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UNBURNED LOOM WEIGHTS FROM VITĂNEŞTI 'MĂGURICE' *TELL* SETTLEMENT (TELEORMAN COUNTY, SOUTHERN ROMANIA)

Ion TORCICĂ *

Rezumat: *Greutăţile din lut din cultura Gumelniţa sunt descoperiri ce oferă informaţii indirecte privind existenţa ţesăturilor, tipul lor şi caracteristicile firelor din care au fost lucrate. În tell-ul de la Vitănești 'Măgurice' s-au descoperit în toate nivelele studiate greutăţi de lut ars sau nears folosite pentru războiul de ţesut. S-au remarcat complexe aparţinând fazei Gumelniţa A2, formate din greutăţi de lut nearse ce atestă existenţa in situ a două războaie de ţesut. Primul complex descoperit în anul 2000 era constituit din 10 greutăţi nearse ce formau două şiruri paralele. În zona complexului fuseseră descoperite într-o secţiune de control stratigrafic alte şapte greutăţi întregi sau sparte. Nu ştim cu exactitate dacă toate au aparţinut unui singur război de ţesut. Al doilea complex, descoperit în anul 2007 în ultimul nivel Gumelniţa A2 cuprindea nouă greutăţi nearse dispuse într-un şir, culcate pe o parte cu faţa superioară în diferite direcţii. Două greutăţi aflate la capetele şirului erau decorate prin incizare cu figuri feminine schematizate iar a treia avea o latură acoperită de incizii orizontale sau oblice suprapuse. Pentru greutăţile folosite la războiul de ţesut în urma unor experimente şi a experienţei ţesătorilor se pot face observaţii privind funcţionalitatea pornind de la greutate şi dimensiuni, parametrii funcţionali ce determină tipurile posibile de ţesătură. Lăţimea lor este la fel de importantă deoarece influenţează spaţiul dintre firele de urzeală. La Vitănești, greutăţile descoperite în 2007 cu masa între 385 şi 457,7 g puteau fi folosite pentru ţesături fine cu fire subţiri iar cele cu masa între 600-1000 g aşa cum sunt cele descoperite în anii 1999-2000 ar fi putut fi folosite pentru ţesături groase cu 5-6 fire/cm². Experimentele dar şi ţesătorii au arătat că un număr ≥ 10 fire de urzeală şi ≤ 30 fire ce pot fi legate de o greutate sunt considerate practice. Raportându-ne la greutăţile din 2007, rezultă că se puteau folosi un număr 15-20 fire cu o grosime de 0,46 mm pentru tensiuni de 20-26 g. Posibil ar fi putut fi folosite şi pentru 30 de fire cu grosimea de 0,27 mm ce ar cere 10 g tensiune. Pentru cele având masa între 500-900 g şi fire ce necesită tensiune mai mică de 50 g puteau fi folosite 20-30 fire pe greutate (ce necesită în mod normal o tensiune cuprinsă între 16-45 g). Dimensiunile variate ale pieselor de la Vitănești, mai ales greutatea, indică folosirea unor războaie de ţesut diferite, unele pentru ţeserea unor pânze fine sau normale cât şi a unora cu fir gros ce necesită o tensiune mare şi greutăţi grele de tipul celor descoperite în anul 2000. Lăţimea pânzelor ţesute în tell-ul de la Vitănești pare să fi fost fluctuantă şi a depins atât de numărul de greutăţi, de lăţimea lor cât şi de distanţa la care au fost ordonate.*

Abstract: *The clay weights of the Gumelniţa culture provide indirect information about the fabrics, the type and the characteristics of the yarns. At Vitănești 'Măgurice' tell settlement burnt or unburned clay weights used for warp-weighted looms were found. Some unburned clay weights identified within dwelling remains prove the in situ existence of warp-weighted looms. The first assemblage, discovered in 2000, consisted of 10 unburnt weights disposed in two parallel rows. In their proximity, on a stratigraphic test section, another seven whole or broken weights were discovered. There is no evidence if all of them belonged to a single warp-weighted loom. The second assemblage, discovered in 2007 in the upper Gumelniţa A2 level, consisted of nine unburned weights disposed in a row, lying on one side, with the upper part in different directions. Two weights, from the ends of the string, were decorated by incisions with schematic female figures and the third had a side covered by horizontal or slightly oblique, superposed scratches. Following the experiments and the experience of the weavers, some observations can be made about the loom weights used for the warp-weighted loom and their functionality, starting with the weight and dimensions and the functional parameters that determine the possible types of fabric. Their width is equally important because it influences the space between the warp yarns. At Vitanesti, the weights discovered in 2007, which have close weight ranging from 385 to 457.7 g, could have been used for thin woven fabrics. Those of 1999-2000 with a greater weight, between 600-1000 g, were used for manufacturing thick-woven fabrics with 5-6 threads/cm². The experiments showed that a number of ≥ 10 warp threads and ≤ 30 yarns on one loom weight are the limits of what is considered to be practical. Referring to the 2007 weights, it is clear that a number of 15-20 yarns, with 0.46 mm thickness, for 20-26 g of tension, could be used, but also for 30 yarns with a*

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thickness of 0.27 mm that would require 10 g of tension. For weights, with the weight between 500-900 g and the warp threads that require a tension of less than 50 g could be used 20-30 warp threads (normally requiring a tension between 16-45 g). The varied dimensions of the pieces from Vităneşti, especially the weight, indicate the use of different warp-weighted looms, some for weaving fine or normal fabrics as well as some with thick wires that require high tension and heavy weights similar of those found in 2000. The widths of the woven fabrics at Vităneşti seem to have fluctuated and depended both on the number of loom weights, on their width and on the distance apart they were arranged.

Cuvinte cheie: *greutăţi de lut; cultura Gumelniţa; război de ţesut; tell; Vităneşti 'Măgurice'.*
Keywords: *loom weights; warp-weighted loom; Gumelniţa culture, tell settlement, Vităneşti 'Măgurice'.*

Clay loom weights for warp-weighted looms are frequent discoveries at Gumelniţa culture sites (Andreescu *et al.* 2009; 2010; Bem 2001; Hansen *et al.* 2007; Marinescu-Bîlcu 2007). They are burned and unburned clay objects and have been analyzed mainly for the presence on their surfaces of incised decorations (Marinescu-Bîlcu 2007; Andreescu *et al.* 2009). Clay loom weights for warp-weighed looms can indicate what kind of fabrics could be made using them (Elster *et al.*: 30; Medard 2012: 367-77) and how the clothes were made (Mårtensson *et al.* 2009: 374). Their use introduced a form of automatism that allowed the weavers to produce more efficiently or in a more standardised manner (Médard 2012: 376). It also provides a window into the life of ancient craftsmen providing insight into questions about where they worked, what tools they used, and what products they made (Boertien 2009: 32).

The analyzed assemblage comprises unburned clay loom weights discovered in different Gumelniţa A2 levels at Vităneşti 'Măgurice' (Plate I). Here the unburned clay weights do not occur in the last Gumelniţa level (B1 phase), but they are frequent in the previous levels (Gumelniţa A2 phase), together with the burned ones. An important group was discovered in the 2007 (Andreescu *et al.* 2008) (Plates II.1, 2, 4 and III) and another in 2000 (Andreescu *et al*. 2001), both part of some unburned or partially burned house inventory, and considered the remains of warp-weighted looms. Other unburned clay loom weights have been found frequently in the domestic waste areas and in the spaces between dwellings (Plate IV).

The presence of these unburned objects only in the Gumelniţa A2 levels raises the question if they occurred only in those levels. Compared with the burned ones they are fragile and less resistant over time. This aspect is compensated by the speediness of their production when necessary (Médard 2012: 370). It is known that the thread imprinted on the upper part of the perforation area is realized over time even if the weights are made by unburned clay (Boertien 2009: 42). The unburned clay loom weights from Vităneşti have many traces of thread on one or on both sides, indicating long term use; they are not treated like objects that could be dispensed quickly, they are an option and not a need. The examples from Pietrele, Căscioarele or Calomfireşti *tell* settlements also have traces of thread (Toderaş *et al.* 2009: 76, pl. IX/4; Marinescu-Bîlcu 2007: 96-98, fig. 2-4).

In 2007 an assemblage of loom weights belonging to a Gumelniţa A2 level was discovered *in situ*. This formed the remains of a warp-weighted loom burnt in the fire that partially destroyed the dwelling (Andreescu *et al.* 2008) (Plates II.1, 2, 4 and III). The nine loom weights, of which only one was fragmentary, had fallen down on the floor, were arranged in a row, lying on one side with their tops in different directions (Plate II.1, 2, 4). The broken loom weight was out of line at a small distance from the others. Near this one, was an unburned clay ball, with a weight up to 300 g, and two broken grinders. Three of the loom weights were decorated by incision (Plates II.1, 4 and III.1, 2, 4). They are unburned clay made, grey-black colour and slightly smoked by the burning. The degreasers used in the paste are fine sand and carbonates. All have smooth exterior surfaces, some of them polished. Sometimes, the very thin polished surface has been exfoliated. Three of them are broken in the middle area. Some of them have been less-well worked, with the lateral surfaces slightly curved, convex or concave.

The perforations were made in the upper part, they have different sizes, sometimes of small size and some have traces from the string with which they were tied (Plate III.1, 4, 8).

Three main shapes were differentiated, also common for burned loom weights discovered in other levels. The first type is the truncated pyramid, with the base and the top approximately flat, slightly concave sides, rounded corners and square section (Plate III.1, 2, 7). For two of them, the perforations preserved the trace left by the thread on the upper part, slightly deviated to the right. The second type has an oval-elongated shape, oval or rectangular in section, with the base, the top

and the sides rounded (Plate III.6, 8, 9). The last type has a parallelepiped shape, the base is straight and the top is rounded or slightly oblique (Plate III.4, 5).

The most interesting aspect of the assemblage is the incised decoration of three of the loom weights. One of them has a side with approximately 25 horizontal or slightly oblique, superposed scratches, covering about 80% of the surface from the base up to perforation (Plate III.4). The decoration of the other two was designed using the shapes of the loom weights and was the subject of a study published in 2007 (Marinescu-Bîlcu 2007: 87-103). The first has an incised decoration consisting of two aftershave triangles (Plate III.1). The upper one is the smallest and is decorated inside with three semicircular, overlapping lines of varied sizes. Two of the lines are doubled by a series of points. The second triangle, much larger than the first, is elongated, with convex lateral sides. Outwardly, these sides have three convex lines, gradually decreased, following the curvature of them. Two overlapping triangles were drawn inside of the triangle, the upper one being smaller.

If this decoration was a feminine figure, the head would have been suggested by the loom weight hole, the upper triangle would be the area of the chest decorated with several rows of ornaments, and the lower triangle would be the area from the waist down which is covered with a large garment. The groups of three lines adhered to the lower triangle would suggest the hands left by the body. At 'Măgura Calomfireşti', Căscioarele 'Ostrovel' and Bucşani 'La Pod' settlements, on some loom weights, the head of the incised female figures also replicated through a perforation made in the body of the loom weight, but this consists of the triangles disposed upside down to the one from Vităneşti (Marinescu-Bîlcu 2007: 87, 95, 97, 99, fig. 1, 3, 5). The second loom weight has a different decoration (Plate III.2). It is also made by two motifs, located under the perforation. The top motif is triangular, with a slightly oblique base, oriented at a distance from the perforation of the loom weight. The interior is filled with three lines which make two triangles and one that is oval elongated. The second motif, located below the first one, has a circular shape, consisting of 5-6 incised lines, concentrically arranged. Except the circle from the centre, the others lines are interrupted on the top or laterally. The general impression left by the incised figure is an extremely stylized human figure but similar to the other one.

The decor follows certain types that have been used in other settlements. Their *in situ* discovery at the ends of the row is a fact that draws attention. If the preserved row is a complete one, the decorated loom weights mark the importance of the row ends.

The other unburned loom weights had different contexts, such as unburned dwellings, their external areas or domestic waste areas (Plate IV and V). In 2000, at Vităneşti 'Măgurice', in a Gumelniţa A2 dwelling, an assemblage consisting of about 10 loom weights that formed two parallel rows, beside which was a grinder, was discovered (Andreescu *et al.* 2001) (Plate IV). In that area a stratigraphic test trench has been excavated in 1999, in which seven whole or broken loom weights, similar to those of 2000 were discovered. We do not know exactly if all of them belonged to a single warp-weighted loom. Compared to the burned loom weights of Gumelniţa B1, these are much bigger and heavier, with different shapes: ovoid, truncated pyramid, and pyramid (Plate IV.2-10).

In the same level were other loom weights with different shapes and sizes, some of them similar to those found in the unburned dwelling (Plate V). These were discovered in the 2000-2002 excavation seasons, and due to fragility, many of them are fragments or broken in many pieces. It is noted that some are similar in shape but with different dimensions (Plate V.1-4).

It was observed that the grey-whitish clay, used for shaping the loom weights, has been also used as raw material for different constructions including fireplaces or dwelling floors, and maybe specially chosen for its qualities.

The assemblages of loom weights, which have been differently interpreted, are known from several Gumelniţa settlements, both to the north and to the south of the Danube (Todorova 1982: 46, fig. 27). At Sultana, in house no. 2/2003, under a clay support structure were about 30 loom weights (Andreescu *et al.* 2010: 10). At Bucşani 7 burnt clay loom weights in a clay box were found (Bem 2001: 163). At Pietrele, in two Gumelniţa A2 unburned dwellings, were assemblages of unburned loom weights, interpreted as the remains of warp-weighted looms (Hansen *et al.* 2007: 48-51, fig. 12-14; Toderaş *et al.* 2009: 46, 47, 76, 77, pl. IX/3, 4, X/2, 3). The first one consisted of 23 unburned clay loom weights. Three of them were decorated with rows of points. They were arranged in two parallel rows and were on the south of an unburned clay box (Toderaş *et al.* 2009: 46, 76, pl. IX/3, 4). It was considered that the warp threads were hanging at 60-70 cm and together with the wooden frame reached 1 m. The second one comprised of 12 unburned loom weights in two rows, disposed inside a rectangular clay feature (Toderaş *et al.* 2009, 47, 78, pl. X/2, 3). At Căscioarele 'Ostrovel', in the 4/1962 dwelling, in the Gumelniţa B1 level, about 90 loom weights were discovered, in the fireplace and scattered in the whole

dwelling. Some of them are decorated. It was considered as a deliberate deposition although originally it was interpreted as loom weights dried in the fireplace (Marinescu-Bîlcu 2007: 92). It can be noticed that the loom weights assemblages are found inside or near clay boxes, features that have not been discovered at Vităneşti.

Observations about the functionality of the loom weights starts with the weight and the size, the functional parameters which determine the possible types of fabric. Their width is equally important because it influences the space between warp yarns (Boertien 2009: 32).

The eight pieces discovered in 2007 have similar weights, ranging from 385 to 457.7 g. Four of them, including the decorated ones, are less than 400 g. They are 4.8-6.6 cm in width and 3.9-5.7 cm thick. The loom weights from the lower levels have weights between 459-899 g, most of them ranging between 500-600 g. It is known that loom weights with different weights can be used in a single configuration, so the slightly different weights of loom weights in a warp-weighted loom did not affect its functioning (Mårtensson *et al.* 2009: 380).

The loom weights discovered at Sitagroi, in Greece, range between 600-1170 g and it was calculated that the obtained fabrics were balanced. These required a tension of 40 g and the fabrics resulted were 5-6 yarns/cm² (Elster *et al.* 2015: 30). At Vităneşti, weights between 600-1000 g could be used for thick fabrics with the above specific features.

Some relationships between types of loom weights and the obtained fabrics were observed as a result of the study of the loom weights found at Arslantepe, in Malatya (Turkey). The thick woven fabrics required heavy and thick loom weights. To produce a coarse and dense fabric heavy but thin loom weights should be used. To produce an open fabric with thin threads thick loom weights are needed and for a dense fabric with thin yarn and many threads per cm² light and thin loom weight must be chosen (Frangipane 2009: 8). No heavy and thin or light and thin loom weights were discovered at Vităneşti. Light and thin loom weights were found at Ciolăneştii din Deal *tell* settlement. The loom weights discovered in 2007 could be used for thin woven fabrics and those of 2000, being bigger, for thick-woven fabrics.

At Arslantepe, it was calculated that each one of the weights of 624-828 g would need 25 warp yarns and that of the 277-584 g 37-59 warp yarns, with a thickness of 0.37-0.58 mm, resulting in the dense fabrics (Frangipane 2009: 24). It was found that a warp-weighted loom with the light weights and thin size (379 g and 3.5 cm) could be functional for different fabrics with a variety of yarn qualities (Frangipane 2009: 24). Also, the thread thickness is the factor that conditioned the number of threads attached to a loom weight (Andersson Strand 2012a: 211). Thus it was calculated that for a weight of 500 g with 10 warp threads requires 50 g of tension and for 25 warp threads, 20 g of tension (Andersson Strand 2012a: 211). These results can also be used for loom weights found at Vităneşti. The experiments showed that a number of ≥ 10 warp threads and ≤ 30 yarns on one loom weight are the limits of what is considered practical (Cutler *et al.* 2013: 98; Mårtensson *et al.* 2009; Andersson Strand 2012a: 211). Referring to the 2007 loom weights, it is clear that a number of 15-20 yarns, with 0.46 mm thickness, for 20-26 g of tension, could be used. Its could also be used for 30 yarns with a thickness of 0.27 mm, and would require 10 g of tension.

For loom weights from Vităneşti, with the weigh between 500-900 g and the warp threads that require a tension of less than 50 g, 20-30 warp threads could be used (normally requiring a tension between 16-45 g). Utilisation of a warp threads which are thicker than 1 mm would require a tension of over 50 g and a spindle whorl of 45 g. These estimations can be partly influenced because the thickness of the thread determines the suitable warp tension that may be affected by the fibre quality and the degree of preparation of fibre (Cutler *et al.* 2013: 97). High tension breaks the thread, too low and it affects the weaving process (Cutler *et al.* 2013: 97).

Based on the experiments of the researchers (Andersson Strand: 2012a: 211; Cutler *et al.* 2013: 97), some estimations can be made about the thickness of yarns used for weights at Vităneşti. For this approach, several spindle whorls were weighed and the existence of a couple of categories were observed. The first category includes the small objects of 7-8 g, which would have produced yarns of 0.37 mm, requiring 18 g of tension, which could be obtained with the weights between 200-600 g. The major category has the weight between 18-25 g, which could be used for fibres of 0.4-0.6 mm and a tension of 25-30 g per fibre. Large spindle whorls have more than 37 g, reaching up to 44 g, and could be used to produce only 0.9 mm yarns that require high tensions of 40-50 g and weights between 500-1000 g. We do not know the characteristics of the Gumelniţa culture fibres, so we do not know the upper and lower limits of tension which were tolerated by the weights.

The width of the cloth is determined by both the width of the starting border and the total width of the loom weights in each row (Cutler *et al.* 2013: 98). Thus, for the 2007 assemblage, if there were eight loom weights, the minimum width of the cloth band would have been 18.8 cm or 26.35 cm,

depending on how the loom weights were oriented. If the width of the starting border was higher and the distance between the weights 2 cm, a cloth with the width of 25.8-32.5 cm could be woven. If the distance between the weights was 5 cm the fabric could have been 24.8-41.35 cm.

It has been stated that the shape, materials and the decor of weights are non-functional parameters, which depend on the available resources, environment, tradition and culture (Mårtensson *et al.* 2009: 397). It is clear that at Vităneşti, it was preferable to have unburned clay for certain loom weights with various shapes and sizes. In the levels where the unburned weights were discovered there are also burnt pieces, some even secondary burnt.

However, the question is if all the loom weights of Gumelniţa A2 levels were initially unburned, they were used and then, due to the secondary burning in the oxidizing or reducing atmosphere, they became burnt loom weights. It is known that a loom weight can be used for different types of thread that need a different tension. It can be also multifunctional and only by changing the thread type can multiple types of fabrics be produced (Andersson Strand 2012a: 211). The various sizes of the objects of Vităneşti indicate that different fabrics were produced.

The widths of the woven fabrics at Vităneşti seem to have fluctuated and depended on the number of weights, on their width and on the distance to which they were ordered. After the number of weights found in 2007, the width of the fabric seems to be small. Agglomerations with a small number of weights have also been found in other settlements (Toderaş *et al.* 2009: 47, 78, pl. X/2, 3). So, it is possible that sometimes fabrics with smaller widths were produced.

Concerning the incised decoration, what was the role of feminine figures? They could act as signs of protection if we accept that in the Neolithic there existed deities that protected this craft, similar to those of antiquity. It is known that in the Near East and in the Greek world, the deities of Uttu in Sumer, Taith and Neith in Egypt, Asherah in the Semitic world, and Athens in the Greek world were patrons of spinning and weaving (Ackerman 2008: 3, 4, 7).

The signs could function as signs of the craftsmen or owners, or they were useful during the weaving as a marker for the models (Belanová *et al.*: 16). It is difficult to separate the sacred from the profane, especially for prehistory (Marinescu-Bîlcu 2007: 93). The clay weights for the warp-weighted loom may be both household objects and some of them may have carried certain symbolic meanings.

In the analysis of the art of aboriginal populations, the anthropologists pointed out that interpreting an ornament/motive is difficult, even if it has a strong emotional significance for an entire community (Boas 2010: 102). There are often circumstances when a person interprets in one way and another person in a different way. It can also be admitted that for a person an ornamental motive could have an emotional value while for the tribe it has no meaning (Boas 2010: 102). Therefore, the particular anthropomorphic motifs of the weaving looms discovered in 2007 could have had a special significance for the owner, although the general reason in itself is common in decorating the Gumelniţa weights (Marinescu-Bîlcu 2007).

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Plate I. Geographic location of Vitănești 'Măgurice' *tell* settlement (1); aerial view of the site (photograph by R.R. Andreescu and C. Bem) (2); view of the site from the south-east (3).

Amplasarea geografică a *tell*-ului Vitănești 'Măgurice' (1); imagine aeriană a sitului (fotografie R.R. Andreescu şi C. Bem) (2); situl văzut dinspre sud-est (3).

Plate II. Unburned clay loom weights discovered in 2007 at Vităneşti 'Măgurice' (1, 2, 4); reconstruction of a vertical warp-weighted loom (3).

Greutăţi de lut nears descoperite la Vităneşti 'Măgurice' în anul 2007 (1, 2, 4); reconstituirea unui război de ţesut vertical (3).

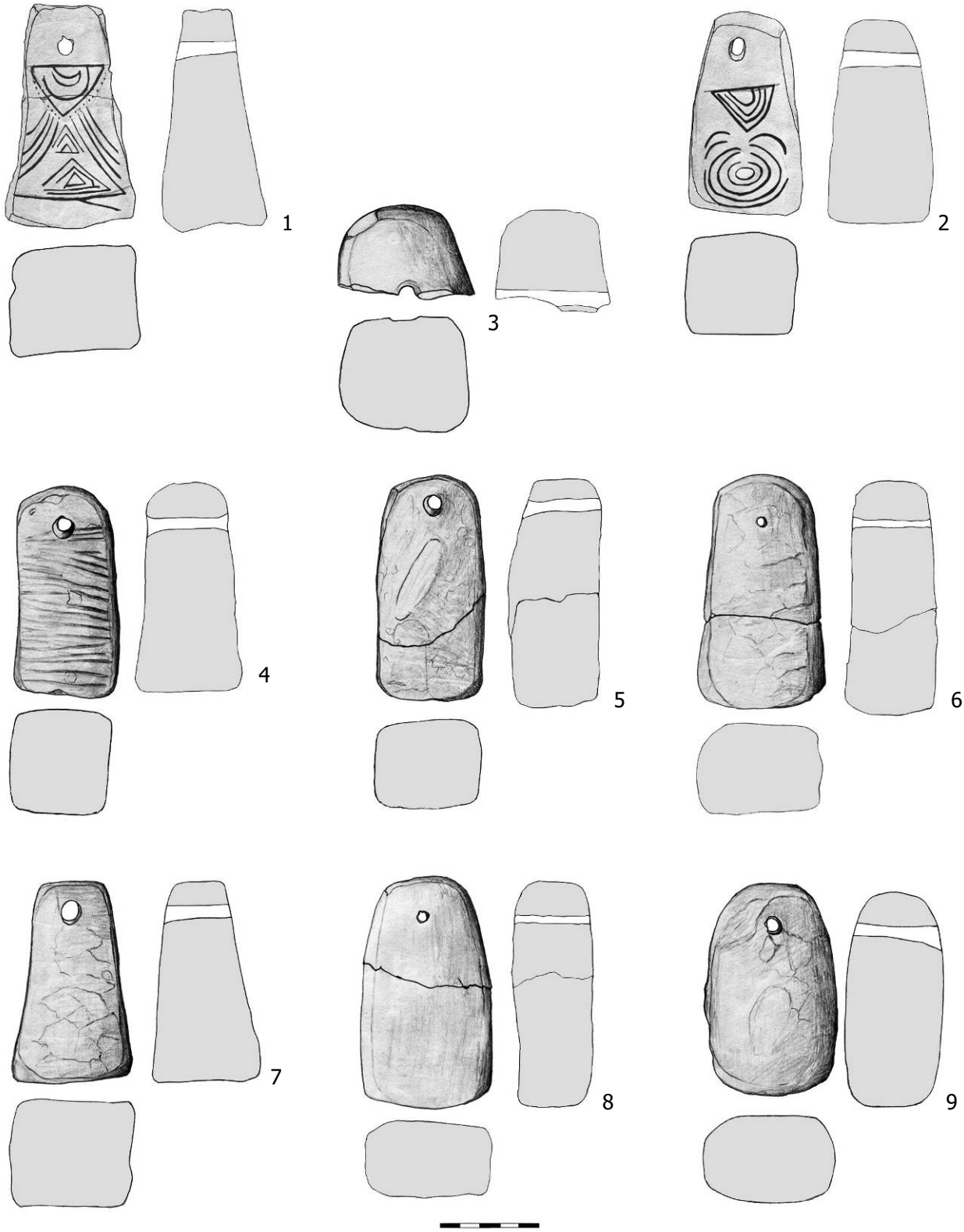

Plate III. Unburned clay weights discovered in 2007 at Vitănești 'Măgurice'.

Greutăți de lut nears descoperite la Vitănești 'Măgurice' în anul 2007.

Plate IV. Unburned clay weights discovered in 2000 at Vităneşti 'Măgurice'.
Greutăţi de lut nears descoperite la Vităneşti 'Măgurice' în anul 2000.

Plate V. Unburned clay weights discovered in 1999 (1-9) and 2002 (10-13) at Vităneşti 'Măgurice'.
Greutăţi de lut nears descoperite la Vităneşti 'Măgurice' în anii 1999 (1-9) şi 2002 (10-13).