

*Categoria A*

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# STUDII – ИССЛЕДОВАНИЯ – RESEARCHES

Nadezhda Kotova, Simon Radchenko

## “M”-like ornamentation in the Southeastern Europe and surroundings during VII-V Millennia BCE

**Key words:** Mesolithic, Neolithic, ornamentation, pottery, idols, social network analysis, Balkan-Carpathian region.

**Cuvinte cheie:** Mesolitic, neolitic, ornamentație, ceramică, idoli, analiza rețelelor sociale, regiunea Balcano-Carpatică.

*Nadezhda Kotova, Simon Radchenko*

### “M”-like ornamentation in the Southeastern Europe and surroundings during VII-V Millennia BCE

This article examines the use of the “M” sign in the ornamentation of anthropomorphic and zoomorphic sculptures, as well as ceramics and amulets, based on materials from Southeastern Europe attributed back to the 7th-5th millennia BCE. Its goal is to present and analyze how this sign was applied. We analyze those artifacts where the “M”-sign serves as a primary ornamental element rather than a secondary one.

The patterns of the symbol’s usage, as well as the evolution of these patterns, were studied through social network analysis, nuancing how its features changed across space and time. These changes were interpreted using Peircean semiotic approaches. This made it possible to trace how, over time, the sign acquired its symbolic and conventional meanings.

The “M”-sign was widespread in the ornamentation of early ceramics in Anatolia and the Near East but can also be found on stone and bone artifacts from the Northern Black Sea region dating to the 7th-early 6th millennia BCE. Later, it gained popularity in the Balkans and Carpathian regions. Scholars have previously attempted to interpret the “M” symbol in the context of the worldview of the first farmers in the region. However, its earliest manifestations are associated with the Mesolithic hunter-fisher-gatherers sites, where it is linked to the imagery of snakes and water. The presence of this sign is often connected with zigzag patterns and its double variation, consisting of parallel lines.

*Nadezhda Kotova, Simon Radchenko*

### Decor de tip „M” în sud-estul Europei și în împrejurimi din milenii VII-V î.e.n.

Acest articol examinează utilizarea semnului „M” în decorarea sculpturilor antropomorfe și zoomorfe, precum și a ceramicii și amuletelor, pe baza materialelor din sud-estul Europei atribuite mileniului VII-V î.e.n. Scopul său este de a prezenta și analiza modul în care a fost aplicat acest semn.

Modelele de utilizare a simbolului, precum și evoluția acestor modele, au fost studiate prin analiza rețelelor sociale, nuanțând modul în care caracteristicile sale s-au schimbat în spațiu și timp. Aceste schimbări au fost interpretate folosind abordări semiotice Peircean. Acest lucru a făcut posibilă urmărirea modului în care, în timp, semnul și-a dobândit semnificațiile simbolice și convenționale.

Semnul „M” a fost răspândit în ornamentarea ceramicii timpurii din Anatolia și Orientul Apropiat, dar poate fi găsit și pe artefacte din piatră și os din regiunea de nord a Mării Negre, datând din mileniul VII-începutul mileniului VI î.e.n. Ulterior, a câștigat popularitate în regiunile balcanice și carpatice. Cercetătorii au încercat anterior să interpreteze simbolul „M” în contextul viziunii asupra lumii a primilor agricultori din regiune. Cu toate acestea, primele sale manifestări sunt asociate cu siturile de vânători-pescari-culegători din mezolitic, unde este legat de imagistica șerpilor și a apei. Prezența acestui semn este adesea legată de modele în zigzag și de dubla sa variație, constând în linii paralele.

### Introduction

The development of sophisticated symbolic language in prehistoric Europe lasted for thousands of years and was incredibly impetuous and heterogeneous. Partially, it was forwarded by the specifics of archaeological assemblages, their amounts throughout space and time, and numerous ways to interpret,

analyze, and develop a particular symbol. Nevertheless, the growing amount of archaeological data, along with the research methods, contribute to the discovery and contextualization of new examples of the complex symbolic language of the Stone Age.

This is particularly noticeable in relation to the assemblages from the South of Eastern Eu-

rope, the frontier of different archaeological and symbolic contexts. During VII-V millennia BCE – Late Mesolithic, Neolithic, and Early Eneolithic of the region – numerous fundamental changes took place in the economic models and the perception of the world there. These changes are transparent to paleogeneticists, archaeologists, and anthropologists. It is reasonable to assume that they were also present in symbolic behaviors and, thus, in the structure of symbolic language. Moreover, such alterations are highly traceable on specific symbols, features of their use, and their role in the figurative systems of time. Obviously, our interpretations are limited by scarce fragments of the archaeological record. Nevertheless, as our methods and tools improve and datasets grow, perspectives look more and more promising.

This paper focuses on the features of one particular sign – an “M” shaped ornament. It aims to collect, present, analyze, and finally comprehend the sign itself, referring to the published assemblages with the “M” ornament, typical to the Balkans and surroundings during the VII-V millennia BCE. This symbol spreads in the ornamentation of the first pottery in Anatolia and the Near East but can also be found on the stone and ivory artifacts of the North Pontic region. It was later distributed across the Balkans and Carpathian region. The sign’s presence is usually associated with a zigzag ornamentation and its double variation consisting of parallel lines. Furthermore, it seems to borrow some of their semantic nuances with time. Scholars have previously attempted to interpret the “M” sign in the context of the worldview of the region’s first farmers [Lazarovici 2003; Szücs-Csilik, Zola 2016; Schwarzberg 2017]. However, a profound analysis of its connection with well-known and newly published archaeological assemblages is yet to be conducted. Here, we endeavor to provide such analysis, focusing on those artifacts that contain the “M” sign as the main ornamentation element rather than as a secondary part of the ornament.

We aim to uncover the sign’s usage patterns utilizing social network analysis and point to possible ways of interpretation. It follows the track that started with the study of double zigzag ornamentation during the VII-V millennia BCE [Kotova, Radchenko 2024]. After a detailed description of the artifacts, ornamented with the “M”-sign, attrib-

uted to VII-V millennia BCE, and their archaeological contexts, the paper presents a novel approach to social network analysis of archaeological data. By investigating a set of intangible features and the connection between them, it will trace the semiotic context of the “M” symbol and summarize it to attempt a generalized interpretation of the symbol.

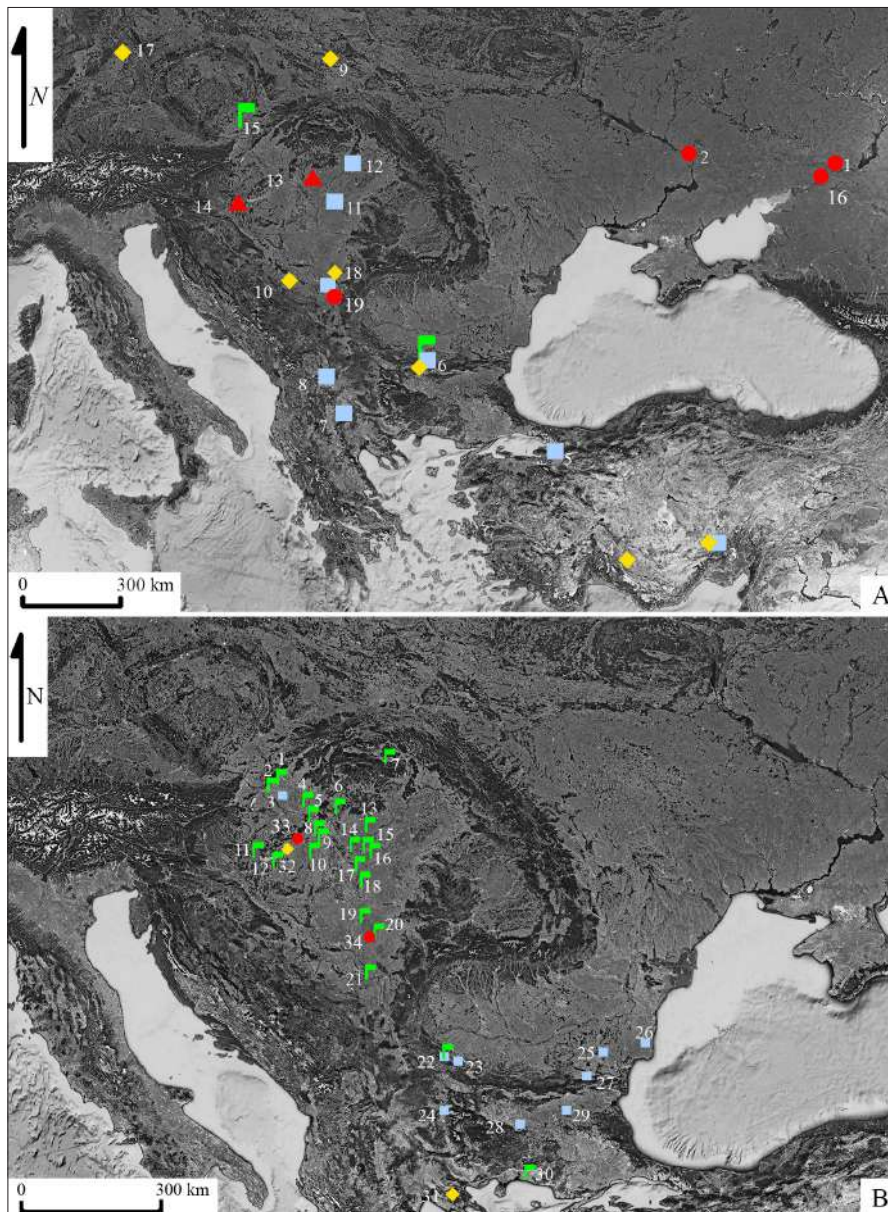
### Materials

#### “M” sign during VII – first half of VI millennia BCE

Assemblages of VII-first half of VI millennia BCE that contain the “M” sign are scarce and can be easily described in their archaeological context (fig. 1). One of the earliest “M” sign usage dates back to the VII millennia BCE in the Eastern European Steppe. It was applied onto the stone and ivory pendants found in Razdorskaya 2 settlement in the steppe of Don region, near Stanitsa Razdorskaya (fig. 2,1-4), discovered by A. Kiyashko, N. Kotova and N. Romashchenko. The site belongs to the set of archaeological assemblages formed during the VII millennia BCE by the groups with a river-oriented economy. It includes a significant amount of shell middens and fish remains. The assemblage contained several bone remnants of a domesticated dog, wild animals, and fish [Gorelik *et al.* 2014].

Non-typical for Eastern Europe assemblages of that time in the Lower Don region (rectangular houses with daub, flat-bottomed pots, clay figurines, polished tools, stone pendants) supposedly have their origin in the climate aridization-caused migration from the Near East [Kotova 2003, 107; Kotova 2009, 164; Kotova 2015, 59; Markuzevich *et al.* 2013a; Markuzevich *et al.* 2013b). Assemblages of Razdorskaya 2 have proven to be somewhat similar to the site of Northern Zagros, which allowed to pinpoint the time of the first wave of migration during the PPNB period between 8500 and 7000 BC [Gorelik *et al.* 2014].

In total, two bone and stone pendants were discovered here. The first bone artifact has a leaf-like shape with a sharpened end at the bottom and a straight upper edge, where two openings are drilled (fig. 2,1). Pendant is 9 cm long and approximately 2 cm wide. The “M” sign has two lines, with double zigzags descending from its lower points. The latter are interpreted in connection to water and, thus, to the river-oriented economy at the settlement [Radchenko, Kotova 2024] that



**Fig. 1.** Location map of sites of origin of the artefacts under study. Circle – pendant or knife; triangle – zoomorphic idol; Square – anthropomorphic idol; Flag – anthropomorphic vessel; diamond – non-anthropomorphic vessel.

A. Sites from 7000 to 5100 BCE: 1 – Razdorskaya 2; 2 – Surskyi Island; 3 – Hacilar; 4 – Catal Huyuk; 5 – Illipinar; 6 – Samovodene; 7 – Tell Sredselo (Mogila); 8 – tell Mogila (Senokos); 9 – Gwoździec 2; 10 – Drjanovac; 11 – Hortobágy; 12 – Mezokövesd; 13 – Füzesabony-Gubakut; 14 – Szentgyörgyvölgy; 15 – Vedrovice; 16 – Rakushechniy Yar; 17 – Gerlingen; 18 – Parța; 19 – Circea.

B. Sites from 5100-4250 BCE: 1 – Cífer-Pác; 2 – Blatné; 3 – Bajč; 4 – Biňa; 5 – Štúrovo; 6 – Szécsény; 7 – Spišský Hrhov; 8 – Budapest Békásmegyer and Budapest-Aranyhegyi út; 9 – Biatorbágy-Tyúkberek; 10 – Törökbálint-Dulácska; 11 – Keszthely-Zsidi út; 12 – Ráksi; 13 – Kömlő; 14 – Abony-Serkeszek-dülő; 15 – Rakoczifalva-Bagi-földek; 16 – Ocsöd-Kovashalom; 17 – Kunszentmárton-Kettőshalom; 18 – Szentés; 19 – Csanytelek; 20 – Battonya; 21 – Vinča; 22 – Gradshnitsa; 23 – Borovan; 24 – Pernik; 25 – Kodžadermen; 26 – Durankulak; 27 – Goljamo Delchevo; 28 – Pazardzjik; 29 – Drama; 30 – Nea Strymi. 31 – Tsangli; 32 – Balatonszarszo-Kis-erdei-dulo; 33 – Töradiilö bei Sukorö; 34 – Battonya-Gödrösök.

finds parallels with other double zigzag ornamented artifacts in Ukrainian Steppe [Radchenko *et al.* 2020; Kiosak *et al.* 2023]. The presence of

the “M” symbol with a double zigzag on one of the artifacts consequently sets a direction for its possible interpretation.

The second ivory pendant is a rectangle with a length of 3,5 cm and a width of around 1 cm. In its upper part, an opening was drilled (fig. 2,2). The vertical lines of the “M” symbol were executed with double lines.

One of the stone pendants was made of a dark grey slate, shaped as a rectangle 3×8.5 cm (fig. 2,3). The upper part is featured with a hole. The “M” symbol, crossed with a long line, is on the front side. On the back side of the pendant, five vertical lines intersect the diagonal grid ornamentation.

Another pendant of a subtriangular shape and rounded edges was made of flat argillite gray. It has a base of 4.5 cm and sides of 5cm [Kiyashko, Tsybrii 2004]. At the triangle’s peak, a small opening was drilled. Three lines divide the engraved motif in three parts. Five lines (two and three) form an “M” shaped zigzag on the right of the fully preserved right side. The left side has two double zigzags forming a rhombic chain, divided by a double straight line. Lastly, an “M” shaped zigzag, consisting of two and three lines, fitted perfectly in the middle part of the left side of the pendant.

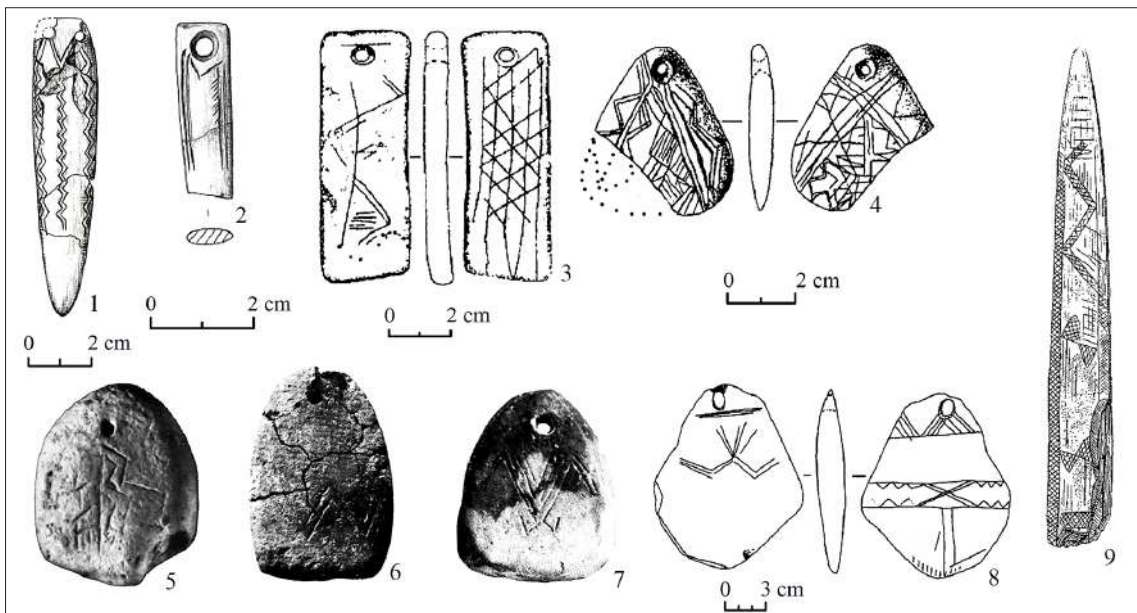
It is worth mentioning that three out of four of these artifacts are featured with the “M” sign as a primary or almost the only ornamentation ele-

ment, and only the fourth artifact is featured with a complex ornament.

By the end of VII millennia BCE, the “M” sign and the double zigzag ornament appeared on the artifacts at the sites with the river-oriented economy situated in the steppe part of the Lower Dnipro region. Although chronologically distant, these sites share mutual archaeological and context features with Razdorskaya 2. One of the most prominent artifacts from these complexes is an ornamented ivory knife from the Surskyi island. Its perimeter is decorated with two subparallel dashed lines, while the space between them is filled with a complicated ornament – the main part of which is occupied with the “M” sign (fig. 2,9).

#### *The “M” sign on sinkers during VI millennia BCE*

One of the easternmost artifacts featured with the “M” sign that is attributed to the VI millennia BCE is a sinker from the settlement of Rakusechniy Yar in the lower Don region [Kiyashko, Tsybriy 2004]. It is made of a small-grained stone and has a size of 13×10,5×2 cm, weighing almost 300 g and significantly differs from the objects of Razdorskaya and other pendants, decorated with an “M” sign or a double zigzag. A hole in the upper



**Fig. 2.** Pendants and sinkers featured with “M” ornamentation, attributed to VII millennium BCE. 1-4 – Razdorskaya 2 [after Gorelik *et al.* 2014]; 5-7 – Töradiilö bei Sukorö [after Makkay 1972]; 8 – Rakusechniy Yar [after Kiyashko, Tsybriy 2004]; 9 – Surskyi Island [after Danilenko 1950]. 1, 2, 9 – bone; 3, 4, 8 – stone; 5-7 – clay.

part was made with two-sided drilling; the ornament was applied beforehand (fig. 2,8). The front side of the sinker is featured with an upside-down “M”-like ornament and the “V” symbol nearby.

Furthermore, the end of VI millennia BCE featured artifacts utterly different from fishing sinkers or pendants – twelve ornamented clay sinkers for weaving from Töradiilö bei Sukorö settlement. They were found near the long house pit, where within the area of approximately 10 m<sup>2</sup>, many vessels’ fragments and millstones were also discovered. These sinkers, around 6-8 cm long and 2-2,5 cm thick, are perforated at the upper part and, presumably, are a part of simple weaver equipment. Eight of them had an engraved ornamentation. The ornament was previously interpreted as an image of a man (fig. 2,5) [Makkay 1972].

To some extent, this image resembles one on the stone pendant of the Razdorskaya 2 settlement (fig. 2,3). It seems to consist of two parts separated by a vertical line. The right side includes two “M” symbols and a short zigzag. The sinkers from Töradiilö bei Sukorö were located in the neighboring areas of the Notenkopf LPC pottery, and the fragments of tableware vessels were attributed to the Želiez phase [Makkay 1972].

Two other weaving sinkers from the Battonya-Gödrösök site of the Szakalhat group in Hungary probably coincide with those from Töradiilö bei Sukorö [Goldman 1978]. One of them has an upside-down “M” sign (which can also be read as a “W” sign) made of two parallel lines (fig. 2,6). Another one is featured with the image of the “M” sign that adjoins the “W” looking zigzag (fig. 2,7). Back sides of both objects are featured with a “V” sign.

All in all, these objects share their variability with those attributed to the VII millennia BCE. The “M” sign can be the only or a central element of an ornament, while it can also serve as a part of a more complex motif (i.e., in the case of objects from Töradiilö bei Sukorö).

#### ***Anthropomorphs and zoomorphs, featured with “M” during VI-V millennia BCE***

The time of the “M” sign’s initial appearance on the weaving equipment generally aligns with its first presence on figurines and ceramic vessels of the Balkans and Carpathian region. These larger assemblages include way more diverse images than the former groups.

Among the anthropomorphic idols containing such symbols, the most ancient appear to be those from Haçilar and Ilipinar in Anatolia, dating back to the first half of VI millennia BCE. Signs on the Haçilar’s one are located vertically, descending from the eyes onto the cheeks (fig. 3,1). Here, they can also be interpreted as zigzags, bringing more evidence of these signs’ proximity, which is already traced on assemblages of European steppe. The figurine from Ilipinar embodies a woman with the “W” sign located above her breasts and enhanced with a “V” sign in between them (fig. 3,2).

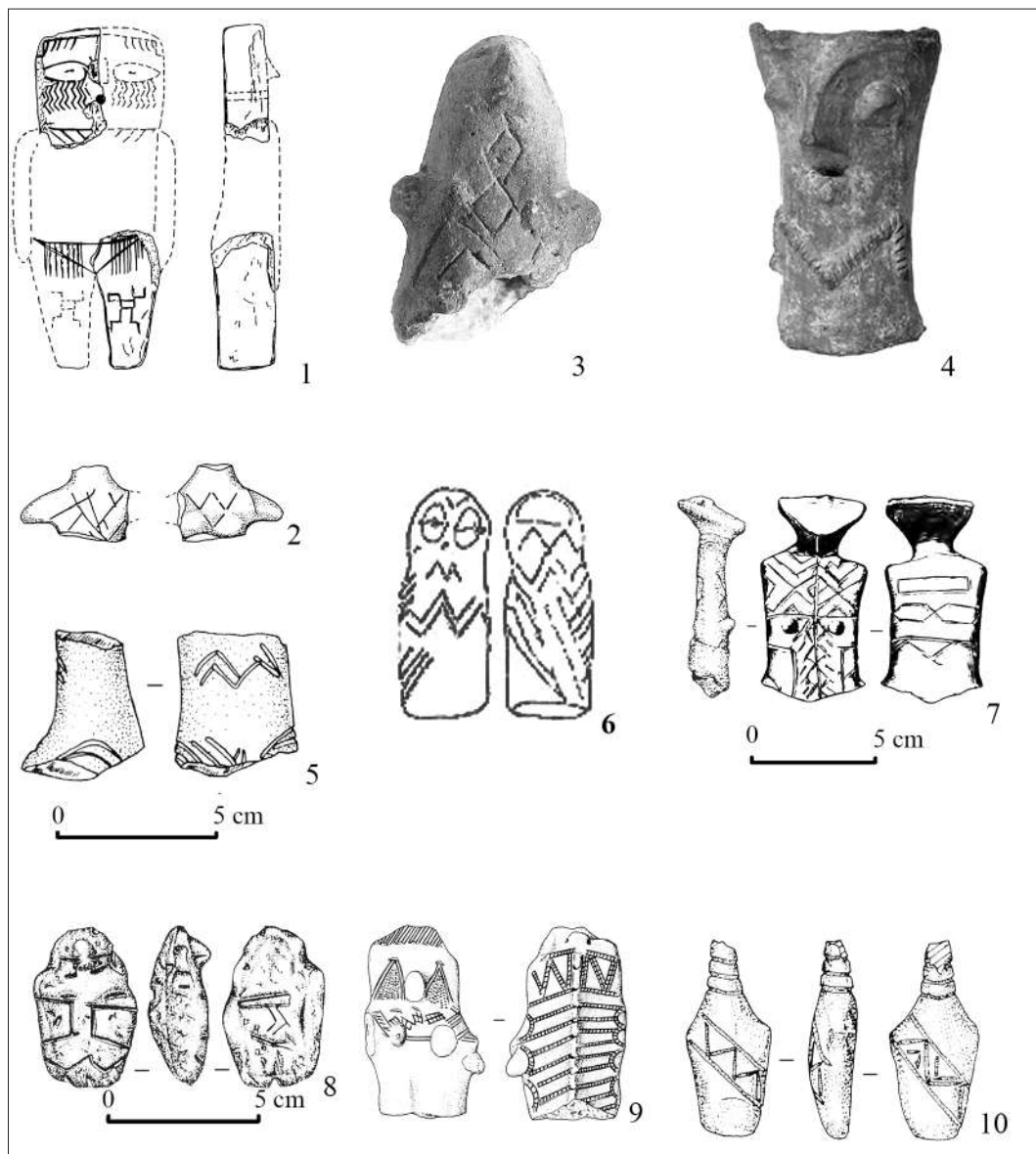
Anthropomorphic idols from Macedonia seem to be close in time. One was found in the Tumba Sredselo in the village of Mogila in Macedonia. On its neck, an “M” sign is molded with clay (fig. 3,4). The upper part of the second idol, found at Mogila in village Senokos, is featured with the “M” sign on the waist. Above it, on its neck and chest, a set of rhombs is depicted (fig. 3,3).

On the territory of Bulgaria, the most ancient artifact of this type is an idol’s neck fragment from layer 1 of the Samovodene settlement (fig. 3,5). It is associated with the region’s Late Neolithic and attributed to the last quarter of the VI millennia BCE [Stamboliyska, Uzunov 2009]. An “M” sign is made with double and single lines on its front side.

Yet another idol of the Banat culture from the Parța settlement in Romania, with the “M” placed at the back of the neck (fig. 3,6) [Lazarovici 2003, fig. 6: 7], is also attributed to this period. The settlement includes two Neolithic shrines, several ornamented tablets, idols, and pots [Lazarovici *et al.* 2001].

Furthermore, figurines of the Eastern part of linear pottery culture in Hungary belong to the same period. A fragment of an anthropomorphic idol from the Hortobágy settlement contains a combination of “M” and “W” symbols, situated in the upper part of the body, namely between the neck and the chest, and is represented as a part of a complex ornament (fig. 3,7). The “M” sign is also engraved on its neck’s back. A similar sign can be detected on the back side of the idol from the Mezökövesd site (fig. 3,8).

Such images, however, are not exclusive to anthropomorphic idols – two zoomorphic figurines with an “M” sign are known from the settlements of the Early Neolithic of Hungary. The



**Fig. 3.** Idols, featured with “M” ornamentation related to the VI-V millennia BCE. 1 – Hacilar [after Hansen 2007]; 2 – Ilipinar [after Hansen 2007]; 3 – Mogila in village Senokos [after Kolištrkoska Nasteva 2005]; 4 – Tumba Sredselo in the village Mogila [after Kolištrkoska Nasteva 2005]; 5 – Horizon I in Samovodene [after Vaisov 1998]; 6 – Parta [after Lazarovici 2003]; 7 – Hor-tobagy [after Hansen 2007]; 8 – Mezokovesd-Moscolyas [after Hansen 2007]; 9 – Bajč [after Hansen 2007]; 10 – Sitagri [after Hansen 2007, Taf. 202].

oldest of them is a figurine decorated with numerous “M” signs from the Szentgyörgyvölgyi-Pityerdomb settlement (fig. 5,5), which belongs to the Formative period of Linear Pottery culture (5450-5350 BCE). A figurine from Füzesabony-Gubakut of the Alföld Linear culture (fig. 5,4) is featured with the “W” sign on the chest area and is of a slightly younger period.

The number of sculptures ornamented with the sought symbol increased in V millennia BCE.

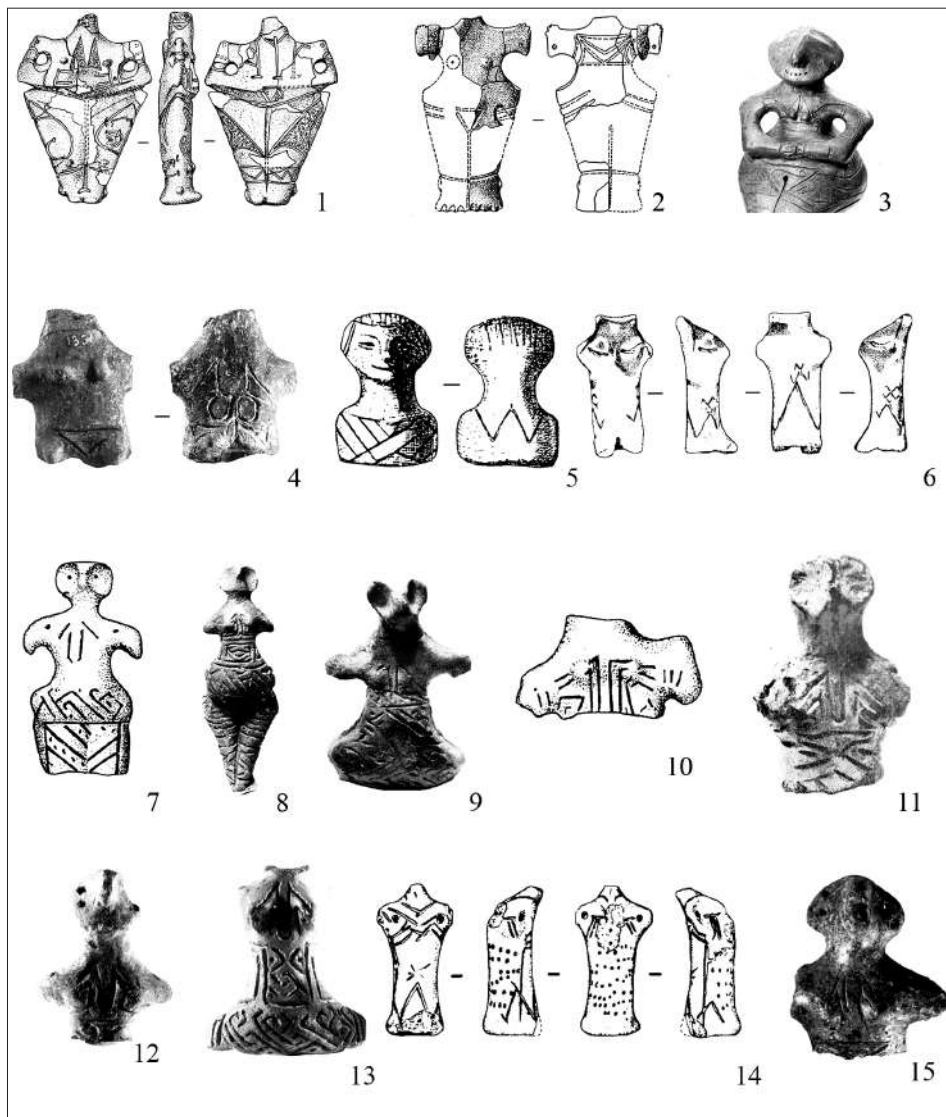
Materials include a figurine from the Bajč settlement in Slovakia (fig. 3,9, the Želiez phase of the Linear Pottery culture). The triangles on its face were executed with two dashed lines. The space between them is filled with dots, similar to the symbols on the vessels of the Želiez group, described further (fig. 9).

Another eccentric idol from the Sitagri settlement in Greece is possibly attributed to the same time. It has a diagonal line on the body and an “M” sign carved out on one of its sides. The Ne-

olithic figurines from Greece also feature a “W” sign, marked as a body decoration for the breast area [Mina 2014, 150].

Multiple figurines of Gradeshnitsa culture in Bulgaria have lavishly carved ornaments, including a big “M” sign in the upper part of the chest (fig. 4,7-13). Its correlation with the waist is somewhat likely. This sign is also present on the materials from Pilavo in Macedonia and Drama in Bulgaria (fig. 4,14-15). The latter also featured a figurine with M-signs on its sides (fig. 4,6). Most likely, these signs are related to the figurine’s belt.

The “M” sign was carved on two figurines of Varna culture from the burial ground of Durankulak, Bulgaria, attributed to the middle of the V millennium BCE. On one of the idols, the sign was located in the chest area, whereas the second had it engraved between the scapulas (fig. 4,1-2). Its presence has also been recorded on a sculpture from the Pazardžik tell in Bulgaria (fig. 4,3) [Hansen 2007] and on one more, from Goljamo Delchevo tell (fig. 4,5). The upside-down variation is found on the idol’s fragment from the Kodžadermen tell (fig. 4,4) and can be interpreted



**Fig. 4.** Idols and figurines of the V millennium BCE, featured with “M” ornamentation from Bulgaria. 1– burial 653 of the Durankulak cemetery [after Todorova 2002]; 2 – cenotaph 258 of the Durankulak cemetery [after Todorova 2002]; 3 – Pasajik [after Hansen 2007]; 4 – Kojadermen [after Hansen 2007]; 5 – Goljamo [after Hansen 2007]; 6, 14 – Drama [after Hansen 2007]; 7, 10 – Borovan [after Hansen 2007]; 8, 9 – Gradeshnitsa [after Vaisov 1981]; 11 – Gradeshnitsa [after Nikolov 1974, image by R. Stanev]; 12-13 – Pernik [after Hansen 2007]; 15 – Pilavo [after Hansen 2007].

either as an “M” sign or as an anatomical representation of the anthropomorph.

Clearly, the frequency of the “M” sign’s usage in ornaments of anthropomorphs (and sometimes zoomorphs) rises during the second half of VI millennia BCE and peaks in the middle of V millennia BCE. Some patterns of its usage can be tracked, such as a tendency of the image’s occurrence on the upper part of the body, neck, or chest of the artifact. Less often, the symbol was placed on the facial area (idol from Bajč) or at the lower back (Mezokövesd and Hortobágy). Compara-

tively often, it was tilted and rarely placed vertically. The earliest occurrence of the symbol (on the Haçilar idol) can be considered as a multiple zigzag and, typically for zigzag’s depiction, associated with water [Kotova, Radchenko 2024].

#### *Ceramic vessels featured with “M” during VI-V millennia BCE*

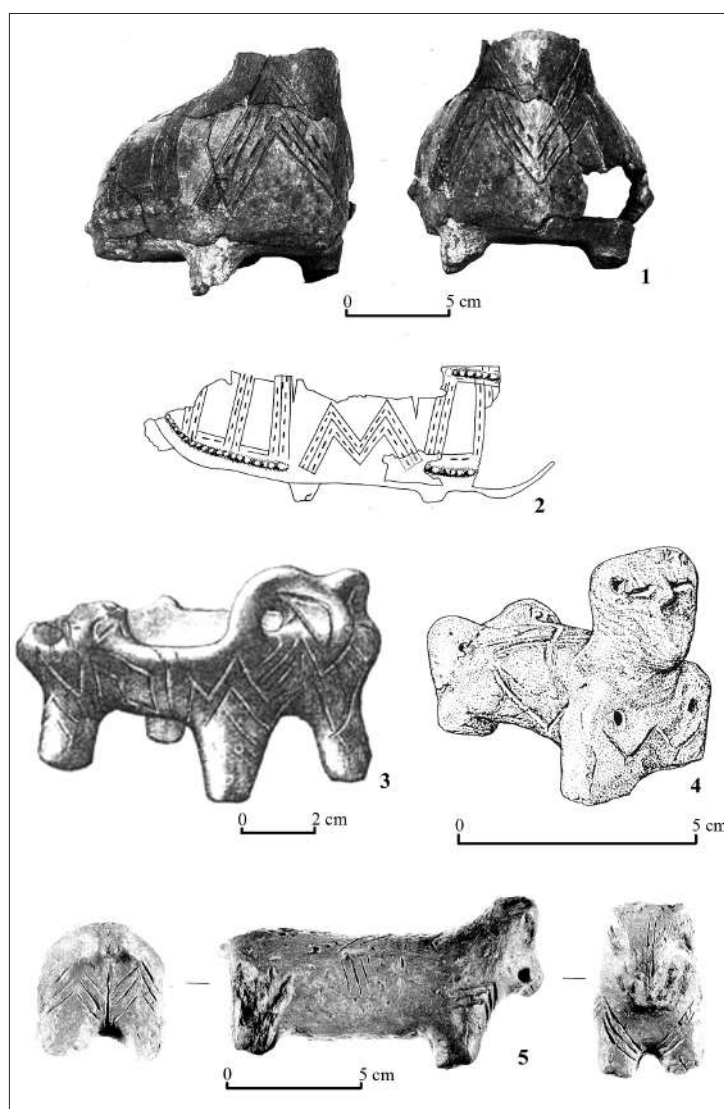
Vessels marked with an “M” sign constitute a relatively big group of artifacts. They are frequent in the broad area, encompassing territories from Central Europe to Iran. Just as in other cases, this particular sign could be a central ornamentation element or a part of a more complex composition.

#### *The most ancient non-anthropomorphic ceramic vessels featured with “M” sign*

Findings of this type include vessels from Çatalhöyük (fig. 6,7-8) and Haçilar (fig. 6,9) in Anatolia and from Tepe Giyan in Iran (fig. 6,6). All four vessels have their necks decorated with a large “M” sign, that serves as a main ornamentation element on three of them and a secondary feature on the last one (fig. 6,7).

Such positioning of the sign is not universal. One of the vessels from the Parța settlement in Romania (fig. 6,5) is featured with numerous “M” signs on its body, whereas the vessel from Gwoździec 2 (Linear Pottery culture, Poland) has it closer to the bottom area. Finally, the pot from Tsangli (Greece) has an “M” sign located on its neck (fig. 6,10). Sign’s location on the vessel from Drjanovac in Croatia is somewhat similar to the latter. The vessel is featured with numerous geometrical sketches and is divided into segments, having an “M” placed in a separate zone right beyond the rim (fig. 6,2).

The sign on the necks of two vessels from Rossen can be interpreted either as several parallel zigzags or as a part of a highly sophisticated composition covering most parts of the vessel (fig. 6,12-13). Those on the vessel from the Ocsöd-Kovashalom in Hungary (fig. 8,11) are also hard to construe. Many of them can be read as an “M” sign (especially numerous zig-



**Fig. 5.** Zoomorphic vessels and idols featured with “M” ornamentation related to Central Europe in the second half of VI – first half of V millennia BCE: 1-2 – Battonya [after Szénászky 1978]; 3 – Vinča [after Garašanin 1979]; 4 – Füzesabony-Gubakút [after Hansen 2007]; 5 – Szentgyörgyvölgyi-Pityerdomb [after Bánffy 2004].

zag fragments). At the same time, additional elements foster the interpretation of the vessel ornament as a mouth on a stylized human face. Smaller pieces of Neolithic vessels from the Gerlingen settlement in Germany (fig. 6,3) and a geographically distanced site of Krasny Gorodok in the Russian forest steppe (fig. 6,1) also point to the presence of a similar ornament. Unfortunately, their level of preservation complicates the precise definition of the ornamentation patterns.

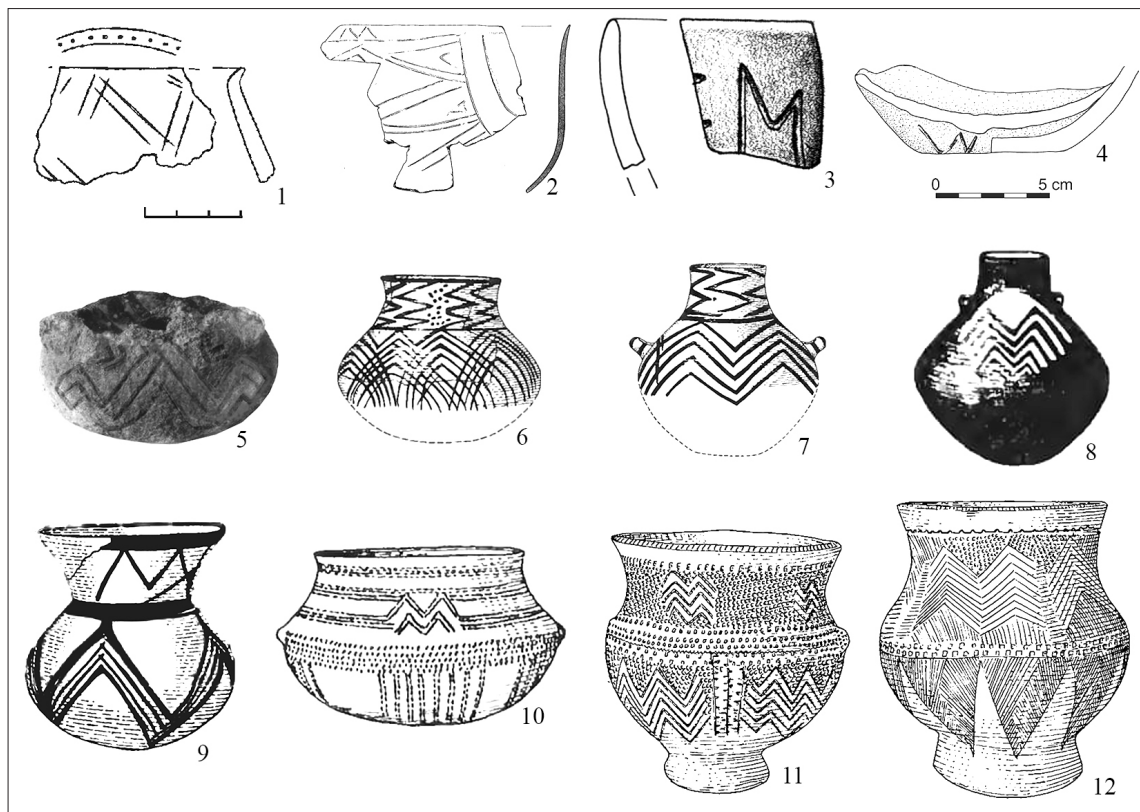
In all of these cases, except one, the “M” sign comprises several parallel lines (from two up to six lines) and is/while being a central part of the vessel’s ornamentation.

*Anthropo- and zoomorphic vessels featured with “M” sign during second half VI – first half V millennia BCE*

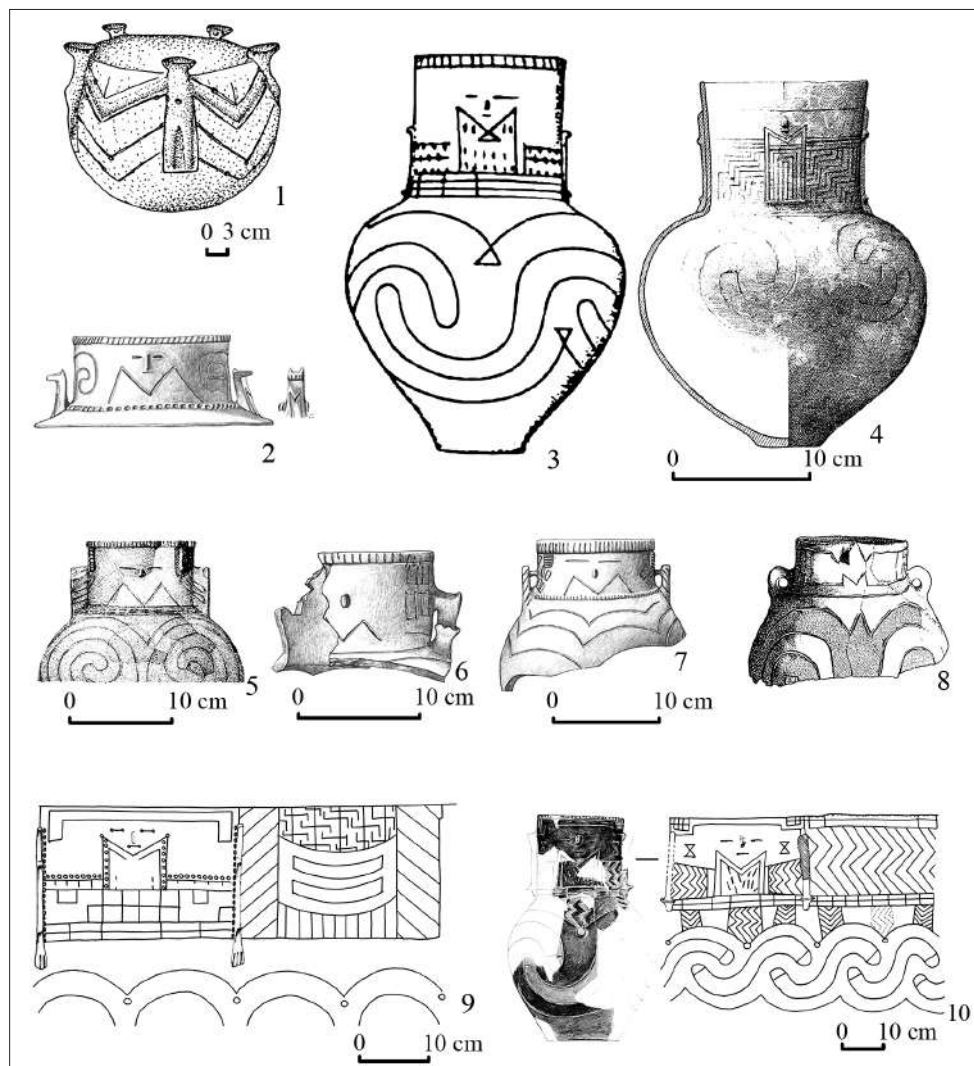
Vessels ornamented with an “M” sign are frequently featured with anthropomorphic symbols. They form a chronologically and spatially widespread group with a broad variety within.

Vessels from Western and Eastern Linear Pottery cultures exemplify this combination. Their most ancient and unusual manifestation is considered to be introduced by the globular high bowl of the Linear Pottery culture from Vedrovice in the Czech Republic, attributed to the last quarter of VI millennia BCE. It is decorated with five molded human-like figures. Their hands are connected and follow the contour of two parallel engraved lines that are situated somewhat lower. Molded anthropomorphic figures form vertical sides of the “M” with their arms and legs forming the diagonals (fig. 7,1).

Schwarzberg outlines a variability of the “M” sign’s image on ceramics [Schwarzberg 2017, fig. 1] and claims vessels from LPC to be the most ancient artifacts with such features in Germany. Based on researcher’s published map [Schwarzberg 2017, fig. 5], those include vessels from Barleben [Becker 2011], Ochsenfurt, Langenbach-Niederhummel, Friedberg-Dorheim [Schwarzberg 2017, fig. 2: 1, 4], and Stuttgart-Bad Cannstatt [Schwarzberg



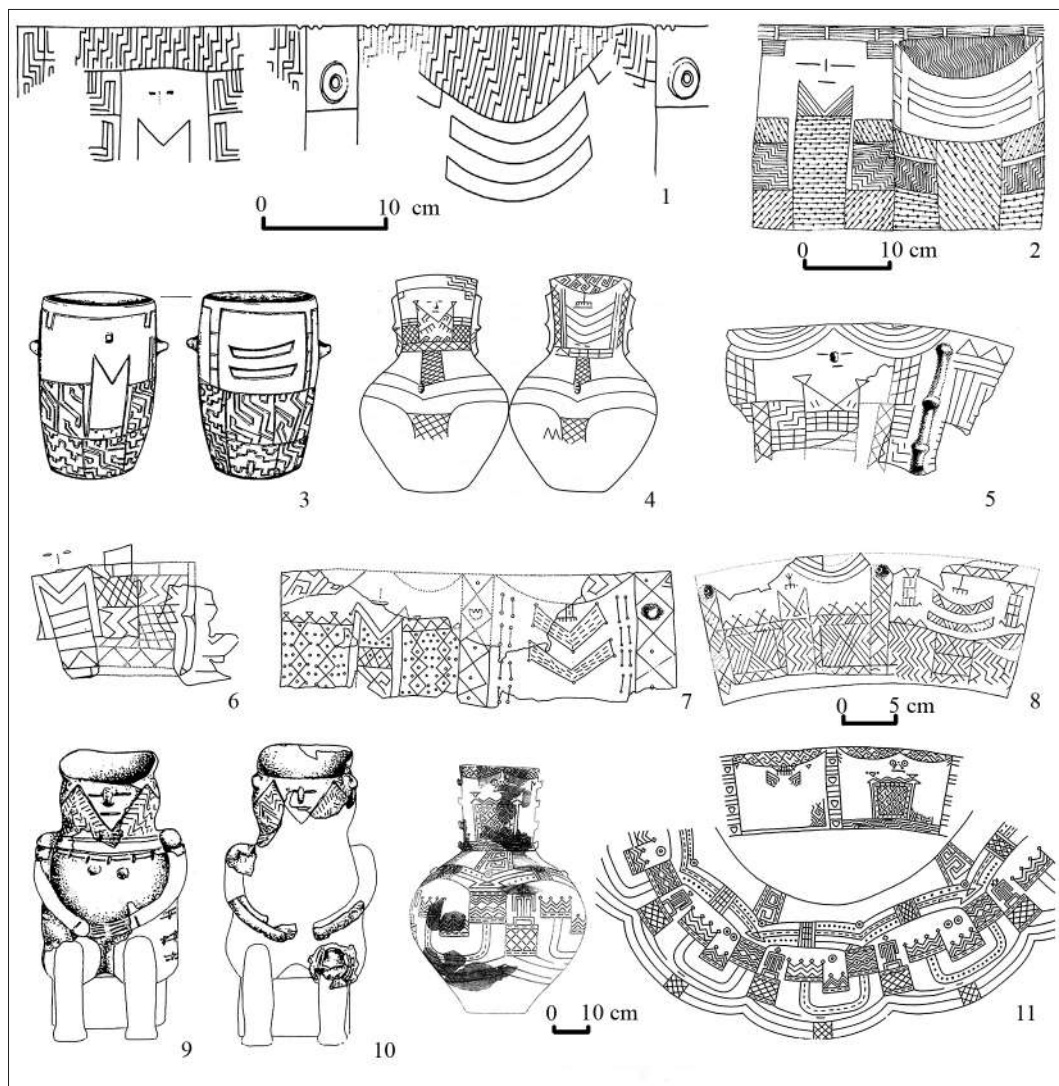
**Fig. 6.** Non-anthropomorphous objects featured with “M” ornamentation: 1 – Krasny Gorodok [after Mazurkevich *et al.* 2013]; 2 – Drjanovac [after Težak-Gregl 1993]; 3 – Gerlingen [after Neth 1999]; 4 – Gwoździec site 2 [after Czekaj-Zastawny *et al.* 2021]; 5 – Parța [after Lazarovici, Lazarovici 2019]; 6-7 – Catal Hüyük, West, Schicht 2; 8 – Hacilar; 9 – Tsangli; 10 – Eberstadt; 11-12 – Rössen [after Müller-Karpe 1968].



**Fig. 7.** Vessels featured with “M” ornamentation related to Central Europe in 5100-4800 BCE. 1 – Vedrovice [after Becker 2011]; 2 – Kunszenmárton-Kettőshalom [after Sebök 2018]; 3 – Szentés-Ilonapart [after Becker 2011]; 4 – Vinča [after Garašanin 1979]; 5 – Kömlő-Birka-járó-legelő [after Sebök 2018]; 6 – Csanytelek-Újhalastó [after Sebök 2018]; 7 – Csongrád-Bokros [after Sebök 2018]; 8 – Battonya-Vid-part [after Sebök 2018]; 9, 10 – Rákószifavla-Bagi-föld 8A [after Sebök 2018].

2010, fig. 6: 2]. The front side of the vessels from Friedberg-Dorheim and Stuttgart-Bad Cannstatt have only the top part preserved to examine the ornamentation pattern. It is somewhat similar to the rectangular pattern, typical for the Flomborn phase of LPC, with concave upper and lower sides located on the neck and shoulders of vessels or amphoras [Pavlů *et al.* 1987, 256, 447, 449; 258: 570; 270: 875; 279: 839]. In any case, the preserved fragments are too tiny for any convincing interpretation as a depiction of an “M” sign, so they are excluded from further analysis. Furthermore, no signs of the facial vessels were found in the pottery of the Notenkopf Linear Pottery culture.

Alas, “M” signs are only reliably documented in materials of the Želiez phase and the sites of the Szakálhat group, where facial vessels are represented abundantly. The sites of Želiez Linear Pottery culture date back to approximately 5063-4850 BCE [Stadler, Kotova 2021, 236], whereas the Szakálhat group is associated with earlier dates – 5300/5200 – 5100/5000 cal. BCE [Sebök 2017]. However, the latter should not be dated back as early as the sites of the Notenkopf phase but rather align to the earliest sites of the Želiez phase [Virag 2000, 391], which is nearly 5100-4900 BCE. Thus, the first facial vessels featured with “M” appeared in the Szakálhat group on the territory of Hungary at the end of VI millen-



**Fig. 8.** Vessels of the Szakálhat group, featured with “M” ornamentation related to Central Europe in 5100-4800 BCE. 1 – Rákósfavla-Bagi-föld 8A [after Sebők 2018]; 2 – Abony-Serkaszék-dűlő [after Sebők 2018]; 3 – Csanytelek [after Becker 2011]; 4-8 – Battonya-Gödrösök [after Goldman 1978]; 9-10 – Torokbalint-Dulacska [after Becker 2011]; 11 – Ocsöd-Kovashalom [Sebők 2018].

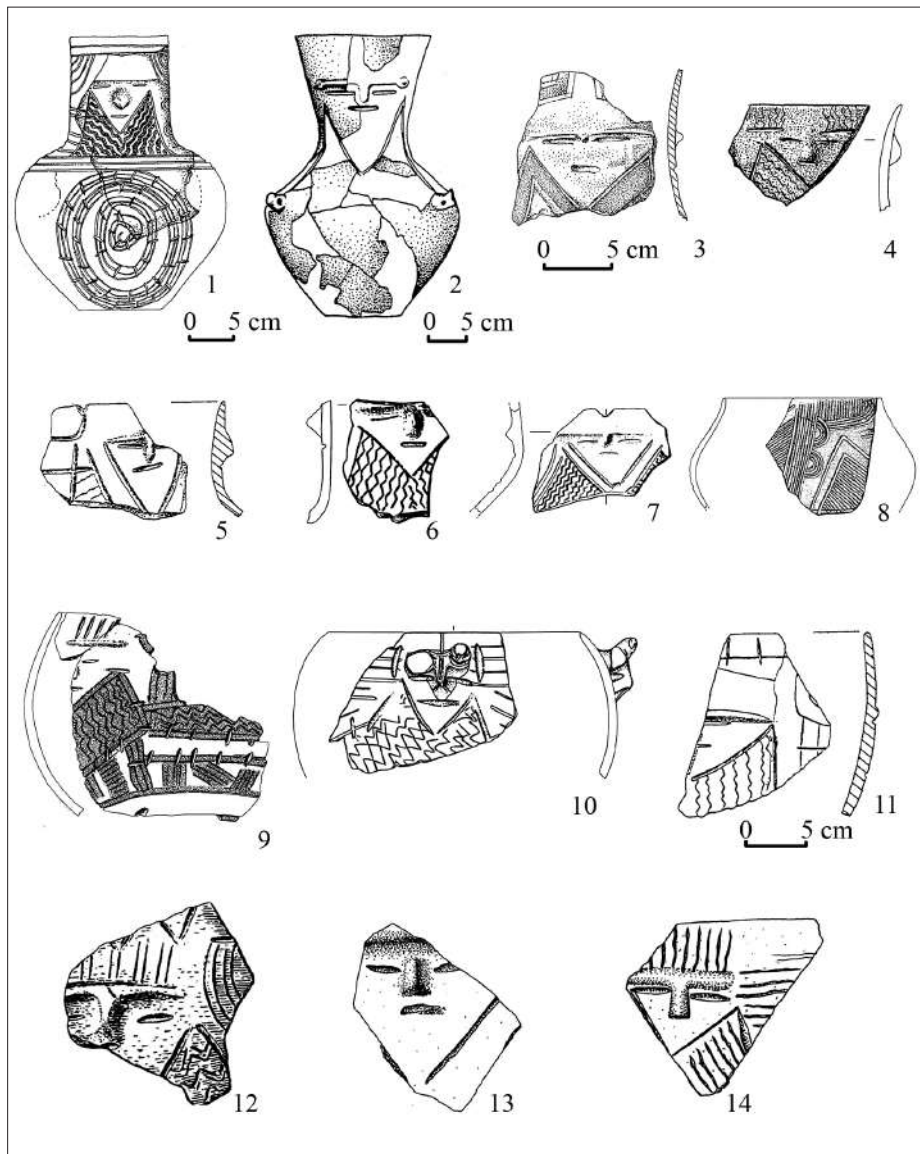
nia BCE and existed till the first quarter of V millennia BCE at the settlements of the Western Linear Pottery culture during the Želiez phase.

In the Szakálhat group, the “M” sign is represented on two different groups of vessels. Sebők defines huge, almost non-portable pots with a neck [Fig. 7,2-10; 8,4-6]. The second group includes relatively small cylindrical vessels (fig. 8,1-3, 8). All these artifacts are featured with various facial images – eyes, nose, and sometimes mouth – and are enhanced with an “M” sign at its neck. Sometimes, only the nose is depicted (fig. 7,6; 8,3). Image of a face can also be rather abstract (fig. 7,8; 8,8). However, they are inevitably fea-

tured with an “M” sign, mainly on the neck.

A very vivid representative of anthropomorphic vessels is the tableware from the Törökbálint-Dulácska collection of the Szakálhat group (fig. 8,9-10). The “M” sign is also present here, with its location above the neckline, outlining the faces of the figurines.

One such vessel was found in the Vinča settlement (fig. 7,4) [Vasic 1932, table 32, slika 68] and was interpreted as a ware imported from Szakálhat or Želiez area that correlates with the beginning of the Gradac phase [Nikolić, Vuković 2008, 62, 66] or Vinča C, and thus, attributed to 5000-4800 BCE [Whittle *et al.* 2016].



**Fig. 9.** Vessel of the Zeliz group of the Linear Pottery culture featured with “M” ornamentation related to Central Europe in 5100-4850 BCE: 1 – Biatorbágy-Tyúkberek; 2-3 – Budapest-Békásmegyér (after Virág 2000); 4 – Budapest-Aranyhegyi út [after Becker 2011]; 5 – Ráksi (after Virág 2000); 6, 9 – Štúrovo; 7-8 – Bajč; 10 – Spišský Hrhov [after Becker 2011]; 11 – Keszthely-Zsidi út [after Virág 2000]; 12 – Biňa –after Becker 2011]; 13 – Cifer-Pác; 14 – Blatné [after Becker 2011], (4-10, 12-14 – no scale).

The inner space of the “M” sign is usually left blank on ceramics of the Szakálhat phase and is rarely filled with incisions (fig. 7,3,10; 8,5,7), lines (fig. 7,4; 8,2,4,8,9-10), or lines and dots (fig. 8,7). Depictions of two “V” signs (fig. 8,4,7) or two concave curves on the opposing to “M” sign’s side are also relatively common. On one of the vessels, it was applied not just under the frontal image but also on the back near the waistline of the anthropomorphic piece (fig. 8,4). Two other pots are featured with zigzags descending from the “M” sign itself (fig. 7,10; 8,8). This latter feature is very no-

ticeable due to the resemblance of the ornamentation motifs on the pendant from Razdorskaya 2 and an anthropomorphic figurine from Haçilar.

A zoomorphic vessel from the Battonya settlement is also featured with a massive “M” sign (fig. 5,1-2) right on the animal’s chest area [Szénászky 1978]. Another zoomorphic vessel from the Vinča settlement shares this sign’s location (fig. 5,3). Furthermore, the sign’s position on these zoomorphic vessels corresponds to its location on older figurines from the sites of Early Neolithic Hungary (fig. 5,4-5).

Similar to the Szakálhat pottery, anthropomorphic vessels from the Želiez group sites also have their lower facial areas ornamented with an “M” sign. Here, the sign is encountered on pots with a high and average neck (fig. 9,1-7), high bowls with a neck (fig. 9,8), and globular high bowls (fig. 9,9-11). The majority of vessels have the inner space of the sign filled with zigzag or wavy lines, sometimes forming rhombic chains (fig. 9,1,4-7,9-12; 10,1). Sometimes the wavy lines are located horizontally (fig. 10,2).

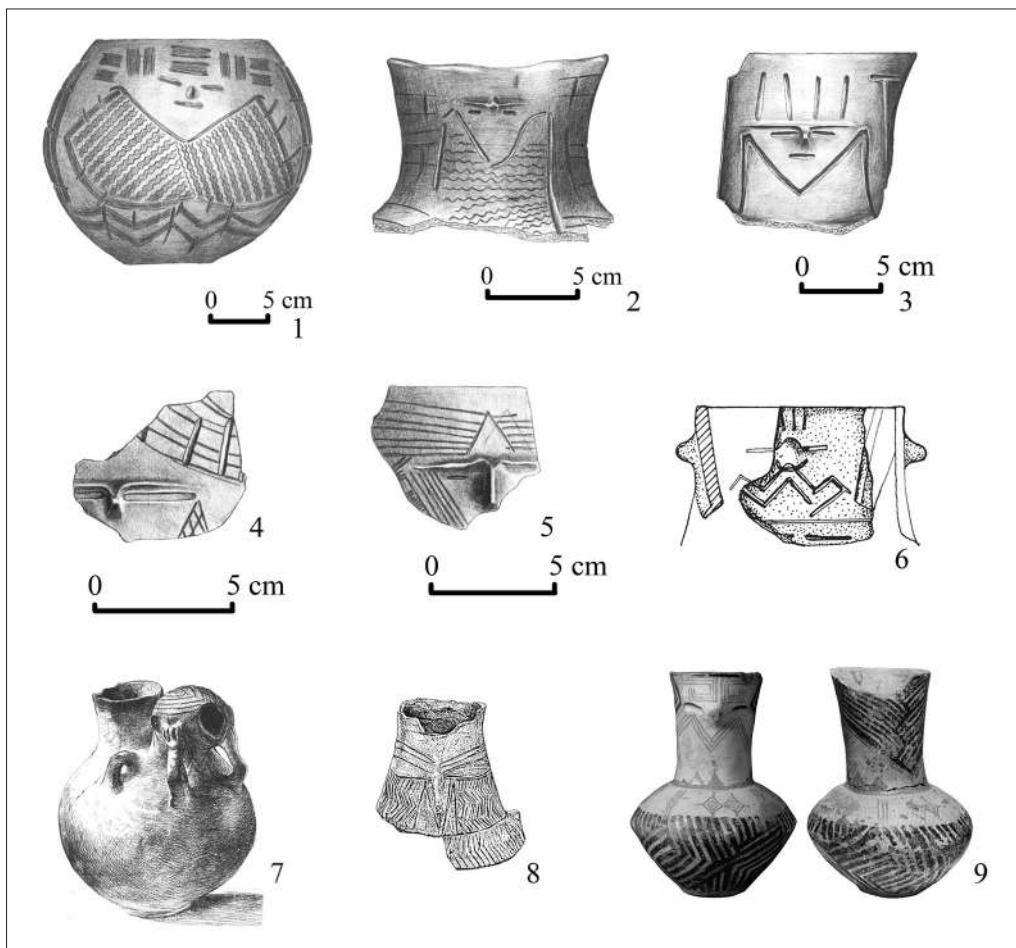
A vessel from the Parța settlement in Romania, attributed to Banat culture and the end of VI millennia BCE, deserves special mention. It has two necks, with one of them being held with two hands. Right beneath the neck, the “M” sign made from a double zigzag is located (fig. 10,7). A similar sign is made with a double line is also located

on the neck of a facial vessel from the Cîrcea settlement (fig. 10,6) [Lazarovici *et al.* 2001].

Further to the east, the “M” sign on vessels appears only sporadically. One pot is known from the Gradeshnitsa settlement in Bulgaria and is attributed to the V millennia BCE, and the other, presumably relating to the same period, was discovered at the site Néa Strymi, Greece (fig. 10,8-9). Even these rare pieces show the same pattern: the “M” sign is connected to a richly incised zigzag and is located on the facial vessel’s neck.

Thus, anthropomorphic vessels with an ornament, including the “M” sign, are primarily typical for the Carpathian region, with their first occurrence in the last quarter of VI millennia BCE, existing till 4800 BCE.

All in all, the occurrence of numerous “M”-ornamented artifacts in the Ukrainian steppe and



**Fig. 10.** Vessel featured with “M” ornamentation related to South-East Europe in 5100-4850 BCE. 1-5 – Szecsenyültetes [after Fábián 2005]; 6 – Cîrcea [after Schwarzberg 2017]; 7 – Parța [after Lazarovici *et al.* 2005]; 8 – Néa Strymi [after Hansen 2007]; 9 – Gradeshnitsa [after Todorova, Vaisov 1993].

Anatolia VII millennia BCE is followed by its modification and subsequent migration. The latter happens to be a literal migration to the West, to the Balkans and Carpathians. Figuratively speaking, it is perceived as a gradual intensification of the connection with other features of the artifacts – vessels' anthropomorphicity, localization of the sign on the anthropomorphic figurines' necks, and double zigzag ornamentation. Determining a pattern of the mentioned connection seems to be the key to understanding the semiotic evolution of the "M" sign during the VII-V millennia BCE.

### Methods

Materials presented in this paper include an exhaustive selection of currently known and substantially published artifacts featured with the "M" sign. To nuance the history of this sign evolution, we have determined a set of key characteristics related to its appearance and location regardless of the artifact's type. These characteristics include: the presence of the sign in its straight ("M") and upside down ("W") forms; anthropomorphism or zoomorphism of the artifact onto which the sign is applied; a connection between the vessels' neck and the sign itself; sign's location near the waistline; spatial proximity of the double zigzags and "M" sign on the same artifact; spatial proximity of "M" sign and rhombs on the same artifact. Every studied artifact was analyzed within binary logic (0/1) for compliance with every listed feature (Table 1). These data became the basis for forming an incidence matrix and further social network analysis.

It is well known that an archaeological similarity network can be transformed into a social network that focuses on relationships between attributes rather than traditional objects or individuals. While traditionally, attributes are used to measure ties between individuals [Kim, Leskovec 2011], the approach can be inverted, looking for ties between attributes and using the frequency of their joint realization on the same individual as a proxy for the strength of their connection [Mills 2017]. This approach is sometimes referred to as a semantic or attribute-based social network [Butts 2008].

In a typical social network analysis, relationships are established between users or entities. However, in an attribute-based social network, connections are formed based on shared characteristics or attributes.

Social network analysis has recently been actively used to highlight the differences between various archaeological assemblages [Mazzucato 2019; Pereira *et al.* 2023]. We applied a similar approach to the set of objects, where the symbol «M» is present in different ways. Thus, the list of attributes of the network represented not the symbol itself but the peculiarities of its use, nuancing the story of the symbol's change through time. The aim was to investigate ties between attributes as reflected by the frequencies of their common occurrences and their change depending on the archaeological context. Our approach here benefits from applying it to the symbol's features rather than the symbol itself, tracing the change of its context on a relatively small group of artifacts. The strength of a tie was estimated using the Jaccard index, and a network was built using UCINET software to reveal where the tie is strongest and engrave the symbol's history into the results of the social network analysis.

The following analysis of the revealed associations requires an attentive approach to the "M" sign and its use, which, therefore, lies within the realm of semiotic study. Given that the task of interpreting the sign seems unattainable due to the nature of the archaeological record, this article's primary focus is not on determining the link between the sign and the signifier or decoding its possible meanings. Realizing the need for a more intricate understanding of the semiotic structure, we refer to Pierce's semiotics in order to determine the features of diachronic changes in the sign's usage.

Archaeological studies of the last 20 years have revealed the incompleteness of the Saussurean semiotics model, along with the inevitable need for a closer look at signs and symbols as a part of the archaeological record. Thus, the three-part semiotic model of Charles Sanders Peirce recently gained recognition [Crossland 2014; Peirce Edition Project 1998[1894]; Preucel 2006; Preucel, Bauer 2001]. It refines the links between the symbol, the symbolizing object, and the interpretant (the sign created by the interpreter that describes the relationship between the sign and the object) and pays additional attention to the interaction between all three of these basic categories, making it more exhaustive and relevant for the archaeological studies (fig. 11).

	«M»	«W»	Double zigzag	Multiple zigzag	Rhombes	Anthropomorphism	Zoomorphism	Connected with Neck	Connected with Belt	Total number of artifacts
«M»		6	33	44	10	68	3	65	6	86
«W»	6		6	4	1	7	1	5	2	13
Double zigzag	33	6		17	5	25	0	22	5	35
Multiple zigzag	44	4	17		9	33	1	32	4	45
Rhombes	10	1	5	9		9	0	7	4	10
Anthropomorphism	68	7	25	33	9		1	62	6	69
Zoomorphism	3	1	0	1	0	1		4	0	4
Connected with Neck	65	5	22	32	7	62	4		2	69
Connected with Belt	6	2	5	4	4	6	0	2		6

**Table 1.** Matrix of correlation frequency between the two analyzed features.

For instance, Pierce treats signs not as arbitrary things, pointing out that signs include “icons and indices (signs that have non-arbitrary relations to their referents) ... Finally, the actor is assumed, but not included, in semiological analysis; however, in a semiotic analysis the actor is an integral part of the semiosis process” [Preucel, Bauer 2001, 88-89]. Pierce’s step away from the binary semiotic model and introduction of the actor’s point of view in the semiotic equation is a notable coherence to the ideas of post-anthropocentric archaeology [Cipolla, Gallo 2021]. As Cipolla & Gallo have noticed, “post-dualistic approach – exemplified both with assemblage theory and Peircean semiotics – helps to challenge and question arbitrary, western assumptions about how the world works” [Cipolla, Gallo 2021, 5]. Thus, Pierce’s semiotics itself provides methodological space for studying the symbol beyond its interpretation and carries semiotic study outside Western mind-related archaeological dualities. Pierce’s model is unimaginably diverse since, throughout its 20 years of development, he has managed to outline more than a hundred possible links between different categories of semiotic systems. Following Cipolla & Gallo [2021], we, however, will restrict ourselves to the basics required for our study.

Pierce’s three-part model features a meticulous description of elements and potential connections with one another. When talking about a sign per se (the linking bridge between the object and its interpretation), Pierce writes about qualisign, a possibility, potential, or abstract quality of the sign; a singular sign that operates as actual singular existence; legisign that operates as an established convention, including linguistic ones [Cipolla, Gallo 2021, 5]. Furthermore, signs can be related to objects in three ways. Icons introduce a physical resemblance between sign and object, indexes indicate a causality or physical connection, while symbols are a social convention. Applying these nuances to archaeological materials, Parmentier [1997, 50-51] distinguished the signifying roles of a singular ornamented pot from the pottery style, pointing out that neither is actually symbolic. For him, pottery style is rather “an indexical legisign embodying an iconic legisign, and a particular pot in that style is an indexical sinsign, a ‘replica’, in fact since it is generated from a template which it (trivially) indexes”.

Following this model, we interpret the change of the “M” sign’s archaeological and semiotic contexts while taking into account the links formed by its features as reflected in the investigated archaeological materials. We aim to under-

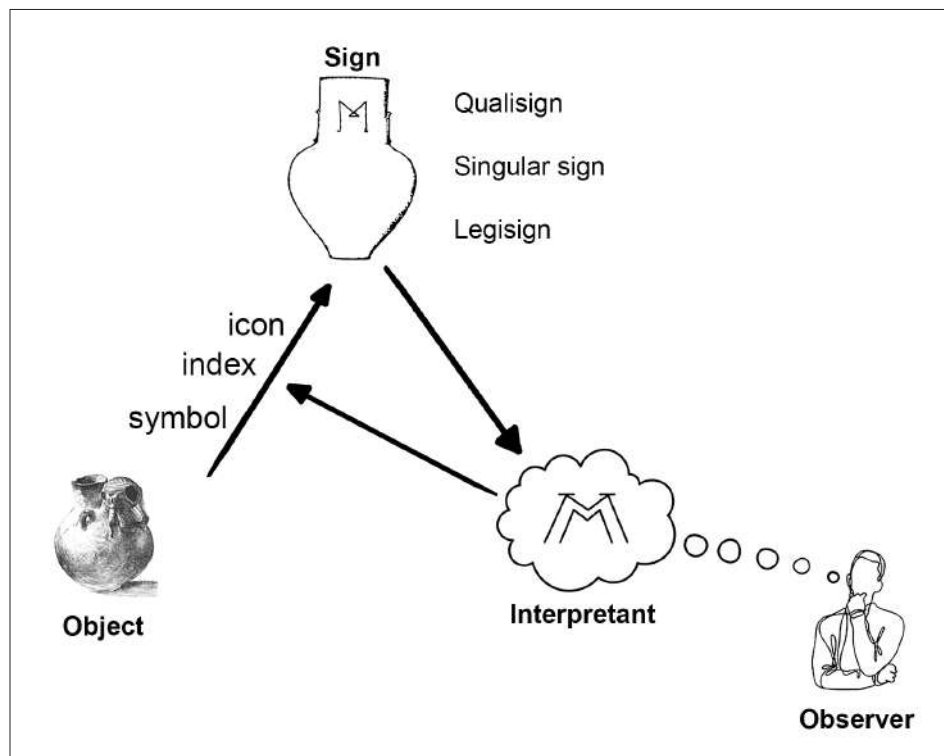


Fig. 11. Pierce's model of the sign modified after [Preucel, Bauer 2001, 3].

stand how the sign migrated and obtained specific parameters and features and whether its semiotic role changed through millennia.

### Results and discussion

#### *Diachronic semiotics of the "M"-sign*

Social network analysis shows various connections between features and contexts of the "M" sign on the artifacts under study (fig. 12). Evidently, the dominant feature group includes an occurrence of the "M" sign and its upside-down version in connection to the anthropomorphic appearance of the artifacts and what can be interpreted as their neck-zone. The sign's connection with multiple zigzag ornament is not as strong, and the connection with the double zigzag ornamentation is even weaker. Several features fall outside the cluster of tightly knit connections: the "double zigzag" ornament, connection to the waist, rhombic ornamentation, and zoomorphism. The study of the archaeological context of connections within the network has the potential to clarify the results further.

It is rather apparent that VII millennia BCE materials are relatively limited in their connection to artifacts' anthropomorphicity. Nevertheless, a decent number of artifacts are associated with hu-

man necks (pendants) and, more frequently, with multiple and double zigzags. In Eastern Europe, the latter occur among the societies of river-oriented economies and presumably are associated with water, rarely – with a depiction of a snake [Kiosak, Radchenko 2024]. Worth mentioning, the interpretation as an aquatic symbol combines an iconic sign-to-object relation and an index one, whereas a snake symbol would have solely remained an icon. In simple terms, double zigzag images (and sometimes "M" signs) could visually resemble both snakes and water symbols. However, their abundance in the fishing context inclines to the latter interpretation. It is in this context that the signs mainly occur on the VII millennia BCE pendants.

Thus, the most archaic mages of the "M" sign only partially represent the primary trend since the artifacts featured with the "M" sign are not anthropomorphic. Some of them are pendants, and thus, are connected with the neck and could be designed to be worn by humans. Alas, such materials are sporadic and are singular signs according to Pierce's model.

Later, at the beginning of VI millennia BCE, the "M" sign appears on an anthropomorphic

piece from Western Anatolia (Illipinar) and figurines from Macedonia (Tell Sredselo and Tell Mogila) at a slightly later date. Inhabitants of the Illipinar region had a strong bond with the inhabitation of the Balkans [Thissen 2008]. They had a significant impact on the carriers of the Linear Pottery culture at the end of the Formative phase and the beginning of the Milanovce phase [Stadler, Kotova 2023, 240-241].

At that time, the first “M” sign occurred on a zoomorphic figurine from the Szentgyörgyvölgyi-Pityerdomb settlement of the Linear Pottery culture in Hungary (5450-5350 BCE).

During the last quarter of VI millennia BCE, a sporadic occurrence of “M” and “W” signs on the anthropomorphic idols is known on the territory of modern Greece and Bulgaria, the Banat culture in the Timiș basin (Parța), and on the Alföld LPC sites in Hungary (Mezokövesd and Hortobágy).

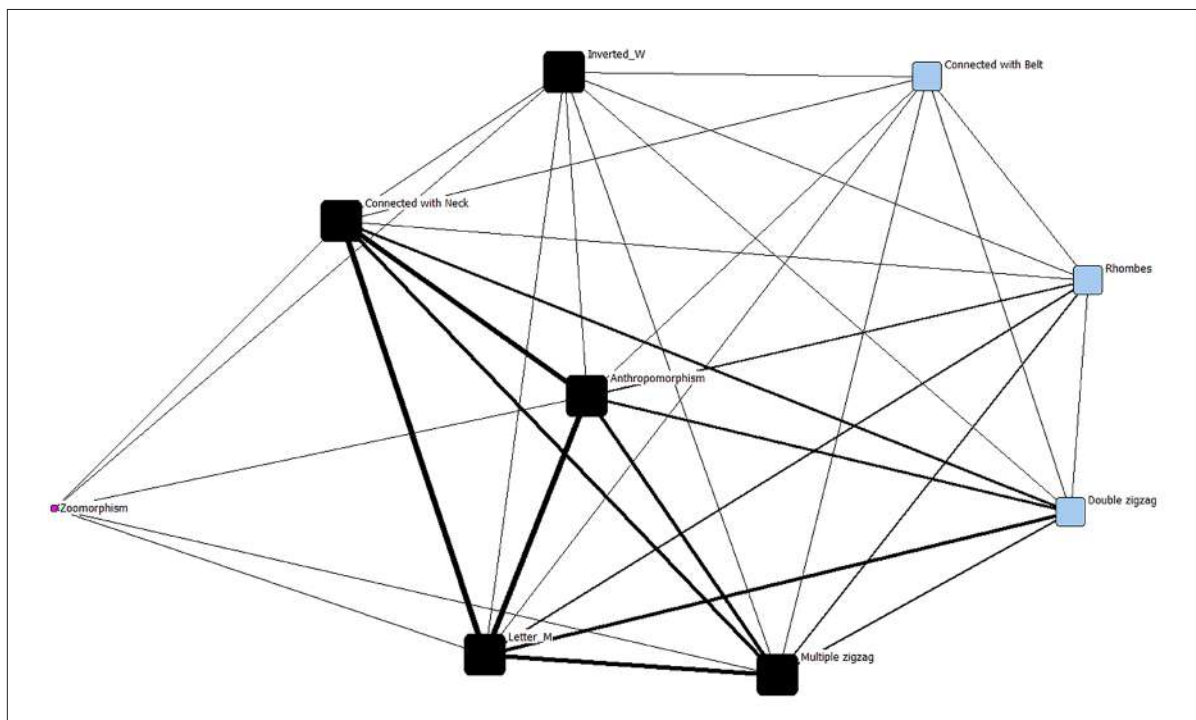
This way, the connections between the “M” sign and zigzag-like images, necks, and anthropomorphicity are formed pairwise and maybe even independently but still develop an explicit cluster of characteristics that unify different artifacts. In the Balkans, such artifacts are mainly anthropomorphic idols, with the Carpathian region having both anthropo- and, occasionally, zoomorphs. At the same time, one can trace the sporadic occurrence of vessels featured with “M” and “W” among the Banat culture settlement in Romania (Parța, Cîrcea) and the Linear Pottery culture in the Czech Republic (Vedrovice).

At the end of VI – first quarter of V millennia BCE, the sign’s popularity and its versions peaked among the later sites of the eastern (Szakálhat group) and western (Želiez group) Linear cultures in Hungary and Slovakia. Here, they are initially associated with facial vessels and rarely – with zoomorphic vessels and idols. The signs are simultaneously conquering Bulgaria and are scarcely present in Greece and Macedonia. In these regions, they are found mostly on anthropomorphic figurines with little to no occurrence on vessels, allegedly imitating vessels of the Eastern and Western linear pottery cultures. In the second and third quarters of the V millennia BCE, all of the “M” variations can only be traced on the figurines of Bulgaria.

During the VI-V millennia BCE, facial vessels became the primary type of artifacts to depict “M” signs. Three main observed features coincide here: the presence of the sign itself, its application on the neck zone, and the anthropomorphicity of the object (Table 2). 69.5 % of all ceramic artifacts fully comply with these criteria. 65% of all artifacts (made of clay and other materials) ornamented with the “M” sign are endowed with two other features, indicating a relatively close bond. Such concision points out a specific pattern and brings to an assumption that from a singular sign, “M” has turned into what Pierce calls legisign – a sign that operates as a convention (a regularly occurring phenomenon, having a pattern). Moreover, significant alterations that took place since the “M” sign occurred in river-oriented so-

	Total number	Double zigzag	Multiple zigzags	Rhombs	Anthropomorphs	Zoomorphs	«M»-sign is related to neck	Anthropomorphs with «M» on the neck
Pendants	4	3	2	1	0	0	4	0
Weights & Sinkers	4	2	3	0	0	0	0	0
Bone knife	1	1	0	0	0	0	0	0
Vessels	59	20	38	7	43	2	43	41
Idols	27	9	3	2	26	2	18	17
<b>Total</b>	<b>88</b>	<b>12</b>	<b>46</b>	<b>10</b>	<b>69</b>	<b>4</b>	<b>65</b>	<b>58</b>
Percentage	100,00	13,64	52,27	11,36	78,41	4,55	73,86	65,91

**Table 2.** Artifact types with “M”-sign, sorted by the features under study.



**Fig. 11.** Social network analysis of the sign «M» features. The line width represents the strength of the connection between features. Black squares indicate a core cluster of related features.

cities of VII millennia BCE till the flourishing of the Neolithic society with a productive economy let one assume that the connection between the sign and the entity it represents has faced some changes as well. From an icon, it transformed into a symbol, manifesting a certain social convention regarding its meaning and, therefore, rules of its depiction. The fact that the sign's context remains constant and follows the connections revealed by social-network analysis leaves a place for an assumption that the meaning of the symbol itself was untouched. It should have been noticed that the sign can have multiple meanings and ways to emerge and evolve.

Originally, the sign occurred on the facial vessels with neither reference to hair depiction nor as a repetitive ornamental element in the last quarter of VI millennia BCE in Banat culture (Romania) and in the neighboring group Szakálhat (Hungary). While in the Szakálhat group, the “M” sign frames the face, in the Banat culture, it is a small double sign located on the neck zone, resembling a pendant. We lean towards the view that considers the “M” sign that frames the face on the facial vessels as an alternative to a pendant. Moreover, such blending foretells the next step of

the sign's evolution – besides remaining a symbolic legisign, it receives an additional option of manifesting as an index – the very same sign in a similar context, but with a different location on the object.

The vessels of the Želiez group are often featured with waves and curves as a filling of space inside the “M” signs. In turn, some facial vessels of the Szakálhat group include the “M” sign framing the face accompanied by “V” shaped symbols and curves on the backside of the vessel. The same group includes vessels with painted double zigzag lines “hanging” from the “M” sign that resembles an image of a serpent. These nuances confirm the already designated connection between the “M” sign and the double zigzag, traced on the materials from the Eastern European Steppe and some figurines with the “M” sign from the Balkans – the similarity remains, regardless of all transformations that took place.

#### *Possible Interpretations of the “M” Sign*

Even though we don't aim for the symbol's interpretation, this research, however, allows us to clarify some interpretational nuances of the “M” sign and to systemize the mentioned hypothesis.

So far, the ritualistic role of the anthropomorphic and zoomorphic figurines seems to be the most plausible version for the Linear Pottery assemblages [Kotova, Stadler 2017; Kotova, Stadler 2017a]. A coherence of separate network elements and their contextual similarity leads to an assumption that all objects, attributed with “M” and “W” signs, are linked with ritual practices. Besides that, facial vessels with a clear archaeological context usually belong to the ritual complexes: Vinča (2008), Törökbálint-Dulácska [Virág 2000], Battonya [Goldman 1978], Parța [Lazarovici *et al.* 2001]. At the same time, interpretations of idols as children’s toys, images of ancestors, or gods of fertility exist [Becker 2011, 346-347]. Schwarzberg noted that almost all authors agree on considering “M” an independent sign of symbolic value and not a random motif. Interpretations of the “M”-sign are, however, can be interpreted with an incredible diversity: as a symbol for mountains, as a symbolized house model, as a strongly abstracted depiction of female bodies in birthing positions, a double abstracted human symbol or a mask, a bucranium or a stylized human face, perhaps an amalgamation of features of both sexes or a “duplication of inherent power,” an ideogram composed of one sign, a heraldic mark, as depictions of beard or chin, abstracted vessels kept in front of the chest, etc. [Schwarzberg 2017, 126-127].

Sometimes, “M” and “W” symbols are even considered a depiction of the Cassiopeia constellation – half of the year it is visible in the night sky as an “M”-like figure, and the other half of the year – as a “W” [Lazarovici 2003, 89]. This hypothesis is complementary to the presumed link between Cassiopeia and ceremonial practices of the farming societies, especially considering the fact that constellation’s best period of visibility falls onto the harvesting season, namely September-December. Szücs-Csilik & Maxim [2016] also draw parallels between snake images and their connection to the agrarian calendar, which can be reflected in the ornamental patterns, especially in the double zigzags [Kotova, Radchenko 2024]. Yet, the evidence base for this hypothesis so far seems to be insufficient.

The semiotic study points out other noteworthy details and features. The shift of the “M” sign from iconic sign to symbolic legisign could have been accompanied by the acquisition or, on the contrary, loss of meanings. This seems reason-

able as its use in the region outlives the transition between two major dominant economy types. Considering the sign’s lengthy history in Eastern Europe and the Balkan region, the variation of its applicability seems to be inevitable. Furthermore, interpreting the “M” sign as a distinct and independently evolving version of the double zigzag introduces it as an icon connected to the worldview of Eastern European river-oriented societies. Meanwhile, in the “Cassiopeia” interpretation, it happens to be a version of an index, initially signifying something by the principle of similarity and later codified as a symbol. This way, adding the “Cassiopeia” hypothesis to the “variation of the double zigzag” requires the existence of two different ways of codifying the same sign within one single social network.

Such variability, however, is still possible. A close enough example of double zigzag ornamentation indicates, “The same ideogram can emerge due to different external impacts; symbols with different semantic meanings might be codified identically” [Kotova, Radchenko 2024, 145].

### Conclusion

The “M” sign goes through significant transformations from the Late-Mesolithic pendants to facial parts of anthropomorphic vessels in the Neolithic cultures of the region. Sign’s context and positioning are highly determined, presumably meaning that a specific symbolic meaning (or meanings, for that matter) has been acquired along the way, with social and symbolic conventions being represented (in Pierce’s terms, an icon is becoming a legisign). Emerging in stone artifacts in VII millennia BCE in the steppe region of Eastern Europe, the sign seems to have evolved up until the middle of V millennia BCE, transforming into a standardized symbol on the anthropomorphic vessels and idols of the Balkan-Carpathian region. In this latter case, it is limited by strictly specified context – in connection with anthropomorphic images – and predominantly embellishes their necks. When connected to these features, the sign occurs more frequently than with any other one. Such a vibrant episode allows, at least partially, the reconstruction of the history of the sign’s codification and its transformation into a symbol.

A combination of social-network analysis with the Pierceand semiotics clarifies possible nu-

ances of signs' evolution and use in a diachronic perspective. Besides a simple indication of the existing connection between different features of the same sign, the applied combination has traced the history of the "M" sign's codification and further development of this codification. Further archaeological contextualization of this story is a matter of nuancing of the archaeological record. From the methodological point of view, applying Pierce and semiotics proves to be successful and complementary to many methods of post-anthropocentric archaeology, in-

cluding social network analysis of elements of material culture, sign systems, or separate signs.

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