

## A GROUP OF BRONZE AGE SOCKETED HAMMERS / BEATING FISTS FROM THE LOWER DANUBE AND NORTHERN BLACK SEA AREA

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**Abstract:** *The article discusses a group of three Late Bronze Age objects, whose functionality has been subject to various interpretations. A new identification as specialized socketed hammers or beating fists for sheet metal working and bronze vessel production is proposed. Thus the range of specialized metalworkers' tools enlarged by a type that so far was apparently missing from the archaeological record of southeastern Europe.*

**Rezumat:** *În studiul de față se discută un grup de trei obiecte din bronzul târziu, cărora până în prezent le-au fost atribuite funcționalități diferite în literatura de specialitate. Se propune o nouă interpretarea acestor obiecte, ca celturi-ciocane sau nicovale de ambutisare pentru prelucrarea tablei și a vaselor de metal, prin aceasta lărgindu-se spectrul uneltelor de prelucrare a metalului din Europa de sud-est cu un tip, care până acum lipsea din inventarul arheologic.*

**Key words:** *Late Bronze Age, Metallurgy, Lower Danube, Northern Black Sea area, beating fist, socketed hammer, metal vessels.*

**Cuvinte cheie:** *Bronz târziu, metalurgie, Dunărea de Jos, aria nord-pontică, nicovală de ambutisare, celt-ciocan, vase de metal.*

The aim of the present short contribution is to draw attention to a group of objects discovered in the Lower Danube and northern Black Sea area in what is today Romania and the Ukraine<sup>1</sup>. Although all of them have been known in the literature for some time, they were so far not identified as a part of the same functional group. Specifically we are dealing with one bronze object from the hoard of Casimcea, jud. Tulcea, Romania and two casting moulds for manufacturing objects of this type from a settlement of the late Tei Culture near Cernica, jud. Ilfov, Romania, and a settlement of the Noua Culture from Ostrovec, obl. Ivano-Frankovsk, Ukraine.

From a chronological point of view they are contemporary. The Tei settlement from Cernica belongs to the last phase (V)<sup>2</sup> of this culture, more recently re-defined as a distinct „cultural group Fundenii Doamnei“ by V. Leahu<sup>3</sup>. The material culture of this phase or cultural group shows strong influences of the Noua-Coslogeni Culture<sup>4</sup>, to which the find from

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<sup>2</sup> Leahu 1966, 120-125.

<sup>3</sup> Leahu 2003, 141-151.

<sup>4</sup> Leahu 2003, 190-207.

Ostrovec belongs<sup>5</sup>. The hoard from Casimcea has been dated in the rough span of Bz D-Ha A<sub>1</sub><sup>6</sup>, its main component, the socketed axes, would go well with the earlier attribution, and the settlement analogies for the socketed tool would also speak in favor of this.

The objects have been addressed differently regarding their function. E. A. Balaguri<sup>7</sup> called the artefacts to be cast in the mould from Ostrovec „bag-shaped” socketed axes, an identification later adopted by Bočkarev und Leskov<sup>8</sup> in their ample study of casting moulds in the northern Black Sea area, while B. Hänsel recently identified it as a hammer<sup>9</sup>. The one half preserved from a two-piece mould from Cernica was first published by Leahu<sup>10</sup>. He identified the object to be cast „more likely as a chisel than a small socketed axe” due to its curved and blunt cutting edge<sup>11</sup>. B. Wanzek referred to the piece as a socketed hammer<sup>12</sup>, and F. Gogăltan included it in his catalogue of socketed hammers and anvils from Romania, however not allocating it to one of the types proposed by him<sup>13</sup>. The object from Casimcea was published by G. Simion as a handle for fixing a cutting or drilling tool<sup>14</sup>, while S. Ailincăi<sup>15</sup> saw it as a hammer. To resolve the question of their function, the objects will have to be described in some detail first.

**a. Casimcea**, jud. Tulcea, Romania (Fig. 1/3). Hoard consisting of four socketed axes, a socketed chisel and the following object: in plan view oval, socketed object with a rounded working surface that shows signs of wear (hitting). Around the upper part of the socket a constriction is followed by a heavily thickened rim. The mouth of the socket is oval. The object is ornamented with vertical ribs starting from the constriction, which is pronounced by a horizontal rib, downwards. The object was obviously cast in a two-piece mould, the casting burrs being clearly visible on its narrow sides. The rests of two casting jets are visible on the upper part of the socket, which can thus be classified in B. Wanzek’s „Eingussvariante” 2 or 3, typical for the lower Danube area<sup>16</sup>.

Metal composition: Cu–84,12%; Sn–15,61%; Pb–0,27%; Ag–trace; Sb–trace, weak.<sup>17</sup>

Length 6.3 cm, diameter of the socket (interior) 1.5 × 1.2 cm, depth of the socket 3.2 cm, weight 200 g. Muzeul de Istorie și Arheologie Tulcea, inv. nr. 46650.

Simion 2001, 320f., pl. VII/6; Simion 2003, 67f., pl. 7/1-6, Ailincăi 2005, 23f.

<sup>5</sup> Simion 2001, 321.

<sup>6</sup> Simion 2003, 68.

<sup>7</sup> Balaguri 1964, 30, no. 4.

<sup>8</sup> Bočkarev, Leškov 1980, 18, Nr. 55; 56.

<sup>9</sup> Hänsel 2011, 144.

<sup>10</sup> Leahu 1988, 238, Abb. 7/3; Leahu 2003, 145, pl. LXVII/3.

<sup>11</sup> Leahu 2003, 145: „Tăișul îngroșat și curbat ar putea indica astfel, mai probabil, o daltă decât un mic topor de tip celt.”

<sup>12</sup> Wanzek 1992, 268, Nr. 3.

<sup>13</sup> Gogăltan 2005, 349, Nr. 12.

<sup>14</sup> Simion 2001, 320.

<sup>15</sup> Ailincăi 2005, 24.

<sup>16</sup> Wanzek 1989, 61-62, pl. 12.

<sup>17</sup> Metal composition analyzed by Gh. Niculescu using a InnovX  $\alpha$  Series with anticatod Wolfram 30 kV și 40  $\mu$ A.

**b. Cernica, jud. Ilfov, Romania (Fig. 1/1).**

A group of halves of multi-piece moulds for socketed chisels, socketed axes, spearheads, bars and objects of the Casimcea type from a settlement of the Tei culture, exact circumstances of discovery not known (hoard?): One half of a casting mould for an oval socketed object similar to that from Casimcea, the rim heavily thickened, the broad sides with parabola-like elevations. Leahu gives a length of 5.9 cm for the mould<sup>18</sup>, but with reference to the scale of the figure approximately 6 cm would be the length of the object, the mould being considerably bigger.

Leahu 1988, 238, fig. 7/3; Leahu 2003, 145, nr. 1, pl. LXVII/3; Gogâltan 2005, 349, nr. 12, pl. III/12.

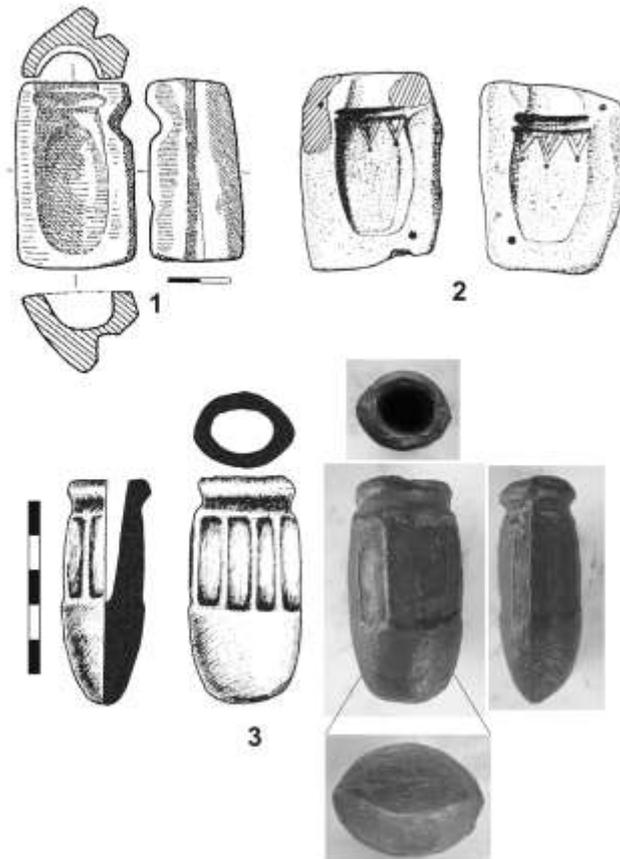


Fig. 1. Moulds for socketed hammers / beating fists from Cernica (1, after Leahu 2003, pl. LXVII/3) and Ostrovec (2, after Balaguri 1964, fig. 1/5-6), socketed hammer / beating fist from Casimcea (3).

<sup>18</sup> Leahu 2003, 145, Nr. 1.

c. **Ostrovec**, obl. Ivano-Frankovsk, Ukraine (Fig. 1/2). Hoard of casting moulds in a settlement of the Noua Culture: two-piece casting mould for objects of the Casimcea type, below the heavily thickened rim there is a constriction followed by a rib, which forms the basis for a decoration composed of hanging triangles with dots at their points. Length of the mould 10.2 cm, width 7.0 cm, length of the object to be cast 6.6 cm.

Balaguri 1964, 30, no. 4, fig. 1/5-6; Bočkarev, Leškov 1980, 18, nr. 58, pl. 7/59.

### **Ball-peen hammers and beatings fists**

All the objects described above share some basic formal characteristics. They are relatively small socketed tools of oval shape, with a mouth area reinforced by distinct and broad ribs, considerably stronger than socketed axes for example. They seem to be fashioned to withstand intense force, and they have a rounded working surface. The piece from Casimcea shows distinct wear from hitting, which speaks in favor of identifying the objects as metalworking tools. The high content in tin measured for the hammer from Casimcea is a typical attribute of Bronze Age socketed hammers from southeastern Europe<sup>19</sup>, since they had to be harder than the material worked by them. Its measurements and weight are well in the limits typical for hammers<sup>20</sup>.

In the comprehensive study of the socketed hammers from southeastern Europe published by B. Nessel, none of the objects discussed here is included<sup>21</sup>. Nor is it possible to assign them to one of the types defined by the form of the striking surface, which is convincingly chosen as the most important distinctive feature when one is concerned with function<sup>22</sup>, following the still basic determinations made by H. Ohlhaver in the late 1930s<sup>23</sup>. Nessel differentiates Ohlhaver's hammer types in two functional groups. The first one comprises multi-purpose tools that may not only have served the smith in his work but could have been used in other crafts as well<sup>24</sup>. These hammers have even and flat (Type 1, Fig. 2/1, 3) or arched (Type 2, Fig. 2/2) striking surfaces. The second group is formed of types that have specific applications in metalworking<sup>25</sup>. They possess roof-shaped striking surfaces that can be used e.g. for modelling plastic ridges or bends out of sheet metal (Type 1, Fig. 2/5), or extremely narrow striking surfaces apt for making ribs or elongated bulges (Type 2, Fig. 2/4), the latter as a starting point for producing wide-mouthed concave bowls from cast bronze discs. Specimens of the second group are thus to be interpreted as specialized metalworking tools for the manufacture of complex sheet metal artefacts. From the southeast European material until

<sup>19</sup> Gogâltan 2005, 372, with bibliography.

<sup>20</sup> Gogâltan 2005, 372-373; Nessel 2008, 73.

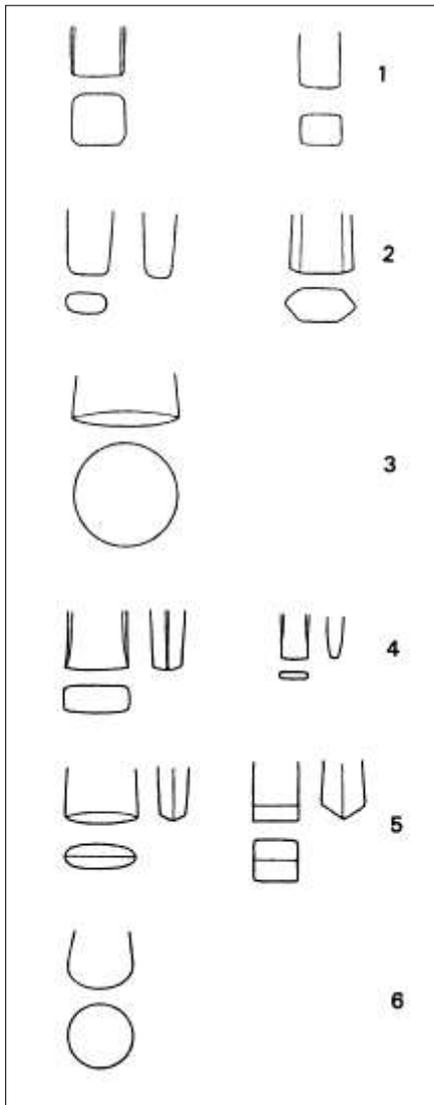
<sup>21</sup> Nessel 2008.

<sup>22</sup> Gogâltan's (1993; 2005) classification of the Romanian socketed hammers according to their shape as well as to the form of their striking surface results in two systems with completely different content, as Nessel 2008, 72 correctly states. Nevertheless Gogâltan's classification by shape and ornaments may be helpful in determining regional or chronological preferences for certain object forms, decorations etc.

<sup>23</sup> Ohlhaver 1939, Abb. 6.

<sup>24</sup> Nessel 2008, 74-75.

<sup>25</sup> Nessel 2008, 75-77.



now one type of implement / striking surface seemed to be missing, Ohlhaber's type 6<sup>26</sup>, which after the ample studies by A. Jockenhövel<sup>27</sup> and B. Armbruster<sup>28</sup> for Central and Western Europe should be expected to be an important part of a specialized toolkit for sheet metal working and bronze vessel production as well: ball-peen hammers (Fig. 2/6).

The characteristic, approximately hemispherical, ball-like shape of the hitting surfaces of the hammer from Casimcea clearly speaks in favor of such an interpretation, the moulds from Cernica and Ostrovec bearing witness to regular production and use of this class of tools. The overall slender, rounded form of the implements discussed here would also allow for the possibility to use them fixed on a stick as beating fists<sup>29</sup>. This would also explain why none of them has a loop for fixing them more securely on a shaft, especially considering the generally rounded form of the artifacts which would make it difficult to fix them by wrapping them with string<sup>30</sup>.

Fig. 2. Types of hammers after their striking surface (*after* Armbruster 2000, fig. 12 based on Ohlhaber 1939, fig. 6 and Jockenhövel 1982, fig. 1).

How those objects were employed in the production of bronze vessels is described in detail by Armbruster (Fig. 3)<sup>31</sup>. First, a flat bronze disc is bulged using a ball-peen hammer. When the metalworker cannot swing the hammer anymore because of the mouth of the vessel getting too narrow, he will put it upside down on a beating fist and continue to shape it by hitting the outside with a flat hammer (of Nessel's functional group I).

<sup>26</sup> Ohlhaber 1939, 27, Abb. 6/6.

<sup>27</sup> Jockenhövel 1982, 461, Abb. 1.

<sup>28</sup> Armbruster 2001, 14, fig. 5.

<sup>29</sup> Jockenhövel 1982, 461; Armbruster 2001, 18. The multi-purpose character of socketed hammers, which easily can be used as anvils in this way, has rightly been stressed by Gogâltan 2005.

<sup>30</sup> Anyway, this could be the role of the ribs and constrictions, apart from them reinforcing the artifacts.

<sup>31</sup> Armbruster 2000, 98-102, Abb. 49, 158-162, Abb. 88.

Use as a beating fist would account for the relatively small diameter and depth of the socket of the piece from Casimcea as well as for the general rounded form and the massive reinforcement of the rim area recognizable on all finds of the group, which is obviously a feature designed to withstand high impact force.

### Remarks on the evidence of bronze vessel production from the Northern Black Sea area

If one accepts the functional interpretation of the pieces given here, the appreciable presence of specialized sheet metal working hammers stands apparently in stark contrast to the few metal vessels known from this time<sup>32</sup> and region. It is only with Ha A that bronze cups, buckets, bowls etc. start to form an important component of the depositions within the Carpathian Basin<sup>33</sup>. On the contrary, the hammers / beating fists have to be dated to the earlier horizon Bz D and were found east of the Carpathians from where merely the simple bowl of Păhnești, jud. Vaslui<sup>34</sup> (Fig. 4/2), as well as a similar, presumably contemporary piece from the later hoard of Tătărani, jud. Vaslui<sup>35</sup> (Fig. 4/1), are known (Fig. 5).

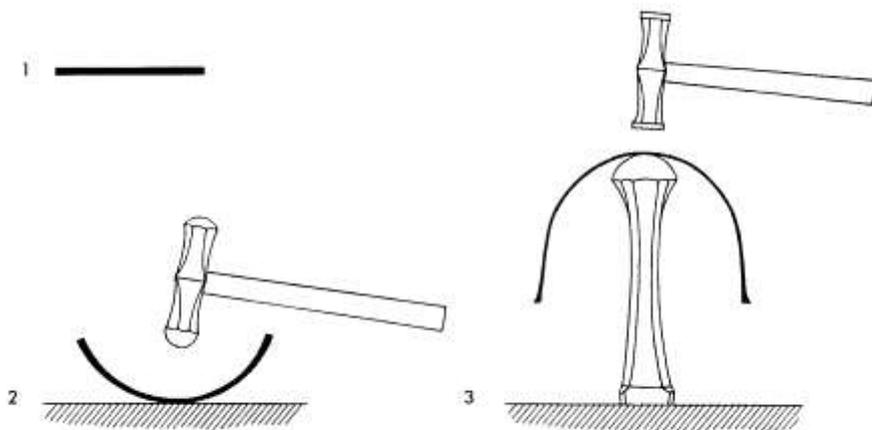


Fig. 3. The use of a ball-peen hammer and a beating fist in the production process of a metal vessel (*after* Armbruster 2000, Abb. 49).

There is no evidence for Bz D metal vessels south of the Carpathian Basin except for the dubious piece from the hoard of Oinacu, jud. Giurgiu, mentioned only in a short note by D. Berciu<sup>36</sup>. In his comprehensive work on the bronze vessels from Romania T. Soroceanu<sup>37</sup> has

<sup>32</sup> The group of socketed hammers / beating fists discussed here appears in the same chronological horizon as the first socketed hammers in Europe in general: Jochenhövel 1982.

<sup>33</sup> Soroceanu 2008, 266f.

<sup>34</sup> Soroceanu 2008, 107, Nr. 50.

<sup>35</sup> Soroceanu 2008, 98, Nr. 46.

<sup>36</sup> Berciu 1966, 233.

<sup>37</sup> Soroceanu 2008, 256.

argued against the existence of this artifact, but at least a sketch seems to exist in Berciu's notes<sup>38</sup>. Only a thorough re-examination and publication of the evidence available can help to solve this problem. To sum up, some examples of Bz D bronze vessels survive, but in any case the inventory of finds so far known seems insufficient to propose a flourishing tradition of local production.

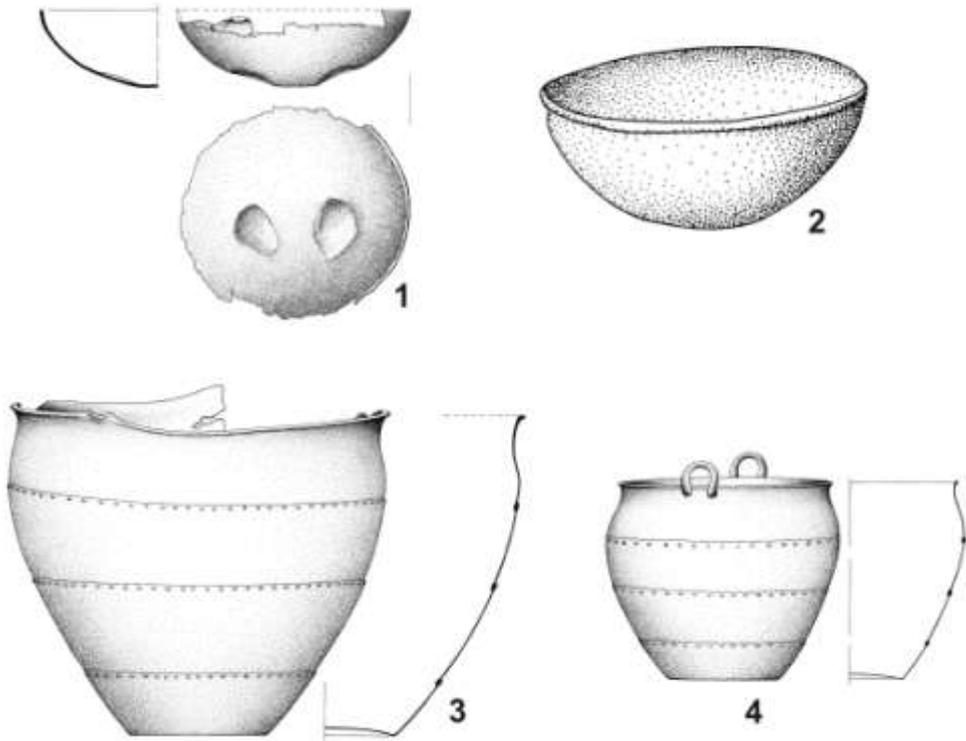


Fig. 4. Bowls from Tătărani (1, *after* Soroceanu 2008, pl. 11/46), Pâhnești (2, *after* Soroceanu 2008, pl. 13/50), Molești (3-4, *after* Dergačev 2002, pl. 38/1-2).

A second possible application area of the hammers are the bronze cauldrons, which already in the Middle Bronze Age are known in the vast area between the river Prut to the west and the Caucasus respectively the southern Ural to the east<sup>39</sup>. In Bessarabia vessels of this type

<sup>38</sup> Information A. Popescu, Bucharest; presentation given by A. Popescu on the occasion of the conference: *Epoca Bronzului și Prima Epocă a Fierului în Spațiul Carpatic. Metalurgia și Circulația Obiectelor de Metal*, Muzeul Județean Vaslui, 19.11.2009.

<sup>39</sup> Dergačev 2002, 134f., Abb. 107.

(Fig. 4/3-4) seem to be connected to the Noua-Sabatinovka Culture<sup>40</sup>, but their distribution area (Fig. 5) does not coincide exactly with that of the hammers / beating fists. Furthermore, they are made of several bronze sheets riveted together, so that more complex metal beating was only needed for the pieces placed at the base and mouth of the cauldrons. That work could have been accomplished quite well with hammers of Nessel's functional group II, types 1 and 2. It is nevertheless possible, that ball-peen hammers were used to spread out the bronze sheets in the first place.

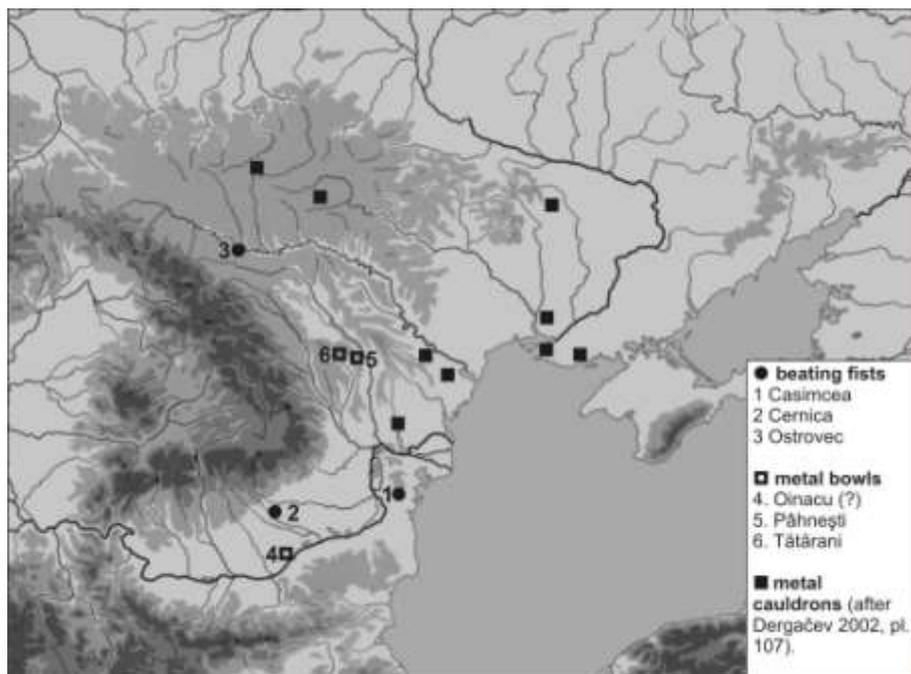


Fig. 5. Distribution of the socketed hammers / beating fists of the Casimcea type and metal vessels of the same chronological horizon.

### The archaeological visibility of bronze vessels

Maybe the problem of an early bronze vessel production in the northern Black Sea area has to be addressed from another point of view. The evidence for socketed hammers / beating fists of the Casimcea type stems almost completely from hoards<sup>41</sup>, and all direct evidence for metal vessels is preserved in the same way. Bronze Age hoarding has long been recognized as a structured, religiously motivated phenomenon with chronologically and / or regionally

<sup>40</sup> Dergačev 2002, 135.

<sup>41</sup> Also in the case of the mould from Cernica, whose circumstances of discovery are not detailed exactly, a hoard of moulds seems to be most probable, as the combination with moulds for spear points, socketed axes / chisels and bars would fit the general structure of such hoards.

differing rules on the categories of objects included<sup>42</sup>. As most of the metalwork known from the region discussed here stems from hoards, the concept of „selective deposition”<sup>43</sup> could have severe repercussions on the archaeological visibility of entire object categories.

To put it in a more concrete way, the Bz D depositions of the Lower Danube area are composed very canonically of sickles and socketed axes<sup>44</sup>, other objects, like the hammer from Casimcea, being a rare exception. In the northern Black Sea area, socketed axes, sickles, spearheads and daggers form the backbone of hoards<sup>45</sup>, depositions of casting moulds being a frequent phenomenon in this region<sup>46</sup>, while they appear scattered throughout southeastern Europe. In the regions further north, between the Carpathians and the Dniester, the situation regarding bronze hoards is similar, with a stronger component of adornments and especially needles in the area of the Noua culture<sup>47</sup>.

The restrictive rules of hoarding thus may considerably obscure our knowledge of the range of implements produced and used. Therefore it seems possible to assume a regular manufacture of bronze vessels even for a region where direct archaeological evidence is weak. The tools presented here definitely speak in favor of this scenario.

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<sup>42</sup> Cf. Geißlinger 1984; Willroth 1985, 219-243; Hänsel, Hänsel 1997; Hansen 1991; Hansen 1994; Soroceanu 1995; Fontijn 2002; Hansen 2005 all with references to further bibliography.

<sup>43</sup> Willroth 1985, 222-223; Fontijn 2002; Țârlea 2008.

<sup>44</sup> Hänsel 1976, 35; Bratu 2009; Uşurelu 2010, 39-41.

<sup>45</sup> Leskov 1981; Kaiser, Popandopulo 2004; Rassmann 1996; Uşurelu 2010, 28-34; Dergačev 2010; Dergačev 2011.

<sup>46</sup> Bočkarev, Leškov 1980; Hänsel 2011.

<sup>47</sup> Dergačev 2002; Uşurelu 2010, 35-38.

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