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THE 'DEPOSITION' OF A DISC-BUTTED BRONZE AXE DISCOVERED IN THE MOLDAVIAN PLATEAU, ROMANIA

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Abstract. The authors' intention is to bring to the notice of specialists a decorated discbutted axe recently discovered east of the Carpathians, in the Moldavian Plateau. This type of axe (A1, according to the established typologies), with few known items, is a typical discovery (mainly as a component of hoards or as an individual find) for the Middle Bronze Age from the area west of the Carpathians — the Wietenberg, Suciu de Sus and Otomani-Füzesabony cultures. The microscopic investigations on the decoration techniques prove the ability of the metallurgical craftsmen to handle complex alloys, as well as a refined artistic sense, qualities used to achieve a certain impressive appearance. The corroboration of all available data on this artefact offers new possibilities for revealing the social and symbolic function of the disc-butted axes of the Bronze Age.

Rezumat. Intenția autorilor este de a aduce la cunoștința specialiștilor un topor cu disc decorat, descoperit recent la est de munții Carpați, în Podișul Moldovei. Acest tip de topor (A1, după tipologiile uzuale), cu puține exemplare cunoscute, este caracteristic epocii mijlocii a bronzului de la vest de Carpați — culturile Wietenberg, Suciu de Sus și Otomani-Füzesabony. Investigațiile microscopice asupra modului de realizarea a decorului dovedesc abilitatea meșterilor metalurgi de a manipula aliaje complexe, precum și un simț artistic rafinat, calități folosite pentru a obține un anumit aspect exterior, impresionant. Coroborarea tuturor datelor disponibile despre acest artefact oferă

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posibilități noi de relevare a funcției sociale și simbolice a topoarelor cu disc din perioada epocii bronzului.

I. Introduction

Central to this paper is bringing into notice a recently discovered bronze artefact, which belongs to the type known in the archaeological literature as disc-butted axes (*Nackenscheibenäxt*). Besides the usual descriptive, typological and chronological approaches, the artefact was investigated through elemental analysis of the alloys and by microscopic analysis. The extrapolation of this data could prove helpful in asserting the possible social/symbolic value and function of such artefacts. Also, the archaeological acceptance of "deposition" might prove appropriate for this particular find since, as the discovery circumstances suggest, the axe was probably the subject of a votive offering.

The study of the disc-butted axes from the Bronze and Early Iron Age in the central and south-eastern part of Europe was mainly tributary to positivist thinking and cultural-typological descriptivism. Most of the archaeological writings concerning these artefacts are typology orientated studies, less attention being paid to the functional matter and even less to the technological problems. In the first half of the 20th century, Ion Nestor established a well-elaborated typology of disc-butted axes⁶, and as new items were discovered, the subsequent papers focused mainly in adjusting Nestor's typology in order to get more accurate criteria (either morphological, chronological and/or decorative) for ascertaining subtypes⁷. Also, the disc-butted axes were often, but only circumstantially taken into consideration in relation with one of the most discussed aspects of the Bronze Age — the bronze hoards⁸. In the above mentioned studies, problems concerning technology and functionality are rarely mentioned, as adjacent issues to the typological and chronological debates (only Kroeger-

⁶ NESTOR 1938.

⁷ see MOZSOLICS 1967; HÄNSEL 1968; VULPE 1970; KROEGER-MICHEL 1983; BOROFFKA 1999, 59–69; DAVID 2002.

⁸ MOZSOLICS 1967; PETRESCU-DÎMBOVIȚA 1977; SOROCEANU 2012.

Michel⁹ seems more concerned about technology). The discussions about the raw materials rely mainly on the SAM investigations¹⁰.

II. The artefact

The axe was discovered in the early '50s (during agricultural works), by a peasant, near the village of Iorcani (Iași County, Romania). Since then, the discoverer of the axe died and passed it to his family. The artefact was donated in the early 2012 (as an ethnographic item) to the Tătăruși Village Museum, curated by Despina and Dumitru Gafița (local teachers). In September 2012, during a visit in the village, the first three authors of the present study identified the axe among other archaeological and ethnographic materials found in the museum, subsequently requesting and receiving the permission to analyse and publish the artefact.



Figure 1. a. Map showing the geographical position of Iorcani village; b. Orthophotomap with the indication of the discovery place.

In terms of local administration, Iorcani village belongs to the Tătăruși commune, Iași County. Geographically, the village is situated in the

⁹ KROEGER-MICHEL 1983, 21–27.

¹⁰ JUNGHANS *et alii* 1968; 1974.

Moldavian Plateau, the Şomuz-Tătăruși sub-unit (fig. 1/a). According to the family of the discoverer, the axe was found at the south-western foots of the Iorcani Hill, in the interfluve created by the two springs of the "Pârâul lui Marian" brook, in the place known by the locals as "Tarlaua lui Dogaru" (fig. 1/b).



Figure 2. The disc-butted axe from Iorcani (photos by Silviu Gania)

On account of its elegant shape, decoration and sizes, this artefact is an outstanding specimen of its type (for its dimensions, see figs. 2–3; it has a weight of 610 g). It was probably made by casting in a bivalve or three-part mould; the finishing is very good, being quite difficult to determine if it was made of a single piece or if the disc was cast separately and then welded to the body. Before decorating the item, all casting traces were removed through polishing, with the burrs being barely noticeable. As an interesting detail of the casting process, on the walls of the shaft hole two small concavities can be observed, diametrically placed on the long axis of the weapon (fig. 4); these were probably caused by a plug placed inside the mould, in order to reserve the hole¹¹. Such features were also observed on the axe from Someşeni¹².



Figure 3. The disc-butted axe from Iorcani: a. the disc; b. the reconstruction of the decoration on the disc; c. the upper narrow face; d. the wide face; e. the lower narrow face (drawing by F.-A. Tencariu, D.-M. Vornicu)

¹¹ KROEGER-MICHEL 1983, 21

¹² VULPE 1970, 67.



Figure 4. Details of the disc-butted axe. Small concavities inside the shaft hole

The preservation of the axe is relatively good; however, the disc, the blade and the interior of the shaft hole bear traces of recent use—the discoverer and his successors used it in various household activities—that left scratches and produced some peeling of the outer surface. Unfortunately, these recent activities render the artefact unsuitable for use-wear analysis.

The axe is decorated almost entirely, except the back of the disc and the shaft hole. The ornamentation was carefully drawn and is composed of motifs also present on other axes of the same type, but not identical to any other one. This fact, along with the observation that, from our knowledge, there are no two axes equally sized, reinforces the idea that these were not mass produced artefacts¹³, but rather commodities of great value, custom made for a relatively small group of people. The ornamentation of the axe from Iorcani is one of the most elaborate sets on the axes of this type (figs. 2; 3; 6/a–b).

The disc of the axe is mushroom-shaped, buttonless¹⁴ and slowly asymmetrical. Unfortunately, the decoration of the disk was destroyed on

¹³ IGNAT 1981, 38.

¹⁴ The centre of the disc is quite damaged by the recent activities so one may say there is a possibility that a button existed in that place and was recently destroyed. However, the authors' opinion, based on the disc aspect and decoration, alongside comparison with other known pieces, is that the axe from Iorcani did not have a button.

about 45% of its surface. However, it is obvious that the main decorative motif is the four-arms spiral vortex (*tetraskelion*), twisted counterclockwise (figs. 2/a; 3/a–b). From the apex of each of the four arms sprung secondary coils, clockwise oriented; from each of the latter, other two, smaller tertiary coils grow. For designing the spirals, groups of three to eight lines were traced; each group of lines is bordered by dotted lines composed of fine stitches. The decoration from the edge of the disc is only partially preserved, composed of linked groups of concentric arcs (four continue lines bordered by dotted lines).

The two wide faces of the axe are identically decorated (figs. 2/b–c; 3/d). The decoration motifs are arranged in registers composed of hachured triangles and chained spiral hooks, horizontally disposed (the spirals are made of groups of four or five continue lines bordered by dotted lines). The last hook sits on a double spiral volute (the so-called C-shaped decoration) in front of which another one was placed. Two dashed lines were drawn between the two confronting volutes, placed crosswise; around the intersection of the two lines a dotted circle was drawn. The decoration motifs of the lower part consists of continuous lines, chained dotted arcs and hachured triangles pointing towards the edge; from the top of the triangles dotted lines start.

The layer supporting the decoration of the narrow faces is quite exfoliated (especially on the lower one — figs. 2/e; 3/e), making the reconstruction of the original design difficult. On the upper narrow face (figs. 2/d; 3/c), around the shaft hole, dotted tangent semicircles are still visible. On both of the narrow faces, the part immediately under the disc is decorated with hachured triangles. The registers under the shaft hole are composed of two alternating motifs: confronting hachured triangles and vertically-disposed spiral hooks; interlinked X motifs are also part of the decoration.

The elemental analysis of the alloys used for making the axe was performed in the Interdisciplinary Laboratory for Scientific Investigations and Heritage Conservation of the Arheoinvest Platform from the "Alexandru Ioan Cuza" University of Iași. The results¹⁵ for the core alloy

¹⁵ For a more detailed analysis and the interpretation of the results see SANDU *et alii* 2014, 918–927.

Discovery place	Elemental composition (%)										
	Sn	Pb	As	Sb	Ag	Ni	Bi	Au	Zn	Со	Fe
Hajdúsámson	7.2	0	0.63	0.04	0.03	0.42	0	0	0	0	+
Hajdúsámson	5.9	0	0.8	0.11	0.05	0.5	0	0	0	0	++
Păuliș	4.9	0	0.47	0.07	0.01	0.21	0	0	0	0	+
Sebeș	4.2	0	0.18	Trace	0.02	0.29	0	0	0	0	Trace
Criț	2.9	0	1.4	Trace	0.03	0.47	0	0	0	0	Trace
Valea Chioarului	6	0	1	0.09	0.01	0.54	0	0	0	0	+
Apa	5.3	0	0.9	0.5	0.03	0.48	0	0	0	0	+
Kispalád	8.7	Trace	0.79	0.11	0.03	0.31	0	0	0	0	+
Szeghalom	4.2	Trace	1.75	0.34	0.02	1.3	0	0	0	0.06	++
Szeghalom	10	0	0.67	Trace	0.01	0.55	0	0	0	0	+
Szeghalom	7.1	0	Trace	0	Trace	0.11	0	0	0	0	+
Bogata	11.9	?	0.5	?	?	?	?	?	?	?	0.4
IORCANI (core alloy)	5.02	0	1.053	0.938	0	0.863	0	0	0	0	0.29

showed no notable differences compared to the results of the elemental analysis for the core of other A type disc-butted axes (table 1).

Table 1. Comparative view of the elemental composition of the core alloys for the A type disc-butted axes (after JUNGHANS *et alii* 1968; VULPE, LAZĂR 2003, 43–52; SANDU *et alii* 2014 918–927)

III. Discussion

Morphologically, the axe from Iorcani presents itself as a classic discbutted axe that can be appointed as an A type axe or Hajdúsámson-Apa type (the typology originally proposed by I. Nestor and renewed by Al. Vulpe was preferred, since it seems more accurate than others). The lack of a button on the disc affiliates the item in the A1 subtype (Hajdúsámson variant)¹⁶.

The main decorative motive from the disc—the *tetraskelion*—is quite common on both A1 – Hajdúsámson and A2 – Apa subtypes¹⁷. The elements that constitute the decoration of the faces also have analogies on other axes, like those from Hajdúsámson, Budapest¹⁸, Valea Chioarului¹⁹ and a fragment from Hungary deposited at the Hamburger Museum für Archäologie²⁰. As a further remark, the counter-clockwise orientation of the *tetraskelion* on the disk is typical (but not exclusively) of the A1 subtype while the clockwise orientation is typical for subtype A2²¹.

The disc-butted axes are specific to the Middle Bronze Age in the area from the west of the Carpathian Mountains, nowadays Western Romania, Hungary and Slovakia (fig. 5). Such items were discovered within hoards or as single-find depositions in the area of Otomani-Füzesabony (hoards of Apa and Hajdúsámson), Suciu (hoards of Săpânța and Valea Chioarului) and Wietenberg cultures (Bogata, Sebeş, Someşeni, Criţ). Not being our intention to go deep in the chronological problems of the disc-butted axes²², we resume to specifying that the Iorcani piece, along with other items of A1 subtype is both typological and chronological the starting point of the evolution of this category of

¹⁶ NESTOR 1938, 183; VULPE 1970, 15.

¹⁷ See the discs of the axes from Hajdúsámson in MOZSOLICS 1967, taf. 9/1b, Szeghalom in MOZSOLICS 1967, taf. 13/3d, Cajvana in IGNAT 1981, 133–146 and Someşeni in VULPE 1970 and DUMITRESCU 1974, 367, taf. 408.

¹⁸ MOZSOLICS 1967, taf.9/1a.

¹⁹ VULPE 1970, taf. 300; SOROCEANU 2012, taf. 13/1a.

²⁰ BOROFFKA 1999, 60, abb. 1.

²¹ VULPE, LAZĂR 2003, 46.

²² For comprehensive discussions on the problem see NESTOR 1938, MOZSOLICS 1967, HÄNSEL 1968; VULPE 1970; BOROFFKA 1999; VULPE, LAZĂR 2003.

artefacts. The A type of the disc-butted axes can be dated, according to the established chronologies, in the second stage of the Middle Bronze Age²³ respectively the FDIII and MDI stages (Reinecke A2 and A2–B1)²⁴.



Figure 5. Map showing the geographical distribution of the A type disc-butted axes, discovered as single find or part of hoards: 1. Rimavské Janovce; 2. Sajólád;

3. Tiszaladány; 4. Hajdúsámson; 5. Vámospércs; 6. Szeghalom; 7. Păuliş; 8. Kispalád; 9. Săpânța; 10. Remetea Oașului; 11. Apa; 12. Valea Chioarului (Gaura); 13. Someșeni; 14. Plăiești; 15. Bogata; 16. Sebeș; 17. Criț; 18. Cajvana; 19. Iorcani.

As one can see (fig. 5), the axes of Hajdúsámson – Apa (A) type are not very common artefacts. A simple count (including all of them decorated or not decorated, discovered as part of hoards, individual

²³ VULPE 1970, 69.

²⁴ HÄNSEL 1968, 61–62; BOROFFKA 1999, 66–67.

finding or of unknown provenience, and even the ones that disappeared over time) indicates a number of 29 axes discovered in different locations west of the Carpathians. Aside from them, two exceptions exist: the axes from Iorcani and Cajvana, both discovered east of the Carpathian Mountains, in the Suceava Plateau (the two localities are almost 50 km apart). The artefact from Cajvana is considered an import from the Wietenberg culture that came eastwards, in the Costişa-Komarov area, through the passes of the Carpathian Mountains²⁵. It can be assumed, with little chance of error, only that the axe from Iorcani reached the east of the Carpathians via the same paths. What cannot be known for sure is when the crossing occurred and whether the artefact was the subject of an exchange between communities or the original owner, who travelled over the mountains and chose, or was forced, for unknown reasons, to separate from his possession at Iorcani.

So, if determining the period of the manufacture of this item is accurate (Middle Bronze Age), one cannot say the same about explaining its presence east of the Carpathians, and the precise timing and motivation of the deposition. It is assumed that the axe, an exceptional piece (either weapon used in the battle or parade, object of prestige — the hallmark of social position, or all at the same time), has been in use for a long time, perhaps for several generations²⁶. In this regard, the area where it was supposedly discovered can bring some clues. Although the discoverer died before the authors identified the axe in the local museum, there is no reason to doubt about the area indicated by his relatives as the place of discovery.

As mentioned before, the artefact was found during agricultural works, in the area delimited by the two springs of the "Pârâul lui Marian" brook, in the place known by the locals as "Tarlaua lui Dogaru" (fig. 1/b). A thorough research of the area, in the late autumn of 2012, after the land was ploughed, led to the discovery of a large number of lithic tools and pottery, mainly undecorated. The flint tools are attributable to the Chalcolithic period, but the majority of the shards are impossible to be

²⁵ IGNAT 1981, 133-146; IGNAT 2000, 42-44.

²⁶ VULPE, LAZĂR 2003, 47.

dated; some might belong to the Noua culture (Late Bronze Age) while one could be dated to the Early Hallstatt. Therefore, it is very difficult to try an association of the axe with the traces of habitation in the area. In fact, none of the A type disc-butted axes was ever discovered inside settlements. Regardless of the archaeological materials, the geographical attributes of the area can be an important clue in explaining the presence of this artefact. It is possible that the small interfluve at the foot of a wooded hill, or even one of the two springs bed, drained today (the exact place of discovery is not known) could have seem an appropriate place for the offering of an object so valuable — if we accept the votive character of such actions. We do not have information about other metal objects found in the same place, so for now, one cannot talk about a possible hoard but probably of a single find deposition (einzelfunde). Moreover, the selective deposition of some bronze objects, in general, and weapons in particular (as single finds), in or near watery places (rivers, springs, streams, wells, swamps, and bogs) was a common practice during the Bronze Age²⁷.

Some considerations on the **decoration technique** on this artefact can be added. Seen at a stereoscopic microscope the surface of the axe has traces of polishing: rougher in the areas less visible (as on the back of the disk — fig. 6/c) and very smooth, sometimes imperceptible on its body (fig. 6 b, d). But exactly how the decoration was realized, might prove to be a question much difficult than it appears. Generally, different scholars mention engraving as the implicit technique, but more intimate studies on the problem are lacking. As an exception, in the seventies, P. R. Lowery and R. D. A. Savage analysed the decoration technique on the disc-butted axe of A type from Someşeni²⁸. Through meticulous observation and experiment, they concluded that the decoration on the axe from Someşeni was made through chasing (technique that involves pushing the material inside by punching), not engraving (which involves removing material to create the decoration)²⁹. Their study remained quite unknown since none

²⁷ SOROCEANU 1995, 33–34, abb. 3 e; SOROCEANU 2012a, 245; FONTIJN 2002, 110; FONTIJN 2005, 150; HARDING 2000, 361–365; BRADLEY 2013, 131.

²⁸ LOWERY et al. 1972, 165-169.

²⁹ LOWERY et al. 1972, 165-169, pl. XV-XVIII.

of the works on Bronze Age decorated objects written after 1972 cites it. Instead, E. Michel-Kroeger observes that on some axes the engraving is deeper, while on others is more superficial. She also assumed that the different parts of the decoration were made with different tools, supposing that the lines were done with a denticulate one, while the dots were not always round, fact she explained through the use of a pointed tool³⁰. Vulpe and Lazăr on the other side, state (with no further argumentation) about the axe of Bogata that: "...it might be assumed that the ornamentation was realised on the wax pattern, prior to the casting"³¹.



Figure 6. Optical microscopy images showing details of the decoration of the discbutted axe: a-b. aspects of the decoration $(1.6\times, 0.65\times)$; c. traces of polishing on the neck of the axe, right below the disk $(1.25\times)$; d. decorative motifs on the neck of the axe $(1.6\times)$ (photos by A. Vornicu)

³⁰ MICHEL-KROEGER 1983, 89-90.

³¹ VULPE, LAZĂR 2003, 44. Original in Romanian, translated by the authors of this paper.

At least in the case of the axe from Iorcani the microscopic observation excludes Vulpe and Lazăr's assumptions (for that matter, we doubt that this hypothesis could be valid for any axe of this type). The photographs taken with an optical microscope (a Carl Zeiss stereoscopic microscope from the Faculty of Biology, "Alexandru Ioan Cuza" University of Iasi) suggest that at least the hachured triangles on the neck of the axe, under the disc, were probably made by chasing, not engraving. Some of the lines forming these triangles and inner hachures are dashed, appearing as rows of small, elongated triangles (fig. 6/d), that could be the result of consecutive punching with a triangular pointed object. As for the continuous lines forming the spiral hooks and other decorative items (fig. 6/b), it is difficult, for now, to assert that the same technique was used. Anyway, if at a glimpse the whole decoration seems close to perfection, a closer look reveals several execution mistakes, such as lines overlapping, imperfect framing or asymmetric motifs. These are additional arguments in stating that the decoration on the axe from Iorcani was made through chasing/engraving. Future research, involving a larger number of specimens, along with experimental data and ethnographic observation should elucidate this matter.

IV. Conclusion

The main goal of this article was to bring into the specialists' attention the existence of another decorated disc-butted axe of A1 type, dating from the Middle Bronze Age. This particular category of metal objects stands out from the "crowd" of Bronze Age artefacts, as they are few in number, with elaborated decorations and discovered mainly as components of hoards or as single finds. The axe from Iorcani alongside with the one from Cajvana are the only decorated disc-butted axes of the early A type discovered east of the Carpathians.

Traditionally, the bronze artefacts were the subject of assiduous efforts made by archaeologists to order them, establish typologies and constructing chronologies. However important are as spatial and diachronic markers of the ancient times, the metal finds also keep encoded in themselves many important and sometimes outstanding information about the people who made, used and discarded/deposited them. Retrieving this information should be of at least equal importance as cataloguing and dating these objects. To put it in other words, as it already was suggested for the archaeological pottery, when one studies the bronze artefact, the aim should not be to answer only the "when and where?", but also the "how and why?" questions³².

Another important conclusion is that ancient makers were highskilled, able to manipulate different alloys to generate quality objects as well as desired surface appearances. Next, the look of certain objects, like the discussed axe, was very important, even to the detriment of efficiency, which brings us to the question of its functionality. What was the discbutted axe from Iorcani: a weapon or an insignia? One can assume based on its original appearance and intricate decoration that it was meant to be foremost a ceremonial weapon, a symbol of wealth, power and/or warrior skills; at the same time, its design, blade and weight are clues that, in case of necessity, the axe could also be a deadly weapon.

Based on the above assertions, on the uniqueness of the decoration and sizes of every known item, one can assume that, most probably, this kind of artefacts were not mass produced, but on commission, as customized personal objects, which makes them not very susceptible for being the subject of common inter-tribal exchanges. So, if we were to imagine a closing for the early "life" of the axe, its presence east of Carpathians was due to the original owner (probably a high-ranked aristocrat-warrior) who was, for unknown reasons, on a journey across the mountains, and the only "trade" that involved the artefact was between him and his divinity, at the moment of the votive deposition.

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³² PRITCHARD, VAN DER LEEUW 1984, 6.

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REFERENCES

BOROFFKA, N., 1999, Zu einem Axtfragment aus "Ungarn, In N. BOROFFKA, T. SOROCEANU (eds.), Transsilvanica. Archäeologische Untersuchungen zur Älteren Geschichte des Südöstlichen Mitteleuropa. Gedenkschrift für Kurt Horedt, Rahden / Westf., 59-69.

BRADLEY, R. 2013, *Hoards and the Deposition of Metal Work*, In: H. FOKKENS, A. HARDING (eds.), *The Oxford Handbook of European Bronze Age*, Oxford, 121–139.

DAVID, W. 2002, Studien zu Ornamentik und Datierung der bronzezeitlichen Depotfundgruppe Hajdúsámson–Apa–Ighiel–Zajta, teil 1, 2, BMA, XVIII, Alba Iulia.

DUMITRESCU, Vl. 1974, Arta preistorică în România, București.

FONTIJN, D. 2002, Sacrificial Landscapes. Cultural Biographies of Persons, Objects And 'Natural' Places In The Bronze Age Of The Southern Netherlands, *C. 2300–600 BC*, Analecta Praehistorica Leidensia, 33–34, Leiden.

FONTIJN, D. 2005, *Giving up weapons*, In: M. PARKER PEARSON, I. J. N. THORPE (eds.), *Warfare, Violence and Slavery in Prehistory*, BAR (International Series) 1374, Oxford, 145–154.

FONTIJN, D. 2008, Everything in its Right Place? On Selective Deposition, Landscape and the Construction of Identity in Later Prehistory, In: A. JONES (ed.) Prehistoric Europe. Theory and Practice, Blackwell Studies in Global Archaeology, Wiley-Blackwell, 86–106. HÄNSEL, B. 1968, Beiträge zur Chronologie der Mittleren Bronzezeit im Karpatenbecken, teil 1, 2, Bonn.

HARDING, A. 2000, European Societies in the Bronze Age, Cambridge.

IGNAT, M. 1981, *Contribuții la cunoașterea epocii bronzului și a Hallstatt-ului timpuriu în județul Suceava,* Thraco-Dacica, II, 133–146.

IGNAT, M. 2000, Metalurgia în epoca bronzului și prima epocă a fierului din Podișul Sucevei, Suceava.

JUNGHANS, S., SANGMEISTER, E., SCHRÖDER, M. 1968, Kupfer und Bronze in der frühen Metallzeit Europas. Katalog der Analysen Nr. 985–10040. SAM, band 2, teil 3, Berlin.

JUNGHANS, S., SANGMEISTER, E., SCHRÖDER, M. 1974, Kupfer und Bronze in der frühen Metallzeit Europas. Katalog der Analysen Nr. 10041–2200 (mit Nachuntersuchungen der Analysen Nr. 1–10040), SAM, band 2, teil 4, Berlin.

KROEGER-MICHEL, E. 1983, Les haches à disque du bassin des Carpathes, Paris.

LOWERY, P. R., SAVAGE, R. D. A., WILKINS, R. L. 1972, *The Technique of the Decoration on a Disc-Butted Axe from Romania*, Proceedings of the Pehistoric Society, 38, 165–169.

MOZSOLICS, A. 1967, Bronzefunde des Karpatenbeckens. Depotfundhorizonte von Hajdúsámson und Kosziderpadlás, Budapest.

NESTOR, I. 1938, Die verzierten Streitäxte mit Nackenscheibe aus West-Rumänien, In: E. SPROCKHOFF (Ed.), Marburger Studien Gero Mehrhart von Bernegg gewidmet, Darmstadt, 178–192.

PETRESCU-DÎMBOVIȚA, M. 1977, Depozitele de bronzuri din România, București 1977.

POPESCU, A.-D 2006, *Beyond Typology: Metal Axes and their Potential*, Dacia N.S., L, 431–450.

PRITCHARD A. C., VAN DER LEEUW, S. E. 1984, Introduction: the many dimensions of pottery, In: S.E. VAN DER LEEUW, A.C. PRITCHARD (eds.), *The many dimensions of pottery. Ceramics in archaeology and anthropology*, Amsterdam, 1–24.

SANDU, I. G., TENCARIU, F.-A., VORNICU, D.-M., SANDU, A.-V., VORNICU, A., VASILACHE, V., SANDU, I. 2014, *Establishing the Archaeo*-

Metallurgic Ornamentation Process of an Axe From the Bronze Age by OM, SEM-EDX, and Micro-FTIR, Microscopy Research And Technique, 77, 918–927.

SOROCEANU T. 1995, Die Fundumstände bronzezeitlicher Deponierungen – Ein Beitrag zur Hortdeutung beiderseits der Karpaten, In: T. SOROCEANU (ed.), Bronzefunde aus Rumänien, I, Berlin, 15–80.

SOROCEANU T. 2012, Die Kupfer- und Bronzedepots der frühen und mittleren Bronzezeit in Rumänien. Depozitele de obiecte din cupru și bronz din România. Epoca timpurie și mijlocie a bronzului (Bronzefunde aus Rumänien, vol. IV), ArchRom V, Cluj-Napoca, Bistrița.

SOROCEANU T. 2012a, Die Fundplätze bronzezeitlicher Horte im heutigen Rumänien, In: S. HANSEN, D. NEUMANN, T. VACHTA (eds.), Hort und Raum. Aktuelle Forschungen zu bronzezeitlichen Deponierungen in Mitteleuropa, Topoi: Berlin Studies of the Ancient World, 10, Berlin, 227– 254.

VULPE, A. 1970, *Die Äxte und Beile in Rumänien*, I, PBZ IX, 2, München. VULPE A., LAZĂR, V. 2003, *Toporul de luptă de bronz de la Bogata de Mure*ş, Marmatia 7/1, 43–52.