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Studii dedicate lui Nikolaus Boroffka la aniversarea a 60 de ani
Studies dedicated to Nikolaus Boroffka on his 60th birthday

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Nikolaus Boroffka

"LEAF SHAPED" NEGATIVES AND THEIR MEANING: A RARE MOULD TYPE FROM THE TELEAC HILLFORT, JUD. ALBA, TRANSYLVANIA

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Keywords: Teleac, mould, pointed metal objects, Bronze Age, south-eastern Europe.
Cuvinte-cheie: Teleac, tipar, obiecte de metal ascuţite, epoca bronzului, Europa sud-estică.

Introduction

The archaeology of South-Eastern Europe was not only formative for the first academic work period of the jubilee, it was also massively influenced by him. Although he has worked on many sites and finds from different periods all over Europe and Asia, one major focus was always the Bronze and Iron Ages. Romania was a working area in which he not only carried out own excavations early in his career, but also devoted numerous studies, which are today among the standard works in South-Eastern European archaeology. Considering his interest in Bronze Age metallurgy[1] and related finds[2], it is perhaps appropriate to contribute to his commemorative publication with a discussion of a mould from Teleac, jud. Alba, Romania. Although I cannot hope this paper will be as important as his studies of Bronze Age metallurgy, I do at least hope it will be of some interest to him.

The find and its function

The mould in question was first mentioned 1965 by Berciu and Popa[3]. It was found during the 1959-1960 excavation campaigns of the fortified Late Bronze Aga and Early Iron Age settlement of Teleac, conducted by Muzeul National al Unirii in Alba Iulia (**Fig. 1**). The mould was discovered in a pit house, were also fragments of a very thick walled vessel were found. The find was described as a "patterned sandstone" (tipar de gresie), decorated with a

[1] Boroffka 2006; Boroffka *et alii* 2016.
[2] Boroffka, Ridiche 2005.
[3] Berciu, Popa 1965.

coloured braid on one side[4]. It was only identified as a mould in the figure captions[5].

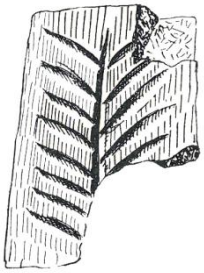

Fig. 1. First published drawing of the Teleac mould (after Berciu/Popa 1965).

After this brief introduction to the research community, the find was stored at the museum, were it at some point lost its glued on inventory number (**Fig. 3d**), and it was subsequently considered lost for more than 40 years. The piece was found again in 2016 and the curator of the Bronze Age period at the museum, Horia Ciugudean, re-identified its function and origin.

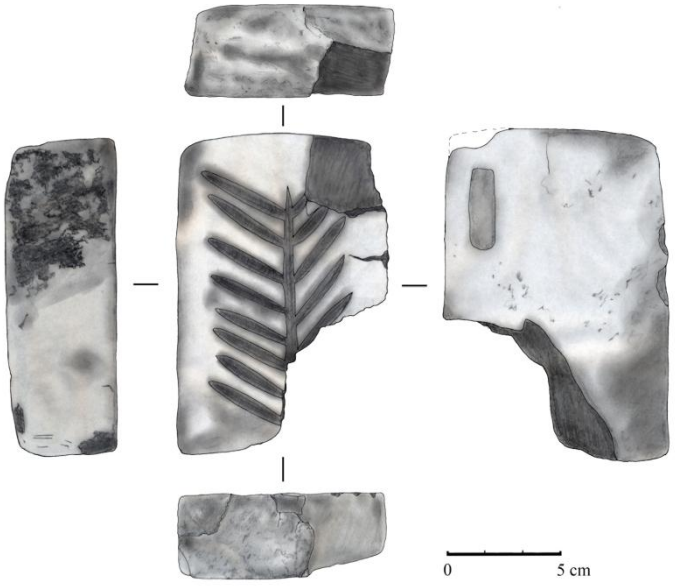

Fig. 2. Drawings of the Teleac mould (made by B. Nessel).

[4] Berciu, Popa 1965, p. 76.
[5] Berciu, Popa 1965, p. 78, Fig. 4, 3.

The find (L.: 9,1 cm, B.: 5,6 cm, H.: 3,0 – 3,5 cm) is one half of a two piece mould. It is cubic in shape and, as mentioned above, made of yellow and light brownish sandstone. It is very carefully made, all sides are well polished, and even its back side has shiny areas. Although it is in a rather good condition, it is fragmented. The lower left corner is missing, which most probably broke off in antiquity, since there are no indications of a recent cut (**Fig. 3b**).

Fig. 3. Photos of the Teleac mould (made by B. Nessel).

The mould had originally 16 small lancet formed negative carvings, which are connected through a central channel. Overall this gives the negative an appearance of a filigree tree leave. Currently only 13 of these incisions are fully or partly visible, due to fragmentation (**Fig. 2-3**). All negatives were incised in single work steps, and none of the lancets are identical to the others. They are carved by hand without the use of a particular geometrical assistance. Therefore the single negatives are slightly different in size and dimensions, particularly in their width. They vary between 2.5 – 2.0 cm in length and 0.3 – 0.43 cm in width. The small carvings are obviously made to cast small metal pieces. Although their exact function is not entirely clear, the carved incisions are undoubtedly negatives to produce a specific type of objects. A function as channels on one part of the mould, while the other half would have the negative for a larger object can be safely excluded because there is neither an indication for this on the mould, nor are any analogous finds present in the archaeological record of central and south-eastern Europe. The structure and shape of the small carved channels also speak against it, since they do not have flat bottoms, which channels usually have.

The channel which connects the negatives has slight reddish colour nuances, which is a strong indication that the mould was used in pyro-technological production processes. Reddish tracks show that the surface was in contact with hot substances, probably metal. The central channel has a very thin crack, where the sandstone could not resist the heat anymore, and there are three more cracks next to the negative incisions. A few greyish strains in the upper and lower parts of the negative also indicate that the mould was used. But considering the good condition of the surface structure, and the limited and small scaled discoloration by heat, it is likely that the mould only saw intermittent use.
The piece has two additional cracks. The first is in the upper right corner and the second is located almost in the centre of the mould on the right side of the negative (**Fig. 2-3**). A deep fracture is found between these cracked areas. It is linked to exposure to high temperatures, whereas the smaller cracks probably points to intentional destruction or that the mould was accidentally dropped.
Since only one half of the mould has been found, it is difficult to give detailed technical information. Most of the pouring funnel was most probably placed on the lost other half of the mould. This seems likely because the channel on the preserved half starts directly at the very edge of the mould. Similar arrangements on analogous finds support this assumption[6] although it cannot be determined for certain. Other characteristics that are related to the casting process, such as carved notches to stabilise a wrapping of the mould, or holes to join the two mould halves, are not visible.

Analogies and dating of the mould

Berciu and Popa dated the Teleac settlement to Ha B and beginning of the Ha C period[7] but they did not mention the chronological position of the mould's find context. New excavations and a re-evaluation of the material from the Teleac hillfort[8] shows that the settlement started in Ha A2 and ended in Ha B3/C. Therefore the chronological classification of the mould can only be determined through comparisons with well dated analogous moulds or cast objects.

There are no known analogies from Teleac's immediate surrounding region, and no similar finds have been made in the broader region, which would include the rest of Transylvania and the Banat, and almost no comparable finds come from the western and northern Carpathian Basin. The only currently known close analogous moulds belong to the settlement of Obřany in the Czech

[6] e. g. Wanzek 1989, Taf. 52, 4.
[7] Berciu, Popa 1965, p. 79.
[8] Uhnér *et alii* in press; Ciugudean 2012.

Republic and the large mould hoard of Sveti Petar-Ludbreški, Kot. Varaždin[9] in Croatia (**Fig. 4b**). The latter was found in a settlement pit, which was filled with a mix of soil, ash and coal particles. Besides 14 moulds, eight casting cores and one nozzle, typical Ha B type pottery fragments were found in the same context. This chronological position is also supported by the other deposited moulds. The settlement of Sveti Petar-Ludbreški is also dated to this period[10].

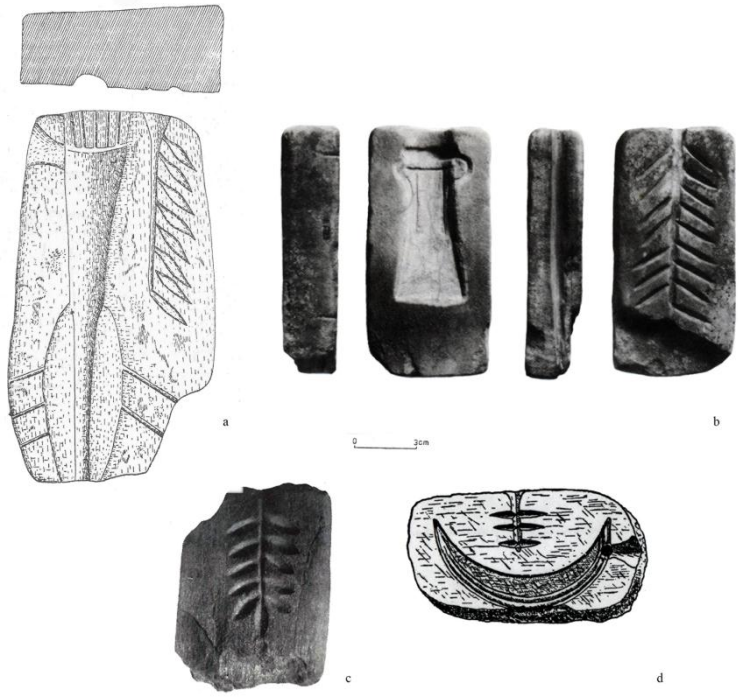

Fig. 4. Moulds with analogous negatives: a) Kietrz, b) Sveti Peter, c) Obřany, d) Horno (after Jentsch 1902).

The Croatian mould is made of stone. Considering the published photographs, it is safe to assume, that it is also made of sandstone. The shape of the mould and the appearance of the 16 small lancet formed negative incisions[11] are almost identical to the Teleac find and the negative has also similar dimensions. However, the mould from Sveti Petar is one half of a multi-negative-mould with a negative for a socketed axe on its other side (**Fig. 4b**). Since the Sveti Petar find is fragmented, it cannot be determined it had the same

[9] Šimek 1978 a, Šimek 1978b, idem 1979, idem 1996.
[10] Simek 1996, p. 58.
[11] Wanzek 1989, p. 199.

number of carved negatives as the Teleac mould. A large part of the upper mould is missing, which could theoretically have had two to four additional negatives.

Although it is possible that the Teleac and Sveti Peter finds are halves of the same mould[12], a comparison makes evident that this is definitely not the case. The angles between the small leaf-shaped carvings are different, so that no matching negative is made by combining them (**Fig. 2 and 4b**). That they were open cast moulds, which were used without a second half is not likely, since there are no semi-finished or finished metal items, which would suggest this.

The mould from the Obřany hillfort was found in a pit in the settlement area, and it is made of stone[13]. The negative is described as resembling an "acacia leaf". It has a thin channel in the centre and eleven "leaf shaped" indentations on the left and the right (**Fig. 4c**). Contrary to the mould from Sveti Petar, the middle channel does not function as central channel to distribute molten metal into the small negatives. The channel ends ca. 0.5 cm before the edge of the form. The mould is 7.5 cm in length and 6 cm in width, which means that the negative must have a length of about 5 cm. The single pointed oval parts of the negative must have a length of about 2 cm, which is comparable to the metrical data of the analogous moulds. But with up to 1 cm in width, the indentations are much wider than the other moulds'. The general impression of the negative is much more compact and it is difficult to determine the functional characteristics of the cast objects. Although Adamek does not directly interpret the function, he indicates in opposition to other researchers[14] that mould was meant to produce a whole object, perhaps of a decorative character or for use in ritual activities[15].

Another mould with a negative of a similar type as the one from Teleac comes from Kietrz, woj.Opole in Poland[16]. It was found in a Lusatian Culture settlement, is also made of stone, most probably sandstone. The negative is placed parallel to a negative of a spearhead, and consists of a central channel from which small pointed ovals are attached. On this mould the central channel functions as the casting channel. The size of the entire mould (L.: 18.15 cm, B.: 10.5 cm, H.: 4.35 cm) is primarily related to the spearhead negative (**Fig. 4a**) and can therefore not be directly compared to the Teleac find. But the negatives of the pointed ovals have lengths between 2.4 – 2.7 cm and widths between 0.45 – 0.6 cm, which are very similar to those on the Teleac mould.

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[12] Compare Jantzen 2008, p. 347, Nr. E 135. Two parts of the same mould, both single finds, were found in a distance of 22 km in Sätila und Förlanda.
[13] Adamek 1961, Taf. 85, 3.
[14] Wanzek 1989, p. 51.
[15] Adamek 1961.
[16] Gedl 1982, Abb. 19.

A mould from Szöreg site C has been proposed as an analogy to the Teleac mould by Wanzek[17], but this is not the case. The piece is with 14.8 cm in length and 9.8 cm wide[18], which is more than twice as large as the other moulds, and the negatives differ substantially from the Teleac find. Compared to the other moulds mentioned here they are more rounded, which indicate a different use of the finished objects. Furthermore, the negatives are only about 1 cm in length, which is considerably shorter than others, which also indicates a different function.

Although no other moulds with similar negatives are known from south-eastern or central Europe, there are some rare cases were similar, but single small indentations occur alongside larger negative moulds. One example is the two-piece mould from Cjurupinsk, Kr. Cjurupinsk in Ukraine[19]. It has an miniature tongue dagger with a mid-rib as the major negative, but also three small lancet formed negatives, which are of similar shape as the ones discussed above. Bočkarev and Leskov identified them as negatives for rods ("Stäbchen-Werkstücke"[20]. With a length between 12 – 12.4 cm and a width of 7.3 cm, the mould is only slightly bigger than the one from Teleac. The same applies for the negatives, which vary between 3.9 cm and 5.4 cm in length and 0.4 cm and 0.45 cm in width. The second half of the Cjurupinsk mould has only two blurred negatives. It dates to the Belozerka phase of the Bronze Age, which roughly covers the 11th-10th century BC[21]. The mould from Wolow[22] has a similar layout, with lancet shaped negatives carved directly next to a celt.

A few sickle moulds from central and south-eastern Europe also have indentations similar to the Teleac mould. But in opposite to the moulds presented so far, they appear almost always as single negatives, which are placed below the sickle in the central part at a right angle to the sickle blade. Two such moulds belong to the large Neckargartach[23] mould hoard, two others were found in the lake settlement of Mörigen[24] (**Fig. 5b-c**). Two moulds with this type come from the fortified hilltops of Hesselberg[25] and Vyšny Kubín[26] (**Fig. 5d**), one was found in Pobedím[27]. Other examples come from the Grävernitz burial mound[28],

[17] Wanzek 1989, p. 51.
[18] Moszolics 1985, p. 197, Taf. 274, 8 a-b.
[19] Bočkarev, Leskov 1980, p. 25, Nr. 93, Taf. 11, 93.
[20] Bočkarev, Leskov 1980, p. 25.
[21] Агульников 2007, p. 224.
[22] Vermehrung 1929, Taf. 6, 3a.
[23] Paret 1952-54, Taf. 4,4.
[24] Heierli 1901, Abb. 211.
[25] Jockenhövel 1982, Abb. 7, 7.
[26] Kubinyi 1882, Abb. 6.
[27] Studeniková, Paulík 1983, p. 286, Taf. LXXIV, 2.
[28] Neumann 1930, Abb. 24; Bierbaum 1956, p. 178-179, Abb. 1-2.

Kürnach[29] (**Fig. 5a**) and one from Denmark without an exact find spot[30]. Since their shape and metrical data share a common range, it is safe to assume that these negatives were for manufacture of similar items.

The small dimensions of the Teleac mould, its cubic shape and that it is made from light sandstone are shared characteristics with several small moulds for manufacture of jewellery items such as beads, pendants and pins[31]. Here, a sickle mould from the hilltop of Horno in the Spree-Neiße district of north-eastern Germany needs to be mentioned, were the second negative is a small "tree" consisting of a channel with a triangular cross section and six protruding negatives with different lengths on the left and right sides (**Fig. 4d**).

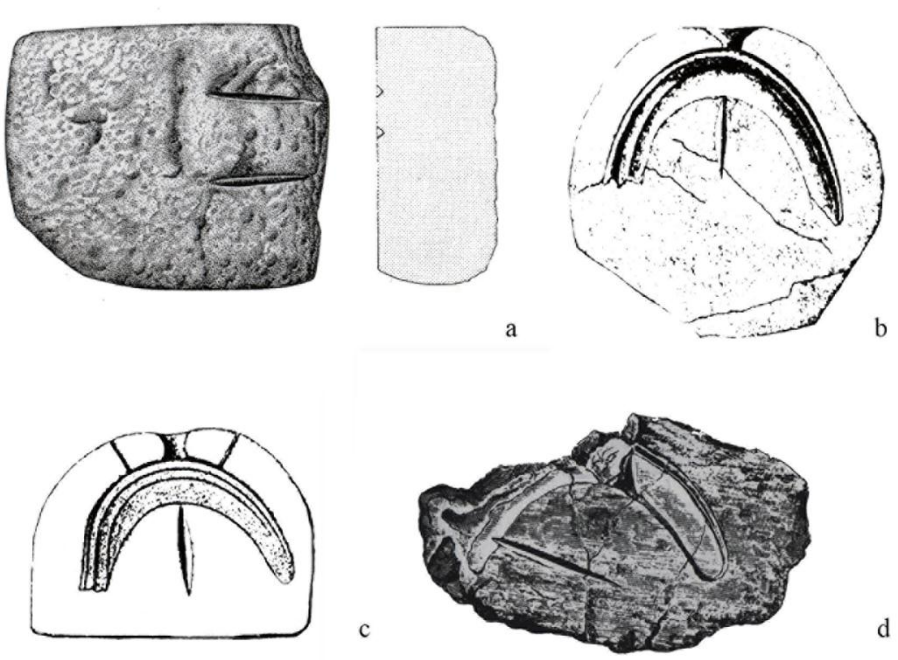

Fig. 5. Moulds with single analogous negatives: a) Kürnach (after Rosenstock/Wamser 1980-82), b-c) Mörigen (after Wanzek 1989), d) Vyšny Kubín (after Wanzek 1989) (scale ca. 1:3).

Jentsch interpreted it as a "pin hilt with three cross bars" (Kreuznadel-Griff mit drei Querstäben)[32]. Although this interpretation concerns the functional

[29] Rosenstock, Wamser 1982, Abb. 45.
[30] Broholm 1944, Taf. 36, 9.
[31] e. g. Gazdapusztai 1959; Paulik 1965, Tab. XVII, 16-17; Novotná 1980, Taf. 53, 1511−1512; Pančiková 2008, p. 105, Abb. 2, 4. 13-15.
[32] Jentsch 1902, p. 260. A similar but larger negative at a mould from Radzovce (Furmánek 1983, p. 90, Abb. 2, 5).

details of the negative, it is not likely that the Horno mould is of a similar type as the Teleac find. A major difference is that the lancet shaped incisions on the Horno mould have close to right angles where they meet the channel, whereas the Teleac mould's incisions tapers to points at both ends. The incisions on the Horno mould are also placed at right angles to the channel while they are placed at oblique angles on the Teleac mould. This indicates that the objects produced from the two moulds had different functions.

Possible function of the manufactured bronzes

To identify the function of the objects that could be cast from this type of moulds it is necessary to describe their form more precisely. The finished objects would be small and elongated with tapering ends and a slightly rhomboid cross section with slight variations in length and diameter. Their widest part would always be in the centre of the body.

There are only a few bronze objects similar to the ones that could be produced from the Teleac mould. A number of small objects made of copper are known from the Early Bronze Age, e. g. from Yamnaja Culture graves east of the Carpathian Mountains (Purcari II, Cuconeştii Veche II, and late Tripolje´period Kurgan graves of Krasyi Chutor, Usatovo, Sofievka[33]. These finds have similar rhomboid cross sections and have been interpreted as awls[34]. Considering the very small size of some of these objects, it is doubtful that this is true for all of them. But these finds date much too early to be good analogies. Furthermore, their find contexts do not indicate a particular use.

It is tempting to search for small lancet formed bronzes in contemporary Ha B hoards, since they often contain large numbers of small wire and rod fragments. But finding close analogies from the early Hallstatt period is surprisingly difficult, and the cross sections as well as the metical data of such finds are usually different. Only a few hoards with similar bronzes can be mentioned. One is the Late Urnfield period (Ha B3) second hoard of Hostomice (**Fig. 6**), which contains five small lancet formed bronzes. O. Kytlicová interpreted these objects as awls or tattoo needles[35]. Another possibility is to interpret the mould for making arrow heads, in which case the second, missing half would have the negatives for the projectile points and barbs. One example of such an arrowhead moulds belongs to the Sveti-Petar hoard[36]. But the negatives on the Teleac mould do not have a standardised shape and they taper

[33] Dergačev 2002, p. 26, Nr. 55, Taf. 18, S; p. 29, Nr. 79, Taf. 19, Q; p. 197, Nr. A 130-131; p. 133-135, Taf. 63, A 130-131, A 133−135).
[34] Dergačev 2002, p. 68.
[35] Kytlicova 2007, p. 263-264, Nr. 52, Taf. 148.
[36] Wanzek 1989, Taf. 37, 3d.

on both ends. Such characteristics are not found on securely identified arrowhead negatives.

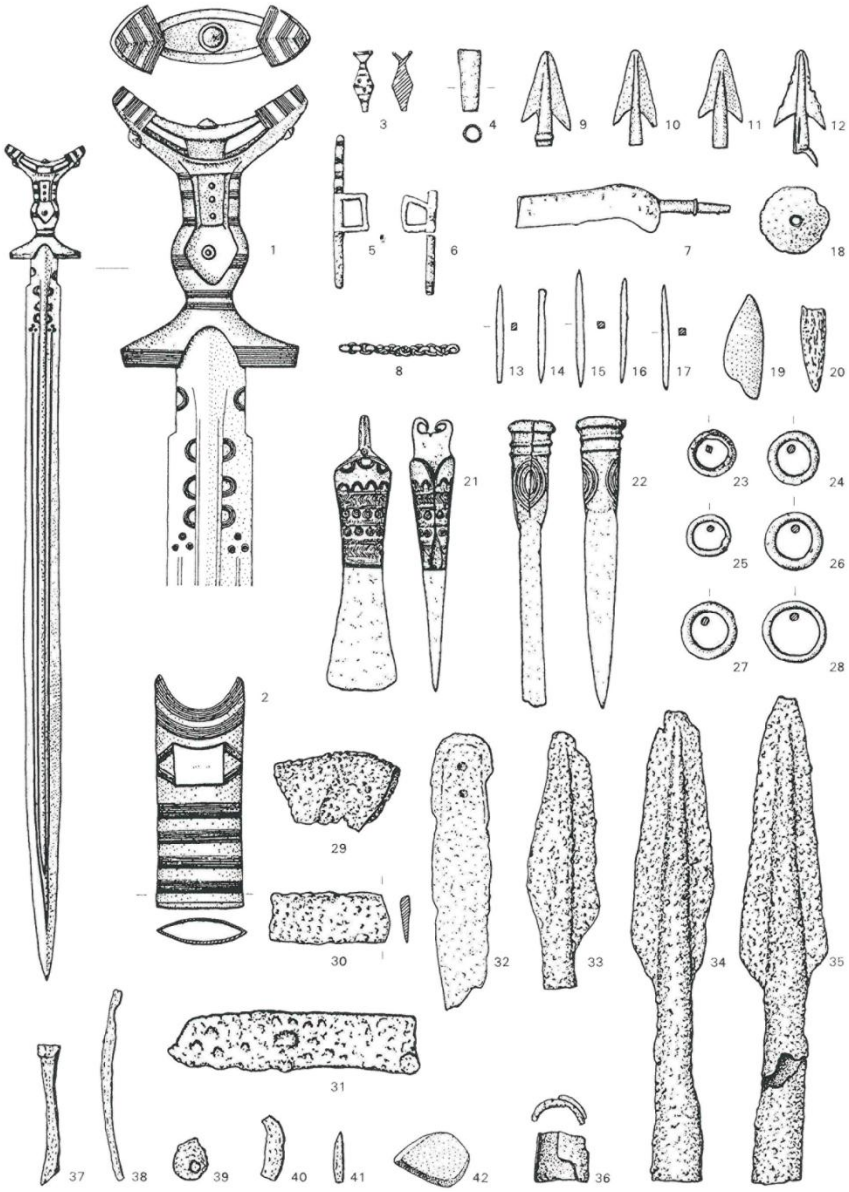

Fig. 6. Part of the Hostomice hoard (after Kytlicová 2007).

Other applications for the small bronze lancets could be to secure a spearhead to a wooden shaft, but documented spearhead shaft fasteners usually have round cross sections, and they are longer so they can be bent on both ends. The lancets are also not suitable as nails to secure organic material to metal objects, such as composite sword hilts. Such bronze rods, which were used as fasteners, usually have round cross sections. It is of course always possible to rework cast items by hammering to produce longer rods or wires with round cross sections, but small items were usually made from material which was separated from larger ingots. To cast very small bronzes and rework them into slightly longer objects is not common and does not seem to be very practical.

Conclusions

To summarise, it is evident that the Teleac mould is a rare type. The low number of similar moulds cannot be accounted for by specific find circumstances in Transylvania or the Carpathian Basin. Other sandstone moulds are well preserved, which excludes the material the mould is made of as an explanation. There are only two possibilities to explain the scarce material record. Either, not many moulds of this type were produced, or they were deliberately destroyed after they were used and not considered suitable components in depositions or as grave goods. Several researchers have argued that it was a common practise in Bronze Age Europe to substitute bronzes in hoards with moulds for the same or similar objects[37]. If this indeed was the case, it is evident that Teleac type moulds were not part of this custom. This also implies that the bronzes manufactured with this mould type does not belong to grave equipment.

The mould from Teleac cannot be considered as a common element of the local material culture, and because of the scarcity of contemporary, similar moulds it is also not possible to interpret it as a foreign element. Wanzek suggested that moulds with small lancet shaped negatives are found east of the distribution area of the associated finished bronze objects[38]. Considering the Czech and Moldavian moulds of this type, this needs to be revised. A comparison of the find spots of the moulds and lancet shaped small bronzes shows, even though only few finds are known, that both find categories have the same distribution area between Moldova in the east and the Rhine valley in the west.

The small bronze lancet shaped objects have a broad distribution, and it is likely that many were produced even though they are not frequently found in

[37] e. g. Böhnisch 2000.
[38] Wanzek 1989, p. 88, Taf. 34.

hoards and graves. Small lancet shaped bronzes are common on Middle and Late Bronze Age settlements in south-eastern and eastern Europe. Grigoriev even suggested that they have "circumpontic" roots[39], but it is obvious that the object type has a European wide distribution (**Fig. 7**).

The number of lancet shaped negatives per mould is not standardised. One to 16 negatives can be found on the same mould, and their numbers are both even and odd. Nor does the number of negatives seem to be connected with the size of the moulds or a combination with a certain negative.

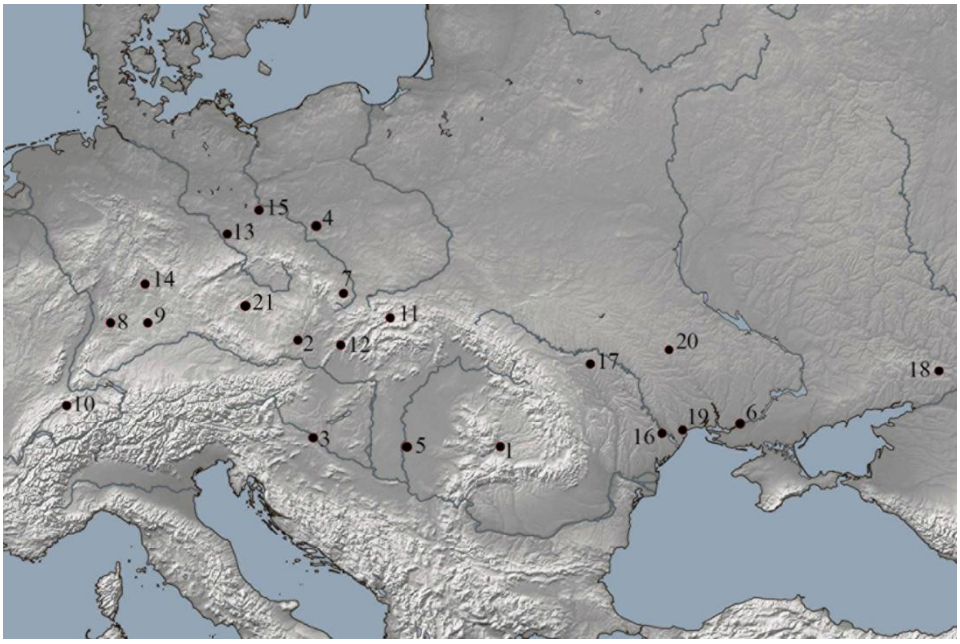

Fig. 7. Map of finds mentioned in the text: 1 Teleac, 2 Obrany, 3 Sveti Peter, 4 Kietrz, 5 Szöreg, 6 Cjubu, 7 Wolow, 8 Neckargartach, 9 Hesselberg, 10 Mörigen, 11 Vysny Kubin, 12 Pobedim., 13 Grävernitz, 14 Kürnach, 15 Horno, 16 Purcari, 17 Cuconeştii Veche II, 18 Krasyi Chutor, 19 Usatovo, 20 Sofievka, 21 Hostomice.

Lancet shaped negatives appear more often on sickle moulds, but this is probably due to the large number of sickle moulds. That the cast bronzes had symbolic or religious significance as assumed by Wanzek[40], does not seem likely. Although his idea that small objects would fit a *do-ut-des* practice, it must be said that neither the find contexts, nor the moulds themselves, indicate this. It

[39] e. g. Grigoriev 2015, p. 288, 307, Fig. 6-18.
[40] Wanzek 1989, p. 51.

seems that this explanation is mainly due to the circumstance, that the function of cast lancet shaped bronzes is difficult to determine.

The finished objects probably had various functions, and any interpretation should take the find context into account. That said, since it should be evident that the moulds were used for production of small lancet shaped objects, it is clear that they were not meant as decorations. They are also ill suited for use as tattoo needles or awls, because they are too short and not sharp enough for these purposes. It is furthermore not likely that they were intended as weapons. At this point, it is disappointingly not possible to determine their function with any certainty.

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ABSTRACT

A recently rediscovered mould from the Teleac hillfort has a rare negative, which only has few analogies in south-eastern and central Europe. The character of the objects that could be cast from this mould is discussed in this paper, along with their potential function. Although it is an uncommon mould type, it has a large distribution area from the Black Sea to the Rhine valley.

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