2019, fig. 47.

52) Trommer/Bader 2013.

53) Bell 2019, 153-154.

54) Rezi 2011, 312-313 fig. 5, A.

55) Knight 2019a, 261-262 fig. 16.

56) It is unclear whether ingot fragmentation could be related to deposition practices or raw material processing. I share B.Nessel's opinion that the latter could have been reasonable since heavy ingots – like the ones in the Rinyaszentkirály hoard – could not be melted without being divided into smaller pieces. Modl 2010; Nessel 2014, 405-407.

57) Nessel 2014, 404-405 fig. 2.

58) Hampel 1896, pl. 115, 13-14.

59) Hampel 1896, pl. 115, 10-12.

60) Pankau 2013, 122-125 fig. 6.

61) von Tompa 1937, 108. – Patay 1990, 36-37. 69. 84. – Mozsolics 1985, 135-137 pls 32-35. – Kemenczei 1988, 20. 48. 60. 71 pls 6, 60; 21, 210; 35, 318; 46, 405; 72-74. – Kőszegi 1988, 149. – Bader 1990, 80. – Hansen 1994b, 542. – Uckelmann 2012, 16-17. – Pabst 2020, 289 fig. 5, 2-3.

62) Overall, 357 fragments were registered to the collection of the HNM. Several belonged to the same object or they were reassembled by recent breakage surfaces. Inventory Book of the HNM 1926.66.

63) von Brunn 1968, 291. – Patay 1968, 246. – Mozsolics 1985, 135-137. – Kemenczei 1988, 20. 49. 60. – Kőszegi 1988, 149. – Patay 1990, 71. 85. – Weber 1996, 223. 226. – Uckelmann 2012, 17. – Mödlinger et al. 2014, tabs 1. 7. – Petres/Jankovits 2014, 60. – Jankovits 2017, 224. – Pabst 2020, 295 list 2.

64) von Brunn 1968, 79 fig. 8, 6. – Novotná 1970, 42 pl. 13, 247. 250. – Mayer 1977, 123 pl. 30, 435. 438. – Kibbert 1984, 36. 38 pl. 2, 28. – Mozsolics 1985, 30 pl. 31, 1. 4.

65) HNM inv. nos 66.1926.94; 66.1926.71. See periodization with further literature. Tarbay 2014a, 86-87 fig. 13; 2014b, 197-201; 2017b, 14-16.

66) E.g. armring with a C-shaped cross-section, ribbed bracelets, ribbed flanged sickles and a Terramare sickle, socketed axes with V-shaped ribs, sheet metal tubes, funnel- and leaf-shaped pendants, a Großmugl type double-edged razor, a blunt-headed pin with a hollow head, a stamp-headed pin with a profiled shaft, a embossed diadem/band, a Zateč type cist , a cheek piece, phalerae, etc. Hüttel 1981, 147-150 pl. 20, 219; Mozsolics 1985, 20-21. 33. 43. 45-46. 52-55. 60-61. 65-66. 72. 135-137 pls 31, 7-11; 33, 2. 4. 7. 10. 12-18; 35, 2-8. 10. 12. 16-17. 21-22. 25; Wanzek 1989, 213-215. 221 fig. 9; Clausing 1996; Weber 1996, 222-223. 226 pl. 48, 512; Petrescu-Dîmbovița 1998, 182-185; Vasić 2003, 42-43. 90-91; König 2004, 67-68; Karavanić 2009, 126; Jahn 2013, 407-408; Tarbay 2014b, 208-213 fig. 32; Jankovits 2017, 224. 275-276. 281. 286-287 pls 77, 2937; 95, 3300; 99, 3427.

67) Pustiměř type knife with a hearth-shaped terminal, Přestavlký type knife; torques with rolled terminals, fibula with a leaf-shaped plate, axe ingots. Říhovský 1972, 17-18. 33 pl. 9, 106; Mozsolics 1985, 31. 23 pl. 35, 18; Tarbay 2014b, 201-204. 213-218 pl. 38.2.

68) Patay 1990, 84 pl. 70, 166.

69) Mozsolics 1985, pl. 33, 11; 2000, 24.

70) Tomedi 2004. – Weihs 2004, 94-100. – Hansen 2016a, 195-196. – Vachta 2016, 100. 109-110. – Davis 2019. – Knight 2019b, 28-30.

71) Knight 2019b, 21.

72) Hansen 2016a, 196-197.

73) Davis 2019, 66. – Knight 2019b, 20-21.

74) For different classification see Mozsolics 1985, 20-22; Leshtakov 2015, 26. 60. 81-82. 228. 233-234. 238. 244-248 pls 5, 3; 33, 1; 42, 2; 70, 4; 155, 7; 163, 11.

75) Holste 1935, 68-71. – Pittioni 1954, 514 fig. 371.1. – Mezzena 1981, 57 fig. 33. – Avila 1983, 62-63. – Mozsolics 1985, 21. – Turk 1996a, 78-82 list 1 map 1. – Vasić 2015, 60-61.

76) Avila 1984, 62-63 pl. 18.134.

77) E.g. Müller-Karpe 1959, pls 126B, 1; 128, 15; Patek 1968, pl. 129, 10; Vinski-Gasparini 1973, pls 60, 24; 112, 4; Marović 1981, pl. 11, 1; Mozsolics 1985, pls 117, 9; 138, 5; Šinkovec 1995, pl. 22, 136; Říhovský 1996, pl. 9, 76; Mozsolics 2000, pl. 115, 7; Barbarić 2009, fig. 2, 5; De Marinis 2009, fig. 5, 1-2; Jovanović 2010, pl. 35, 271; Bruno 2012, 480-481. 483-484 fig. A, 175. 178. 191. 210; Lauermann/Rammer 2013, pl. 104, 1; Vasić 2015, pl. 15, 205. 209. 210; Reiter/Linke 2016, pl. 54, 5.

78) Jacob-Friesen 1967, 238. – Schauer 1979, 69-70. – Mozsolics 1985, 22. – Říhovský 1996, 57. – Pabst 2020, 289.

79) Schauer 1979, 69-70 fig. 6. – Mozsolics 1985, 22. – Říhovský 1996, 57. – Leshtakov 2015, 81-82. 238. – Pabst 2020, 289-290 fig. 4.

80) Mozsolics 2000, 56.

81) Vinski-Gasparini 1973, pl. 60, 14. – Schauer 1979, 70 figs 1, 1. 3. 5; 6. – Hansen 1991, 39; 1994b, pl. 24, 13. – Říhovský 1996, 57-58. – Weihs 2004, 33 fig. 31 pl. 15, 133. – Kytlicová 2007, pl. 167C, 3. – Mitás et al. 2018, 237. 241 pl. 2.2. – V. Szabó 2019, figs 35. 37. – Pabst 2020, 290. 295 fig. 4 list 2.

82) The object was found in September 1944 by Béla Várhegyi, who sold it to the HNM for 5 Forints. The spearhead was discovered ca. 2-3 m deep, near to a »mill« that was located at the Csele creek's estuary. The inventory book of the HNM also noted that it was in a secondary position. Inventory Book of the HNM 1948.47. The spearhead fragment was mis-identified by Tibor Kemenczei as a sword blade. Kemenczei 1991, 85 pl. 70.431.

83) E. g. Hampel 1886, pl. 27, 1. – Vinski-Gasparini 1973, pls 46, 17; 60, 23; 67, 13. – Schauer 1979, 70. – Mozsolics 1985, pls 36, 2; 117, 10. – Čerče/Šinkovec 1995, pl. 120, 5. – Mozsolics 2000, pl. 54, 10. – Karavanić/Mihaljević 2001, pl. 5, 1. – Windholz-Konrad 2002, 400-402 pl. 3.14. – Salaš 2005, pls 93, 21; 213, 153. – Makkay 2006, pl. 12, 86.

84) Hampel 1886, pl. 27, 1. – Gentile/van Gijn 2019, 10 figs 5, A; 10, C.

85) Marović 1981, 37 pl. 10, 5; Wosinsky 1896, 498; Born/Hansen 2001, 140 fig. 112. I consider the spearhead from the Alun hoard near Brza Palanka (Borski okr./SRB) (Ha B1) a loose parallel, as its midrib is more rectangle shaped based on published illustrations. Strejović 1961, 47 figs 1. 3; 1975, 97 pl. 80, 4; Vasić 2015, 33-34 pl. 2.18; Pabst 2020, 289 note 3; 295 list 2.

86) Pabst 2020, 290-291 note 6.

87) Jacob-Friesen 1967, 143-149 map 4. – Říhovský 1996, 71. – Salaš 2005, 70-71. – Gedl 2008, 62-63. – Laux 2012, 20-21. – Mitás et al. 2018, 237.

88) See Bünker 1914; Patay 1968; Thrane 1975; Szabó 1993; 1994-1995; Patay 1996; Szabó 2009; Notroff 2009; Uckelmann 2012, 14-21; Szabó/Kunfalvi/Békefi 2018.

89) Jacob-Friesen 1967, 245-249 pls 130-133. – Laux 2012, 65-67. 101. I am only aware of one specimen from the Northern Balkans in Jakovo (Surčin municipality/SRB) (Vasić 2015, 52 pl. 10.139).

90) Trommer/Bader 2013. – Molloy 2018, 213-214.

91) Nos 6 and 13 were unsuitable for use-wear analysis due to their missing blade parts. Modern damages with patina breaking that are identical to the ones observed by D. R. Bell were also present along the cutting edges of specimens nos 3 and 4. Bell 2019.

92) Bridgford 2000, 105-108. – Horn 2014, 22. – Bell 2019, 153 fig. 10.1. – Gentile/Gijn 2019, 136-137.

93) Anderson 2011, 604-606 fig. 6. – Gentile/Gijn 2019, 136-137 fig. 6, A-B.

94) Horn 2014, 32 fig. 3, f.

95) Bridgford 2000, 145. – Anderson 2011, 605. – Horn 2014, 32 fig. 4, a; 2015, 204.

96) Bruno 2012, 219 fig. 7, 4.2.

97) Bruno 2012, 219 fig. 7, 4.3.

98) Pabst 2020, 289.

99) Schauer 1979. – Tarot 2000, 40-49. – Anderson 2011. – Mödlinger 2011a, 15-18. – Horn 2013, 102. 104 fig. 6; 2014, 37-38; 2015, 204. 210; 2018, 58. – Molloy 2017, 302-303. – Gentile/van Gijn 2019.

100) Schauer 1979, 69-75. – Anderson 2011, 604-606. – Mödlinger 2011a, 17. – Leshtakov 2015, 238. – Molloy 2017, 292.

101) Bridgford 2000, 145. – Rezi 2011, 313-313 fig. 5. – Bruno 2012, tab. 7, 8.

102) York 2002, 84. – Bruno 2012, 257-266 figs 7. 26-7. 31. – Bietti Sestieri et al. 2013, 161. – Knight 2019a, 261-265.

103) Kemenczei 1988, 48. 60. 71 pls 21, 210; 35, 318; 46, 405; 72-74; 1991, 80 pls 331-331D. Hilt fragment no. 22 was also assigned to the Ennsdorf and II/a types. Mozsolics 1985, 15 pl. 32, 1; Kőszegi 1988, 40.

104) Ó Faoláin/Northover 1998, 74-76. 78-80. – Molloy 2011, 213-214 fig. 10, 7. – Mödlinger 2011b, 21-50. – Siedlaczek 2011, 116. – Molloy 2019, 17-24 fig. 1.

105) Mödlinger 2011b, 21-50. – Quilliec 2007, 407 fig. 11.

106) Gener 2011.

107) Molloy 2011, 74. – Gener 2018, 137-147.

108) Bridgford 2000, 105-108; Quilliec 2008, 69-70; Molloy 2018, 216; Bell 2019, 153-154; Gentile/van Gijn 2019, 135-137. Use-wear traces were not observable on fragment no. 16. The identification of such traces were not possible on no. 22 due its fragmentation shape.

109) Gentile/van Gijn 2019, 135. 137 fig. 5, D.

110) Novák/Váczi 2010, 103 figs 7-8.

111) Quilliec 2008, 70 fig. 8.

112) Kemenczei 1988, 20 pl. 6, 60.

113) Kőszegi 1988, 41.

114) Novák 2011, 83-86 pl. 26, 347-349. A comparable early specimen is also known as a stray find from Pullach im Isartal (Lkr. München/D). Wels-Weyrauch 2015, 82 pl. 19, 207.

115) Peroni 1956; Mozsolics 1971, 64-66; Kőszegi 1988, 41; Mozsolics 1985, 18-19; Hansen 1994a, 215-219; for further literature and new data on the Hungarian finds see Tarbay 2020.

116) Patek 1968, pl. 78, 19. – Makkay 2006, pl. 11, 67.

117) Vinski-Gasparini 1973, pls 27, 6; 72, 2.

118) Mozsolics 1985, pl. 104, 9.

119) Mozsolics 1985, pl. 124, 17. – Čerče/Šinkove 1995, pl. 37, 6.

120) Use-wear traces could not be observed on some specimens due to corrosion (nos 23. 28) or fragmentation (no. 26).

121) Bell 2019, 153-154. – Gentile/van Gijn 2019, 137. 139 figs 8, A-B; 9, A-B.

122) Knight 2019b, 31-32.

123) Quilliec 2008, 70 figs 9-10. – Mörtz 2013, 60 fig. 4; 2018, 175.

124) The presence of another helmet, cuirass (no. 30), »composite armour« and neckguard fragments was also suggested by A. Mozsolics. Mozsolics 1985, 26 pl. 35, 33-34. 39; Kőszegi

1988, 41; Jankovits 2000, 193; Petres/Jankovits 2014, 60. The former, along with the identical fragments from Rinyaszentkirály are more likely part of type Žatec cists or large belts. See Mozsolics 1985, 26 pl. 96, 1-2; Clausing 1996; Tarbay 2014b, 210-213 figs 31-33. The second is more likely the rim of a helmet based on its thickness and motifs.

125) Patay 1968, 243 fig. 1, 2-3. – Vinski-Gasparini 1973, pl. 28, 1-4. – Madsen 1872, 22 pl. 17, 3. – Petres 1982, 60-61. – Mozsolics 1985, 27-28 pl. 204, 7. – Hansen 1994a, 20-21 fig. 6. – Kemenczei 2003, 26 pl. 7, 20. – Makkay 2006, pl. 4, 6. – Uckelmann 2012, 14-21 pls 1-6. – Molloy 2016, 360-362 fig. 13, 10.2.

126) Mozsolics 1985, 24-25. 137 pl. 35, 37. – Kőszegi 1988, 41. – Mödlinger 2017, 31-42. 57-68.

127) von Merhart 1941, 5-11 fig. 1, 12. – Mozsolics 1953, 37 fig. 3. – Foltiny 1955, 80 pl. 53, 8. – Hencken 1971, 146-148. – Kemenczei 1979, 80-82. – Mozsolics 1985, 24-25. 137 pl. 35, 39. – Clausing 2001, 207-216. – Mödlinger 2017, 42-53 figs 2, 3; 2, 9 pls 2, 13-15. 17; 3; V. Szabó 2019, fig. 47.

128) Mödlinger 2014, 797 fig. 5 tabs 2-3.

129) Patay 1968. – Mozsolics 1985, 24-29. – Uckelmann 2012, 14-21. – Mödlinger 2017, 31-53.

130) To a lesser extent, however, modern damage is also present in the assemblage.

131) Molloy 2011, 67-72; 2018, 201-202 fig. 10, 2.

132) Gener 2011.

133) Fontijn et al. 2012.

134) Tarbay 2018, 12. 24.

135) Bradley 2013, 121.

136) Quilliec 2008, 69. – Horn 2014, 35-36; 2015, 203. – Tarbay 2018, 8-11. – Bell 2019. – Gentile/van Gijn 2019, 10.

137) Gosden/Marshall 1999. – Fontijn 2002. – Kristiansen 2002, 329-330. – Whitley 2002, 220-221. – Chapman/Gaydarska 2006, 8. – Kristiansen 2008, 42-44. – Quilliec 2008, 75. – Joy 2009, 543. – Molloy 2011, 72. – Pearce 2013, 64. – Bunnefeld 2018, 205-206.

138) Fontijn 2002, 26.

139) Fontijn 2002, 32.

140) Fontijn 2002, 27.

141) Knight 2019b.

142) Fontijn 2002, 26.

143) Davis 2019, 66. 70.

144) Kopytoff 1986, 89. – Gosden/Marshall 1999. – Joy 2019, 543. – Knight 2019b.

145) Joy 2019, 543.

146) Whitley 2002, 221-223. – Fontijn 2005, 152. – Anderson 2018, 219-220. – Georganas 2018.

147) Hansen 2013, 380-381; 2016a. – Rezi 2011, 303-307.

148) Chapman 2000, 23. Modern damages were also identified and not included in the analysis. See Tarbay 2017a.

149) Knight 2019a, 254. 260-264 figs 9-17.

150) See Cosack 2003; Bietti Sestieri et al. 2013; Tarbay 2015.

151) Nebelsick 1997; 2000.

152) Jacob-Friesen 1967, pl. 8.4-5. – Hansen 1996/1998, 14-19 fig. 13. – Bruno 2012, 262-263 fig. 7, 31. – Dietrich 2014, 475-482. – Tarbay 2014, 208 fig. 29 list 15. – Hansen 2016a, 186-187. – Tarbay 2017a, 84. – Dietrich/Mörtz 2019. – Vilaça/Bottaini 2019, 135.

153) Wosinsky 1896, 480 pl. 113, 15. – Németh/Torma 1965, 62 pl. 3.6-6a. – Mészáros 1971/1972, 29 pl. 8, 1. – Vinski-Gasparini 1973, pl. 77, 22. – Mozsolics 1985, pl. 107, 6. – Hansen 1996/1998, 19 notes 53-55. – Soroceanu/Szabó 2001, fig. 4, 2. – Salaš 2005, pl. 65, 1. 3. – Borgna et al. 2016, pl. 71, 1-2. – Tarbay 2017a, fig. 5, 4. – V. Szabó 2019, figs 35. 156.

154) Tarbay 2014b, 208-210.

155) Grinsell 1961, 477-478. – Fokkens 1999, 39-40. – Fontijn 2002, 230 fig. 11.3; 2005, 149-152. – Quilliec 2008, 75. – Melheim/Horn 2014, 8. – Anderson 2018, 224.

156) van Gennep 1960. – Fontijn 2005, 151. – Horn 2011, 63. – Melheim/Horn 2014, 7. – Anderson 2018, 223. – Mörtz 2018, 179-180.

157) Grinsell 1961, 477-478. – Kristiansen 1999, 103. – York 2002, 90. – Fontijn 2005, 151. – Horn 2011, 64. – Mörtz 2013, 61-62. – Mörtz 2018, 175-176.

158) Bradley 1990, 102-107. – Chapman 2000, 6-7. – Fontijn 2002, 229-230. – Cosack 2003. – Bradley 2005, 150. – Fontijn 2005, 151. – Brück 2006b, 80. – Bietti Sestieri et al. 2013. – Tarbay 2015. – Brück 2016, 81. – V. Szabó 2019, 61-71.

159) Chapman 2000, 46-47. – Fontijn 2002, 224. – Vandkilde 2013, 47-49.

160) Vandkilde 2013, 47-49.

161) Uckelmann 2012, 72-73. 81-86. – Klooß/Lidke 2014.

162) Anderson 2018, 221-222.

163) Vandkilde 2013, 47.

164) Chapman 2000, 46-47.

165) Kristiansen 1999, 103; Chapman 2000, 46-47; Vandkilde 2013, 49; Mörtz 2018, 172; Anderson 2018, 218-220; Vandkilde 2018, 233-236. Elemental composition analysis will be needed to identify objects that may have belonged together but cannot be reassembled along their breakage surfaces (e. g. nos 18. 21).

166) Bradley 2005, 151. – Hansen 2013, 376. – Baitinger 2016a; 2016b. – Hansen 2016a, 195-197. – Brandherm 2018, 51.

167) Bradley 2005, 151. – Brandherm 2018, 51.

168) Modl 2010. – Nessel 2014, 405-407.

169) Bradley 2005, 163. – Delfino 2014, 136-137. – Brandherm 2018, 48-49. – Wiseman 2018, 40-47.

170) Delfino 2014, 124-125. – Tarbay 2015/2016.

171) Mozsolics 1984, pl. 5. – Kacsó 2013. – Tarbay 2014b, fig. 68. – Delfino 2014, 138.

172) Fontijn 2002, 28. – Bradley 2005, 150. – Brück 2006.

173) Brück 2006b, 91.

174) Bradley 2005, 151. – Kyrieleis 2006, 95-97. – Baitinger 2013, 266-270. 280. – Hansen 2013, 376-377. – Mörtz 2013, 58. – Baitinger 2016a, 256; 2016b, 21. 27-28.

175) Primas 1990, 85-87. – Chapman 2000, 6. 37-39. 54-64. – Fontijn 2002, 33. – Brück 2016, 82.

176) Bradley/Ford 2004, 174-175. – Brück 2006b, 79. 91.

177) Vinski-Gasparini 1973. – Mozsolics 1985. – Hansen 1994a. – Turk 1996b. – Hansen 2013, 380-381. – Váczi 2014.

178) von Brunn 1968. – Mozsolics 1985.

179) Hansen 1994a; 2013, 373-375 fig. 6.

180) Hansen 1994a, 11-97; Novák/Váczi 2010. This selection pattern is most likely continuous on regions interacting with Transdanubia like Alps or Moravia, and even distant territories like Transylvania.

181) Vinski-Gasparini 1973, pls 44, 2; 45, 1-10. 15-16; 46, 17-18. 20. 22. 25-26; 48, 1-7. 19. 31; 66, 1-13. 37a; 67, 8-18. 22-23. – Mozsolics 1985, 116-118 pls 36, 1-23; 40, 13. 16; 54, 1-13. 17-20; 55, 1-8. 21; 56, 1-6. 9-14; 60, 5-7. 9. 11-14. 17-27; 61, 20-21. 23-24. – Čerče/Šinkovec 1995, pls 75. 83, 168. – Makkay 2006, pls 1-5; 6.1; 10-12. – Jovanović 2010, pls 30, 224; 31-37; 38, 228; 59, 497. – V. Szabó 2019, fig. 47.

182) Rezi 2011. – Novák/Váczi 2010. – Tarbay 2018.

183) Needham 1988, 245. – Kristiansen 2008, 41-43. – Molloy 2011, 217. – Vachta 2016, 106-110. – Anderson 2018, 221.

184) Mozsolics 1985, 9-75; 2000.

185) Ožďáni/Žebrák 2017. – Mörtz 2012.

186) Fontijn 2002, 221. 223. – Downing/Fibiger 2017, 549. – Molloy 2018, 208.

187) Točik/Paulík 1960. – Vinski-Gasparini 1973, pl. 103.4. – Jankovits 1992, 6-10. – Ilon 2015.

188) Fontijn 2005, 152. – Anderson 2018, 221-223.

189) Chapman 2000, 46-47.

190) Treherne 1995. – Clausing 2005, 163 pl. 14-15a. – Fontijn 2005, 150. – Whittaker 2008, 83. – Hansen 2016b, 207-213. – Pitman/Doonan 2018, 121-122.

191) Needham 1988, 246. – Hansen 2016a, 200. – Vachta 2016, 101-106.

192) Needham 1988, 246. – Vachta 2016.

193) Vachta 2016, 101-110.

194) Vachta 2016, 101-102.

195) Soroceanu 1995, 35-49 fig. 11. – Tarbay 2014, 222-227 fig. 44. – V. Szabó 2019. – Tarbay/Havasi 2019, 401-406 fig. 16.

196) Abbreviations: RRM: Rippl-Rónai Museum, Kaposvár, HNM: Hungarian National Museum, Budapest, S: state, T: technological class, D: defects, U: use-wear, M: manipulations, P: post-depositional damages, L. length, W: width, b/mr: blade-midrib interface, b: blade, r: rim, Th: thickness, Wt: weight.

197) Mödlinger et al. 2014, 797 fig. 5 tabs 2-3.

198) Mödlinger et al. 2014, 797 fig. 5 tabs 2-3.

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Summary

The study discusses biographical possibilities of weapon selection in Late Bronze Age Transdanubia (Western Hungary) on the examples of two hoards. One was found in Rinyaszentkirály (Somogy County/H) and conventionally dated to the Ha A1 period, the other is originating from Keszőhidegkút (Tolna County/H) and it can be identified as a multi-period assemblage. The main goal of the study was the characterization of weapon selection in these assemblages based on the evaluation of craft, use-wear and manipulation traces observed by macro-photographs and microscope-camera images, and the comparison of these observations with previous experimental, archaeometrical, and use-wear data. This work allowed to gain »fragments of information« on the object's »generalized« prehistoric and modern biography and identify weapons with potentially »specific« prehistoric life-paths. Based on our results, the Rinyaszentkirály hoard belongs to an exclusive category of Late Bronze Age weapon equipment. It was a personal set (greave, metal-hilted sword, spearhead) of an individual with high social status. All objects were used, and at least two of them could have had a specific biography. All weapons were intentionally destroyed and manipulated. The weapons in the Keszőhidegkút hoard could represent complex sets that belonged to multiple local individuals who were part- or full-time combatants. The use-wear analysis revealed that these weapons were indeed applied in combat, some were intensively used, repaired, and maintained for a long period of time. During the act of deposition, these weapons were broken into pieces, probably by plastic deformation. The selection of these large scrap hoards followed a *pars pro toto* concept, they are highly structured regarding the types, technological traits, treatment and symbolic meaning of the objects. They may have been ritual offerings by several individuals or even by an entire community during some crucial life-cycle events. The weapon sets and their associative elements reflected the »combatant« or »warrior« identities within these groups.

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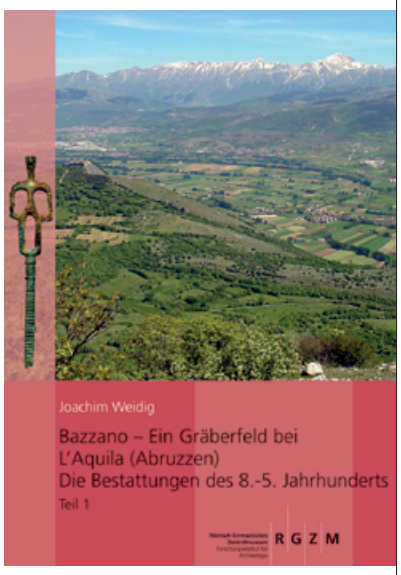

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Joachim Weidig

Bazzano – Ein Gräberfeld bei L'Aquila (Arruzzen)

Die Bestattungen des 8.-5. Jahrhunderts v. Chr.

Bazzano bei L'Aquila gehört zu den größten vorrömischen Bestattungsplätzen im apenninischen Mittelitalien und übertrifft in der Zahl der Gräber sogar die Nekropolen von Fossa und Campovalano. Über 500 Bestattungen der orientalisierenden und archaischen Zeit (8.-5. Jahrhundert v. Chr.) aus den Grabungen der Soprintendenza per i Beni Archeologici dell'Abruzzo von 1992-2004 werden in dieser Publikation erstmals vorgelegt und ausgewertet.
Neben Fragen zu Bestattungsbräuchen und Sozialstrukturen ist der Hauptteil der Arbeit der Klassifizierung und zeitlichen Einordnung von typischen mittelitalischen Objekten gewidmet, die weit über Bazzano hinaus verbreitet sind. Mit den ergänzenden anthropologischen Beiträgen wird das Bild einer mobilen eisenzeitlichen Bevölkerung entworfen, die sich in ihrer Lebensführung von den in der benachbarten Nekropole von Fossa bestattenden Individuen unterschied. Möglicherweise geht dies auf eine ausgeprägte Weidewirtschaft, auf Transhumanz oder aber auf eine sehr aktive Kriegerschicht zurück, deren Stellung auch durch die hohe Anzahl von waffenführenden Gräbern hervorgehoben wird.

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Waffen im vorrömischen Spanien

Actas del encuentro Armamento y guerra en la península ibérica prerromana (s. VI-I a. C.): problemas, objetivos y estrategias

Akten der Tagung Bewaffnung und Archäologie des Krieges auf der iberischen Halbinsel in vorrömischer Zeit (6.-1. Jh. v. Chr.): Probleme, Ziele und Strategien

Die umfangreichen archäologischen Datenbanken, die heutzutage zur Verfügung stehen, ermöglichen einen neuen Blick auf die vorrömischen Waffen der Iberischen Halbinsel.
Hier wird eine komplette Synthese vorgelegt, die sich nicht nur auf technologische und formale Fragen erstreckt, sondern auch auf soziale, kulturelle, ökonomische und sogar politische Wechselbeziehungen. Die jüngsten und weitreichenden Ergebnisse erlauben es, die technischen Neuerungen zu untersuchen und die Chronologien genauer anzupassen. Insbesondere aber lassen sich mediterrane Einflüsse auf die Produktion der iberischen Waffen identifizieren sowie der Einfluss einer iberischen Waffenart auf die Herstellung fremder Waffen, konkret der römischen.

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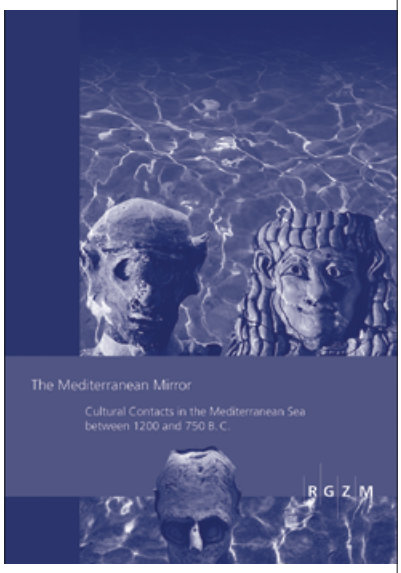

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The Mediterranean Mirror

Cultural Contacts in the Mediterranean Sea between 1200 and 750 BC

Between 1200 and 750 BC, the Mediterranean world saw the breakdown of Bronze Age civilizations, and the rise of Iron Age cultures. These chronological stages which unfortunately are often taken into consideration separately, have been bridged.
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Armi votive in Magna Grecia

La ricca documentazione archeologica della Magna Grecia e dell'Italia anellenica proveniente da scavi recenti e passati consente di studiare presenza e signifi cato delle armi difensive e offensive (reali o simboliche) in contesti votivi. Confrontare il dossier di dati delle città greche con quello del mondo indigeno non solo mostra la complessità e la diversità del fenomeno, ma consente di riaprire la discussione sul rapporto tra guerra e culto nel mondo antico e, più specifi catamente, sulla modalità e sulle pratiche rituali riferibili al mondo delle armi e alla rappresentazione della guerra tra il periodo arcaico e la romanizzazione. In passato l'argomento è stato studiato poco, quasi mai nel mondo italico e magnogreco dal momento che nella letteratura archeologica sono stati presi in considerazione quasi sempre solo gli oggetti più signifi cativi o meglio conservati mentre gran parte dei materiali sono ancora nei depositi in attesa di essere editati; spesso nelle pubblicazioni mancano i riferimenti ai contesti, ai dati quantitativi o ai dettagli utili per comprendere la manipolazione subita prima e dopo la deposizione. I rinvenimenti effettuati negli ultimi anni in alcuni santuari della Magna Grecia (ad es. Caulonia), le »scoperte« nei depositi di alcuni musei (ad es. Paestum) e gli studi monografi ci su casi particolari (ad es. le corazze), consentono oggi di avviare uno studio sistematico delle armi in contesto votivo, di indagare le modalità e le caratteristiche della loro deposizione e di restituire le vicende storiche riferibili ad esse.

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