

STONE OBJECTS FROM THE TERRITORY OF ANCIENT CITY ORGAME / ARGAMUM. PRELIMINARY RESULTS

Marius C. STREINU

National Heritage Institute, Bucharest; e-mail: marius.streinu@gmail.com

Key-words: stone objects, projectiles, grinders, pestles, whetstones, hand mills, Orgame/Argamum

Abstract: The present paper presents and provides an interpretation of five classes of stone objects resulting from field research of the French-Romanian project "Orgamè/Argamum, nécropoles et territoire". The objects were discovered in sites placed around the Razim Lake, belonging to different historical periods. They are divided in two categories and fall under various types, starting with weapons and finishing with common household items. This diversity gives us the opportunity to observe the origin of stones and the techniques of their production. An important point is to understand for which purpose various stone objects were used in different periods of time, in a limited and well defined geographical area, so that we obtain new information about various aspects of the military and economic spheres.

Cuvinte-cheie: obiecte din piatră, proiectile, șlefuitor, pistile, cute, râșniță de mână, Orgame/Argamum

Rezumat: Prezentul articol analizează cinci tipuri de obiecte din piatră descoperite în timpul cercetărilor de teren din cadrul programului franco-român "Orgamè/Argamum, nécropole et territoire". Acestea au fost descoperite în situri arheologice din jurul lacului Razim, datate în epoci istorice diferite și se împart în două categorii cu mai multe tipuri, începând cu arme și încheind cu obiecte folosite în viața de zi cu zi. Această diversitate ne oferă posibilitatea de a identifica proveniența pietrei și tehnica folosită la producția acestora. Un aspect important este acela al încercării de a înțelege care este scopul folosirii obiectelor din piatră în diferite perioade de timp, într-un spațiu geografic bine definit, obținând astfel noi informații despre aspectele militare și economice.

CONTEXT OF THE FINDS¹

The study of stone objects found in different sites placed around the Razim Lake opens a new research direction in this area. The majority of the newly-identified objects come from Orgame/Argamum and from the other sites located in the area of this Greek and Roman city. Much of the reported stone material, either small or fragmentary, was recently discovered during the archaeological excavations and surveys undertaken within the French-Romanian program of interdisciplinary research at Orgame/Argamum and on its territory.

The main objective of the project, entitled "Orgamè/Argamum, nécropoles et territoire" – ANR Pont-Euxin 2010–2013 coordinated by Alexandre Baralis² and Vasilica Lungu was the application of new methods of analysis devoted to the study of spatial networks of occupation around Greek and Roman site of Orgame-Argamum, alongside classical archaeological excavations.

The research involved a multidisciplinary approach starting from archaeological excavation and followed by processing of all finds, by means of digital mapping, photo-interpretation of satellite and aerial photographs, paleo-environmental studies, surface surveys and archaeological excavations, ceramological and archaeometric analysis, anthropology, paleopathology, palynology, geomorphology, macrobiology, archaeozoology, architecture and so on. The researched area covers a surface of 20 km around the ancient city of Orgame/Argamum. Twelve scientific institutions from four countries were involved, including Romania with four institutions³ from Bucharest and Tulcea County.

THE STONE OBJECTS⁴

The total number of stone objects discovered is 55, and represent two categories: military equipment (weapons) and household tools. They are divided into five

¹ I would like to thank Vasilica Lungu (Institute of South-Eastern European Studies) for the information about the discovery context.

² Louvre Museum, Department of Greek, Roman and Etruscan Antiquities.

³ Centre Camille Jullian (UMR 7299), CNRS - Aix-Marseille Université; Institutul de Studii Sud Est Europene; Universitatea București; Institutul de Arheologie "Vasile Pârvan"; Institutul de Cercetări Eco-Muzeale "Gavrilă Simion" Tulcea; Université de Bordeaux 3; Cerege

(UMR 7330), CNRS - Aix-Marseille Université; Exeter University; Laboratoire d'archéométrie et d'archéologie (UMR 5138), CNRS-MOM, Lyon; Archéoloattes, CNRS (UMR 5140); Ecolab (UMR 5245); CNRS – Université Toulouse III; LA3M (UMR 7298), CNRS - Aix-Marseille Université and Institut Français d'Études Anatoliennes.

⁴ I want to thank Albert Baltreș, from the Geological Institute of Romania, for the invaluable help and support.

different types: projectiles (33), grinders (7), pestles (4), whetstones (3), and hand mills (8 fragments). A detailed

catalogue is not included, as the final results will be published in the monograph dedicated to the project.



a



- Getae settlement
- Secondary Getae settlement
- Shoreline under Getae control
- Greek settlement
- Shoreline under Greek control

Spatial network of Getae and Greek occupation (6th–5th centuries BC)

b

Figure 1. a. Systematic Surveys. Map was made by P. Leboutellier (Institut Français d'Études Anatoliennes, USR 3131, Istanbul) (after Baralis, Lungu 2015, p. 378, fig. 4); b. Greek and Getae settlements around the Razelm-Golovița lagoon (5th-4th centuries BC). Map made by A. Baralis (Centre Camille Jullian, UMR 7299, Université Aix-Marseille) (after Baralis, Lungu 2015, p. 384, fig. 1).

1. Projectiles

During three years of surveys in the area close to the Greek and Roman city of Orgame/Argamum, besides lithic objects, emerged a number of 33 spherical or approximately spherical stone projectiles (Fig. 2). They come from three different contexts: 32 of them have been discovered after a survey in the 2–3 J–I squares⁵ (Fig. 1/a), while one of them was found in the ditch of the *Heroon* tumulus⁶ some years ago and the other one in the tumulus TD97⁷. The state of preservation for 19 of them is precarious, all fragmented, while the remaining 14 are complete; 25 of all projectiles have traces of ploughing, indicating that they were affected by intensive agricultural work in the area. Our range projectiles' calibre is 1 and 2 *mina*, after Campbell and Pollastrini calculations⁸.

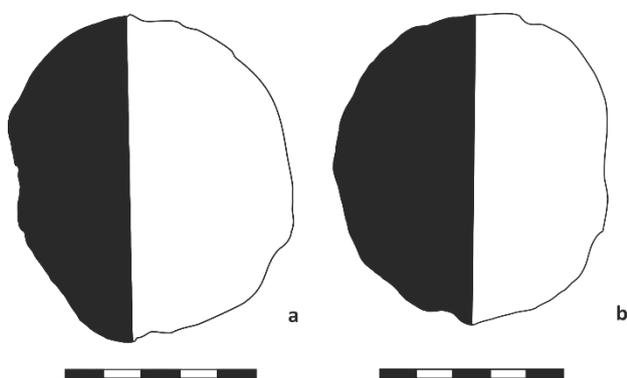


Figure 2. Drawings of stone projectiles.

From a morphological point of view, considering the round shape and dimensions of the items, all examined projectiles may be reduced to only one type. All pieces have the same white yellowish nuance of local limestone. Their texture is generally compact, with more or less tendency to fine granular. However, there is a variation in the quality of fabrics. The projectiles found in the first two contexts are made of fine sandstone with limestone, while the one discovered in the stone fill of the TD97 M1 tumulus presents more siliceous concretion. Concerning the technical method of their production, all of them have been shaped by abrasion. Unfortunately, the majority of the projectiles, found in the area of 2–3 J–I squares, have been damaged by ploughing which affected, sometimes beyond recovery, the original shape. They have been

broken, spread all over the area, and even the complete ones display ploughing traces.

Ab origine, these objects belong to the category of ammunition. They have been documented in the specialty literature since the Greek Age, and have been used until the Late Roman times⁹, remains from both periods being well attested on the site. As a consequence, a firm chronology of these artefacts is almost impossible to determine. Moreover, their contexts of discovery are less clear: the circular trench of the tumulus *Heroon* contains Greek and Roman materials among the offerings, while the item from tumulus TD97 was found in the layer of stones close to the surface. However, due to their small size, these projectiles could belong to the Roman period; it can also be assumed that they have been used by the inhabitants of the city of Argamum for defensive purposes. This hypothesis is supported by the discovery, in 1974, of two deposits of similar stone projectiles in a close area, named "La Zimbru"¹⁰. We have no detailed information about them, as far as in her notes, Maria Coja was just mentioning them briefly.

This kind of discoveries provides important data related to the military defensive and offensive techniques in the western basin of the Black Sea. Their presence indicates undeniably the existence of sizeable war machines designed to propel them. A machine of this type, called the *πετροβόλος* (*petrobolos*) by the Greeks, was used during Alexander's siege of Tyre in 332 BC¹¹. A similar machine, named *ballista*, was part of the Roman artillery¹².

During archaeological excavations, the identification of artillery equipment is quite rare, if not exceptional. To our knowledge, the only complete *ballista* discovered until now, is the one from Hatra¹³, of medium size calibre, which could propel projectiles weighting around 10 Roman pounds, the equivalent of 3.27 kg¹⁴. Considering the small dimensions of the projectiles from Argamum, we can suggest that they have been probably thrown by a small *ballista*, certainly of the lowest calibre, belonging perhaps to the type of *cheiroballista* or *manuballista* - a hand ballista. If our hypothesis is correct, then it is possible to speak for the first time about the presence of such equipment at Argamum. Regarding the type of projectiles found at Argamum¹⁵ (ancient Orgame), the analogies are numerous. Similar finds are known in Moesia Inferior at Babadag – *Topraichioi*¹⁶ and Capidava¹⁷.

⁵ The 2–3 J–I squares were situated at the base of the western hill, occupied by *Basilica 4* sector of the necropolis excavations, close to the lake.

⁶ The tumulus *Heroon*, known also as tumulus TA95, occupied the north side of the promontory of Capul Dolojman.

⁷ Tumulus TD97 is situated about 200 m far on the south-western side of the tumulus *Heroon*.

⁸ Campbell 2003, p. 26–28; Pollastrini 2012, p. 91–92.

⁹ Grimal 1973, p. 188.

¹⁰ Coja 2005, p. 147.

¹¹ Campbell 2011, p. 682

¹² Amon 2004, p. 39; Campbell 2011, p. 685; Rațiu, Stoian 2014, p. 322; Schiefsky 2005, p. 14.

¹³ Baatz 1978; Campbell 2003, p. 41; Wilkins 2003, p. 70.

¹⁴ Baatz 1978, p. 7; Rațiu, Stoian 2014, p. 322.

¹⁵ I also include here the projectiles found by Maria Coja and published in Coja 2005, p. 146–147.

¹⁶ Opaiț *et alii* 1991, p. 325–326.

¹⁷ Rațiu, Stoian 2014, p. 324.

Outside our area of interest, analogies can be found at Hinova (Mehedinți County)¹⁸, Sucidava (Corabia, Olt County)¹⁹, Răcari (Dolj County)²⁰, Pleșa (Gorj County)²¹, Drobeta (Mehedinți County)²², Arutela (Vâlcea County)²³, Feldioara (Brașov County)²⁴, Inlăceni²⁵ (Harghita County), Brețcu (Covasna County)²⁶, Cășeu (Cluj County)²⁷, Buciumi (Sălaj County)²⁸, Arcobadara (Bistrița-Năsăud County)²⁹, Porolissum (Moigrad, Sălaj County)³⁰, Romita (Sălaj County)³¹, Gherla (Cluj County)³², Mehadia (Caraș-Severin County)³³, Bistreț (Dolj County)³⁴, Celei (Gorj County)³⁵, Bumbești (Gorj County)³⁶, Vărădia – *Chilii* (Caraș-Severin County)³⁷ in nowadays Romania and Seuthopolis (Bulgaria)³⁸, Novae (Bulgaria)³⁹, Nelson Island (Egypt)⁴⁰, Burnswark (U.K.)⁴¹, Neiderberg (Germany)⁴², Viminacium (Serbia)⁴³ and Dura Europos (Siria)⁴⁴.

2. Grinders

During the three years of research of the aforementioned French-Romanian program, seven grinders have been discovered at Călugăra and Zimbru, two indigenous settlements identified north of Orgame/Argamum (Fig. 1/b).

The grinders are exclusively made of stone (Fig. 3). They may be described according to the shape, state of preservation, weight, geological era, and stone type. By shape, two of them are rectangular, three circular, one cylindrical and another one oval. The state of preservation for six of them is very good – complete items, while one is fragmentary. The weight of the objects varies between 29 and 714 g, and all of them are polished. From a geo-chronological point of view, for the raw material, the geological era for four of the grinders is unknown, while three of them belong to Cretaceous. The type of stone used for two of the grinders is unknown; one is Turanian limestone, one is sandstone with green schist, one is green schist, another one is a little reddish sandstone and the last one is sandy limestone. Such determination can facilitate the identification of the source of the stones and

begin a discussion on the areas of extraction and the potential commerce with such items⁴⁵.

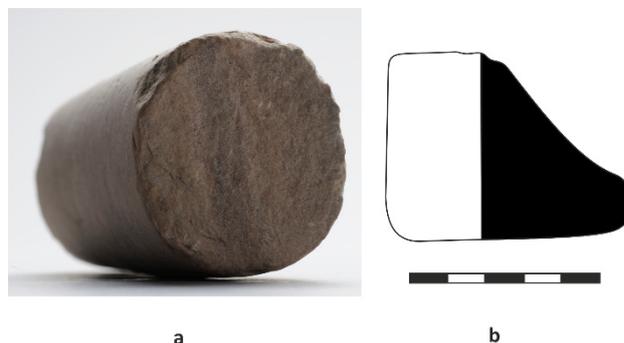


Figure 3. Grinder fragment; photo made by Loïc Damelet (MMSH-Aix-en-Provence).

Similar grinders were found in Baia⁴⁶, Lacul Tașul⁴⁷ and Chirnogeni⁴⁸, all of them located in Moesia Inferior.

3. Pestles

Another type of stone objects discovered during this project is the pestle. Such items were discovered in three points of interest, reaching a total of four. They have been found in different sites: thus, two were found at Călugăra, one at Zimbru and another one comes from our survey at Enisala – *Poligon* (Fig. 1/b).

The pestles were described according to the shape, state of preservation, weight, geological era and type of stone (Fig. 4). By shape, all are tapered with circular section. One of the items is complete, while the other three are fragmented. The weight of the objects varies between 74 and 504 g. They are made of different stones and all of them are polished. Concerning the age of the stones, the geological era for one is unknown, the other one is attributed to Triassic, the third belongs probably to Cretaceous and the last one is circumscribed to Superior Cretaceous. The type of stone for one is grey organogenous limestone, one is Turanian

¹⁸ Davidescu 1989, p. 67; Amon 2004, p. 192; Zăgreanu 2013, p. 65.

¹⁹ Amon 2004, p. 179; Bondoc 2007, p. 247–248, 252, fig. 7.

²⁰ Bondoc, Gudea 2009, p. 64, 156; Zăgreanu 2013, p. 65.

²¹ Amon 2004, p. 197.

²² Amon 2004, p. 189; Vlădescu 1975, p. 53; 1983, p. 188–189; Zăgreanu 2013, p. 65.

²³ Amon 2004, p. 196; Vlădescu 1975, p. 53; 1983, p. 188–189; Zăgreanu 2013, p. 65.

²⁴ Gudea 2008, p. 233; Zăgreanu 2013, p. 65.

²⁵ Gudea 1979, p. 199–268, pl. XXXIV; Zăgreanu 2013, p. 65.

²⁶ Gudea 1980, p. 321, pl. 51/6–8; Zăgreanu 2013, p. 65.

²⁷ Chirilă *et alii* 1970, p. 64–65; Gudea 2009, p. 235, Abb. 10; Zăgreanu 2013, p. 64.

²⁸ Gudea *et alii* 1972, p. 64–65, pl. LXIII.

²⁹ Zăgreanu 2013, p. 63.

³⁰ Gudea 1989, p. 749, pl. CCCXIII; Opreanu *et alii* 2013, p. 87, fig. 15–16.

³¹ Matei, Bajusz 1997, p. 131, pl. LXXXIV/2; Zăgreanu 2013, p. 64.

³² Protase *et alii* 2008, p. 112, pl. LXXXIX; Zăgreanu 2013, p. 64.

³³ Macrea *et alii* 1993, p. 114; Zăgreanu 2013, p. 65.

³⁴ Amon 2004, p. 173; Zăgreanu 2013, p. 65.

³⁵ Amon 2004, p. 179, nr. 15–25; Zăgreanu 2013, p. 65.

³⁶ Amon 2004, p. 197; Zăgreanu 2013, p. 65.

³⁷ Iaroslavschi, Bozu 2003, p. 296; Opreanu *et alii* 2013, p. 88; Zăgreanu 2013, p. 65.

³⁸ Nankov 2008, p. 40–41, fig. 22, 23, 24.

³⁹ Lemke 2009, p. 213; 2013.

⁴⁰ Pollastrini 2012, p. 91–92.

⁴¹ Campbell 2003, p. 25.

⁴² Johnson 1983, p. 81–83; Zăgreanu 2013, p. 65.

⁴³ Bogdanović 2013, p. 396–398; Rațiu, Stoian 2014, p. 324; Zăgreanu 2013, p. 65.

⁴⁴ James 1990, p. 289–290; Rațiu, Stoian 2014, p. 324; Zăgreanu 2013, p. 65.

⁴⁵ A detailed analysis will be included in the final study published in the project monograph.

⁴⁶ Mihail, Ștefan 2014, p. 265 (B.1.a. for circular form (Pl. 2/3 și 2/8), p. 265 (B.1.b. for oval grinder (Pl. 2/1) – Neolithic era = Baia Tell, Tulcea County).

⁴⁷ Matei 1985, p. 136, 4.C.2. (for oval grinder) – Roman era = Tașaul Lake, “Limba oii” point.

⁴⁸ Papisima 2006, p. 323 (Pl. VII/2 și VII/3) – Chirnogeni – Late Bronze Age.

spongolit, one is Sedimentary rock, smooth sandstone, and another one is Turanian sandstone.

Pestles with the same characteristics were found at Cherna, in Bulgaria⁴⁹ and at Olbia, in Ukraine⁵⁰.



Figure 4. a. Drawing of a pestle fragment from Călugăra; b. photo of the same pestle fragment (made by Loïc Damelet, MMSH-Aix-en-Provence).

4. Whetstones

A third type of stone objects discovered during the survey program in two sites is represented by whetstones: two were found at Călugăra and one at Zimbru. The total number indicates three different items (Fig. 1/b).

As in the other two cases, all three whetstones were processed according to shape, state of preservation, weight, geological era, type of stone and one more characteristic than the others: traces of use (Fig. 5). By shape, two are rectangular and tapered, while one just rectangular. Two of them are complete items and one is fragmentary. Only one whetstone displays visible traces of use as sharpening stone. The weight of the objects varies between 74 and 252 g. From a chronological point of view, the geological era for two of them is unknown and for the last one it is probably Superior Cretaceous. The type of stone for one is fine sandstone of green schist; the second is calcareous sandstone and the third one is medium smooth sandstone, possibly green schist.



Figure 5. Whetstone from Călugăra (made by Loïc Damelet, MMSH-Aix-en-Provence).

Whetstones with the similar characteristics were found also at Țibrinu⁵¹, Constanța County.

5. Hand mills

Hand mill is the last type of stone objects discovered during this research project. These household tools were discovered in two areas of interest in our project, reaching a total of eight fragments from four different objects: one was discovered in Casa Romană I, while three others have been identified during the excavations in Casa Romană II, both buildings located in the area of the former Greek necropolis of Orgame (Fig. 6).

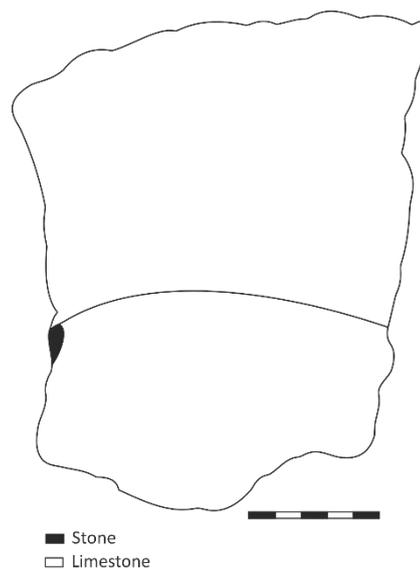


Figure 6. Drawing of a hand mill fragment.

⁴⁹ In Bulgaria, Cherna village, Thracian necropolis, dated between 7th–8th centuries BC. (Vasilchin 2003, pl. XX, nr. 119).

⁵⁰ Kryjitski, Leipunskaia 2011, p. 132, fig. 106.2.

⁵¹ Irimia 2011. For the rectangular one: Irimia 2011, p. 39, Pl. X/46; XXII/46 – Hallstatt; for the rectangular cone-shaped ones: Irimia 2011, p. 39, Pl. IX/45; Pl. XXII/45 – Hallstatt.

The four hand mills can be divided into three sub-types, according to the shape and two sub-types, according to the material they are made of.

Type I (shape)

I.a. The first sub-type is represented by three fragments of hand mills that come from both houses: one fragment from Casa Romană I and two fragments from Casa Romană II. They are made of the same stone type, defined as coarse calcarenite. Two of these fragments represent a match. This kind of mill has a flat base, a raised rim of 1.5 cm from the edge and measures 7 cm to the curb. The rim gives the depth of the mill, affecting the surface used to grind. The half preserved stood ends in a rest hole. The lithic material from which these items were made can be assigned to the Aptian-Sarmatian geological age.

I.b. This second sub-type is represented by four fragments of hand mill which are connected together, two by two, without the fitting of the groups of two between them. All four are part of the same object, even if there is a difference of level regarding the top side, between the two groups of fragments. The grinder has a flat base and sanded, semicircular edge, polished and partly slightly abrasive. The upper side is abrasive. The rock is not porous. From the edge, it shows a slight inward slope. They are made of a very hard stone, called *anchimetamorphic* that could be identified with microconglomerates of green schist. They are assigned to the Precambrian geological age.

I.c. The third sub-type is represented by one single fragment of hand mill, also made of *anchimetamorphic*. The hand mill has a finished flat base and a partially finished semicircular edge, slightly abrasive. The top has a border which measures a width of between 3 and 4.5 cm. It has a rectangular shape orifice inside, keeping the two sides with a length of 5 cm each.

Type II (raw material)

II.a. The first variant is represented by hand mills of the sub-variant I.a. This is a coarse calcarenite with scallop, snail and pores resulting from the dissolution of organisms. This type of stone can be found in southern Dobrudja, more exactly south of the Capidava-Ovidiu line.

II.b. The second variant is represented by hand mills of the sub-variants I.b and I.c., made of *anchimetamorphic*. This material comes from the area limited by Peceneaga and Baia, in Tulcea County, to the north, and Histria to the south, an area where the green schists can be found.

I could not find analogies for these objects for the moment. In all cases of hand mill discoveries and mentions, even if they are complete or fragmented, they are only noted without presenting any feature. However, we can draw some summary conclusions. Thus, hand mills type I.-a. originate probably from a remote area, but from the same province which confirms, once again, that the millstones were an important product of quarrying, being

transported from long distances, even longer than today. The hand mills of type I.b-c might come from the immediate area of Cape Dolojman which indicates that, leaving aside the existence of quarries in the area, they were manufacturing such objects. Or, given the fact that "Casa Romană II" is considered to have been also used as a workshop, and taking into account the number of tools discovered there, I suggest that some of the mills were also manufactured on site. Moreover, given the fact that two of the types are made of the same type of stone, this could be a possible argument for our hypothesis, despite the fact that the pieces do not show the same degree of manufacture.

CONCLUSIONS

These types of materials have long been ignored by researchers, even though they are part of the elements that help paint the daily life in ancient times. In the case of the stone projectiles, their study can lead to information on ancient warfare, from the type of assault machines, to the procurement of the ammunition. As for the household items, a detailed study could provide new insight on local production and commerce, once the source of the raw materials is determined. The ongoing study of the stone objects discovered in the territory of Argamum intends to answer some of these questions. So far, apart from establishing a typology of the objects, their study revealed the existence of a local manufacture and a preference for certain shapes. Furthermore, establishing the source of the stone will enable new theories regarding its exploitation in ancient times, as well as comparisons regarding the use and manufacture of such objects in the neighbouring sites.

REFERENCES

- Amon 2004 – L. D. Amon, *Armamentul și echipamentul armatei romane din Dacia sud-carpatică*, Craiova, 2004.
- Baatz 1978 – D. Baatz, *Recent Finds of Ancient Artillery*, *Britannia* 9, p. 1–17.
- Baralis, Lungu 2015 – A. Baralis, V. Lungu, *Stratégies coloniales et réseaux d'occupation spatiale gètes sur le littoral de la Dobroudja du Nord: les acquis du Programme ANR Pont-Euxin*, in: G. R. Tsetsckhadze, A. Avram, J. Hargrave (eds.), *The Danubian Lands between the Black, Aegean and Adriatic Seas (7th Century BC – 10th Century AD). Proceedings of the Fifth International Congress on Black Sea Antiquities (Belgrade – 17-21 September 2013)*, Oxford, 2015, p. 371-386.
- Bogdanović 2013 – I. Bogdanović, *Roman stone and clay shot from the Viminacium amphitheatre*, *Proceedings of the XVIIth Roman Military Equipment Conference Weapons and Military Equipment in Funerary Context, Zagreb 2010, 24th–27th May, Zagreb*, 2010, p. 393–411.
- Bondoc 2007 – D. Bondoc, *Some stone projectiles from the civil settlement at Sucidava*, in: L. F. Vagalinski (ed.), *The Lower Danube in Antiquity*, Sofia, p. 247–256.
- Bondoc, Gudea 2009 – D. Bondoc, N. Gudea, *Castrul roman de la Răcari. Încercare de monografie*, Cluj-Napoca, 2009.

- Campbell 2003 – D. B. Campbell, *The Roman Siege of Burnswark*, *Britannia* 34, p. 19–33.
- Campbell 2011 – D. B. Campbell, *Ancient catapults. Some Hypotheses Reexamined*, *Hesperia* 80, p. 677–700.
- Chirilă et alii 1970 – E. Chirilă, L. Cubes, L. Chifor, S. Dănilă, N. Gudea, O. Lakó, *Tezaur monetare din nordul Transilvaniei, sec. XVI-XVIII*, Zalău.
- Coja 2005 – M. Coja, *Orgame/Argamum I. Cercetările dintre anii 1975–1985. Capitol dintr-o monografie arheologică inedită* (edited by M. Mănucu-Adameşteanu), Bucureşti–Tulcea, 2005.
- Davidescu 1989 – M. Davidescu, *Cetatea romană de la Hinova*, Bucureşti, 1989.
- Grimal 1973 – P. Grimal, *Civilizația romană*, vol. 1, Bucureşti, 1973.
- Gudea et alii 1972 – N. Gudea, E. Chirilă, V. Lucăcel, C. Pop, *Castrul roman de la Buciumi. Contribuții la cercetarea limesului Daciei Porolissensis*, Cluj-Napoca, 1972.
- Gudea 1979 – N. Gudea, *Castrul roman de la Inlăceni*, *ActaMP* 3, 1979, p. 149–273.
- Gudea 1980 – N. Gudea, *Castrul Roman de la Brețcu. Încercare de monografie/Das Römerkastell von Brețcu, Ein Monographie Versuch*, *ActaMP* 4, 1980, p. 255–332.
- Gudea 1989 – N. Gudea, *Porolissum. Un complex arheologic daco-roman la marginea de nord a Imperiului Roman*, *ActaMP* 13, 1989, p. 1–1178.
- Gudea 2008 – N. Gudea, *Castrul roman de la Feldioara. Încercare de monografie arheologică/Das Römerkastell von Feldioara. Versuch einer archäologischen Monographie*, Cluj-Napoca, 2008.
- Gudea 2009 – N. Gudea, *Funditores und Ballistarii, Eine Fallstudie zur Dacia Porolissensis*, in: A. W. Busch, H.-J. Schalles (eds.), *Waffen in Aktion. Akten der 16. Internationalen Roman Military Equipment Conference (ROMECC)*, Xanten, 13–16. Juni 2007, *Xantener Berichte* 16, Mainz am Rhein, 2009, p. 223–236.
- Iaroslavschi, Bozu 2003 – E. Iaroslavschi, O. Bozu, *Raport preliminar privind principalele rezultate ale cercetărilor arheologice din castrul de pământ de pe Dealul Chilii (comuna Varadia, județul Caraș-Severin)*, *Banatica* 16/1, 2003, p. 295–300.
- Irimia 2011 – M. Irimia, *Depozitul de piese de fabricație de la Tîbrinu (com. Mircea Vodă, jud. Constanța), 1997–1998*, *Pontica* 44, 2011, p. 23–68.
- James 1990 – S. James, *The Arms and Armour from Dura-Europos, Syria*, London, 1990.
- Johnson 1983 – A. Johnson, *Roman forts*, London, 1983.
- Kryjitski, Leipunskaia 2011 – S. D. Kryjitski, A. A. Leipunskaia, *Olbia. Fouilles, Histoire, Culture. Un état antique sur le littoral septentrional de la mer Noire (second quart du VIe siècle avant notre ère-troisième quart du IVe siècle de notre ère)*, Nancy-Paris, 2011.
- Lemke 2009 – M. Lemke, *Stone projectiles from Novae*, *Novensia* 20, 2009, p. 209–219.
- Lemke 2013 – M. Lemke, *Stone projectiles discovered in the Castra Legionis Novae near Svishrov (BG)*, in: *Weapons and military equipment in a funerary context: proceedings of the XVIIth Roman Military Equipment Conference*, Zagreb, 2013, p. 357–364.
- Opaïț et alii 1991 – A. Opaïț, M. Zahariade, Gh. Poenaru-Bordea, C. Opaïț, *Fortificația și așezarea romană tîrzie de la Babadag-Topraichioi*, *Peuce* 10, 1991, p. 183–310.
- Macrea et alii 1993 – M. Macrea, N. Gudea, I. Moțu, *Praetorium. Castrul și așezarea romană de la Mehadia*, București, 1993.
- Matei 1985 – C. Matei, *Cercetări periegetice pe malul de sud al lacului Tașaul*, *Pontica* 18, 1985, p. 125–139.
- Matei, Bajusz 1997 – A. Matei, I. Bajusz, *Castrul roman de la Romita-Certiae*, Zalău, 1997.
- Mihail, Ștefan 2014 – F. Mihail, C. E. Ștefan, *Obiecte din piatră și materii dure animale descoperite în tell-ul de la Baia, jud. Tulcea*, in: C. Micu, C. E. Ștefan, S.-C. Ailincăi (eds.), *Studii privind preistoria sud-estului Europei. Volum dedicat memoriei lui Mihai Șimon*, Brăila, 2014, p. 263–298.
- Nankov 2008 – E. Nankov, *The fortifications of the early Hellenistic Thracian city of Seuthopolis: Breaking the mold*, *ArchBulg* 12, 3, 2008, p. 15–56.
- Opreanu et alii 2013 – C. H. Opreanu, V.-A. Lăzărescu, D. Ștefan, *Noi cercetări la Porolissum*, *AnB S.N.* 21, 2013, p. 83–106.
- Papasima 2006 – T. Papasima, *Cercetările arheologice de la Chirnojeni*, *Pontica* 39, 2006, p. 321–333.
- Pollastrini 2012 – A. M. Pollastrini, *Studio preliminare sui proiettili di ballista da Nelson Island–Abuqir–Egitto*, in: G. Guarducci, S. Valentini (eds.), *Atti del IV Convegno Nazionale dei Giovani Archeologi "Il futuro nell'Archeologia. Il Contributo dei Giovani Ricercatori"*, *Tuscania (VT), 12–15 Maggio 2011*, Rome, 2012, p. 89–96.
- Protase et alii 2008 – D. Protase, N. Gudea, R. Ardevan, *Din istoria militară a Daciei romane. Castrul roman de interior de la Gherla/Aus der Militärgeschichte des Römischen Dakien. Das Römische Binnenkastell von Gherla*, Timișoara, 2008.
- Rațiu, Stoian 2014 – A. Rațiu, G. I. Stoian, *Proiectile pentru balistă și praștie de la Capidava*, *SCIVA*, 65, 3–4, 2014, p. 319–335.
- Schiefsky 2005 – M. J. Schiefsky, *Technical terminology in Greco-Roman treatises on artillery construction*, in: T. Fögen (ed.), *Antike Fachtexte/Ancient Technical Texts*, New York, 2005, p. 253–270.
- Vasilchin 2003 – I. Vasilchin, *A biritual Thracian necropolis at the village of Cherna, Dobritch district*, *BSA Varna* 34–35 (49-50, 1998-1999), p. 5–102.
- Vlădescu 1975 – C. M. Vlădescu, *Observații asupra tipologiei armamentului roman din Dacia Inferior*, *SMMIM* 7–8, 1975, p. 23–51.
- Vlădescu 1983 – C. M. Vlădescu, *Armata romană în Dacia Inferior*, București, 1983.
- Wilkins 2003 – A. Wilkins, *Roman artillery*, Risborough, 2003.
- Zăgreanu 2013 – R. Zăgreanu, *Proiectile de piatră din castrul roman de la Arcobadara*, *RevBistr* 27, 2013, p. 63–71.

ABRÉVIATIONS / ABBREVIATIONS / ABREVIERI

- AA – Archäologischer Anzeiger. Deutsches Archäologisches Institut, Darmstadt, München, Tübingen–Berlin
Acta MN – Acta Musei Napocensis Cluj-Napoca
ActaMP – Acta Musei Porolissensis, Zalău
AJA – American Journal of Archaeology, Boston
Altertum – Das Altertum, Deutsche Akademie der Wissenschaften zu Berlin Sektion für Altertumswissenschaft
Akademie der Wissenschaften der DDR Zentralinstitut für Alte Geschichte und Archäologie, Berlin
AnB – Analele Banatului, Muzeul Banatului, Timișoara
Antiquity – Antiquity. A Review of World Archaeology, Durham, UK
ArchBulg – Archaeologia Bulgarica, Sofia
AIGR – Anuarul Institutului Geologic al României, București
AIIA Cluj – Anuarul Institutului de Istorie și Arheologie, Cluj-Napoca
AM – Mitteilungen des Deutschen Archäologischen Instituts, Athenische Abteilung
Apulum – Acta Musei Apulensis. Muzeul Național al Unirii, Alba Iulia
ArchKorr – Archäologisches Korrespondenzblatt, Mainz
Argesis – Argesis. Muzeul Județean Argeș. Pitești
ArhMold – Arheologia Moldovei, Iași
BA – Biblioteca de Arheologie, București
BAI – Bibliotheca Archaeologica Iassiensis, Iași
BARIntSer – British Archaeological Reports. International Series, Oxford
BCȘS – Buletinul Cercurilor Științifice Studentești. Arheologie – Istorie – Muzeologie, Alba-Iulia
BICS – Bulletin of the Institute of Classical Studies of the University of London, London
Bjb – Bonner Jahrbücher des Rheinischen Landesmuseums in Bonn, Bonn
BMA – Bibliotheca Memoriae Antiquitatis, Piatra-Neamț
BMJT – Buletinul Muzeului Județean Teleorman, Alexandria
BMMN – Buletinul Muzeului Militar Național, București
BMTA Giurgiu – Buletinul Muzeului „Teohari Antonescu”, Giurgiu
BPS – Baltic-Pontic Studies, Poznań
Britannia – Britannia. A Journal of Roman-British and Kindred Studies. Society for the Promotion of Roman Studies, Cambridge
BSA – British School at Athens, Athens
BSPF – Bulletin de la Société Préhistorique Française, Paris
CA – Cercetări Arheologice, București
Carpica – Carpica. Complexul Muzeal „Iulian Antonescu” Bacău, Bacău
Carst – Cercetare, explorare, Actualitatea speo, Recenzii, editorial, Știință, Tehnică, Cluj-Napoca
CCA – Cronica Cercetărilor Arheologice din România, București
CCDJ – Cultură și Civilizație la Dunărea de Jos, Călărași
CEFR – Collection de l'École Française de Rome
CercIst – Cercetări Istorice, Iași
Dacia – Dacia (Nouvelle Série). Revue d'archéologie et d'histoire ancienne. Académie Roumaine. Institut d'archéologie « V. Pârvan », Bucarest
Documenta Praehistorica – Documenta Praehistorica, University of Ljubljana, Faculty of Arts, Department of Archaeology
EphemNap – Ephemeris Napocensis. Academia Română, Institutul de Arheologie și Istoria Artei, Cluj-Napoca
ERAUL – Études et Recherches archéologiques de l'Université de Liège
ÉtThas – Études thasiennes, École Française d'Athènes, Athènes-Paris
EurAnt – Eurasia Antiqua. Deutsche Archäologisches Institut, Berlin
GodišnikSofia – Godišnik na Sofijaskija Universitet „Sv. Kliment Ochridski”, Istoriceskij fakultet, Sofia
Hesperia – Hesperia. Journal of the American School of Classical Studies at Athens, Cambridge
IFAO – Institut français d'archéologie orientale, le Caire
JAS – Journal of Archaeological Science

Kernos – Revue internationale et pluridisciplinaire de religion grecque antique, Liège
Marisia – Marisia. Studii și materiale. Arheologie – Istorie – Etnografie, Târgu Mureș
MemAnt – Memoria Antiquitatis, Piatra Neamț
MCA – Materiale și Cercetări Arheologice, București
OLBA – Mersin University Publications of the Research Center of Cilician Archaeology, Mersin, Turkey
Paléo – Paléo. Revue d'Archéologie Préhistorique, Les Eyzies, France
Peuce – Peuce, Studii și cercetări de istorie și arheologie, Institutul de Cercetări Eco-Muzeale, Tulcea
Pontica – Pontica. Studii și materiale de istorie, arheologie și muzeografie, Muzeul de Istorie Națională și Arheologie Constanța
Quartär – International Yearbook for Ice Age and Stone Age Research
RCRFAcra– Rei Cretariae Romanae Fautorum
RE – Realenzyklopädie: Paulys realenzyklopädie der klassischen Altertumswissenschafts, Stuttgart, 1893
RI – Revista Istorică. Academia Română, Institutul de Istorie „Nicolae Iorga”, București
RESEE – Revue des Études Sud-Est Européennes. Academia Română, Institutul de Studii Sud-Est Europeene, București
RevBistr – Revista Bistriței. Complexul Muzeal Bistrița-Năsăud, Bistrița
SAA – Studia Antiqua et Archaeologica, Iași
SCIV(A) – Studii și Cercetări de Istorie Veche (și Arheologie), București
SlovArch – Slovenská Archeológia, Nitra
SMMIM – Studii și Materiale de Muzeografie și Istorie Militară, București
SP – Studii de Preistorie, București
Suceava – Suceava. Anuarul Muzeului Bucovinei, Suceava
Th-D – Thraco-Dacica, București
Transylvanian Review – Transylvanian Review. Centrul de Studii Transilvane, Cluj-Napoca
Tyragetia – Tyragetia. Anuarul Muzeului Național de Istorie a Moldovei, Chișinău
VT – Vetus Testamentum