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The Archaeology of Games. Playing with Knucklebones in the Early Chalcolithic of the Balkans

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Front cover: White painted anthropomorphic pot from the Neolithic site of Mursalevo, Southwest Bulgaria (early 6th mill. BC). © Mursalevo Salvage Excavation Project.

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EDITORIAL

This collection of essays honors Professor Vassil Nikolov on the occasion of his sixty-fifth birthday. A distinguished scholar of southeast European prehistoric archaeology, Vassil has been with the National Institute of Archaeology and Museum of the Bulgarian Academy of Sciences since 1984, after successfully completing his PhD thesis on *The Early Neolithic Pottery Decoration in Bulgaria*, but not before he spent some unemployed time due to his politically incorrect family background. Throughout the years, Vassil went up the steps of the academic career, defended a second doctorate (DSc), *Studies on the Neolithic Pottery in Thrace. The Karanovo II–III, III and III–IV Ceramic Assemblages in Their Northwest Anatolian and Southeast European Context*, in 1998, held the positions of the Director of Museums and Art Galleries Directorate of the Bulgarian Ministry of Culture (1991), Head of the Prehistory Department (1989–1999), Deputy Director (1999–2003) and Director (2003–2007) of the National Institute of Archaeology and Museum, Chairman of the Academic Board of the Institute (2003–2015), Corresponding Member and Member of the Executive Board of the Bulgarian Academy of Sciences (since 2013), all the time teaching prehistoric archaeology at all major Bulgarian universities and widely lecturing abroad, directing national and international excavation and research projects, editing journals and collected volumes, organizing conferences and exhibitions, and even hosting a weekly TV show about Bulgarian archaeological heritage. He has been awarded numerous fellowships and honors, notably Alexander von Humboldt Research Fellowships (first in 1991–1993) and the Order of Merit of the Federal Republic of Germany (2009).

The papers in the volume are contributed by Vassil's friends and colleagues, former and present students, and reflect his wide range of research interests, from the Paleolithic to the Iron Age, from Central Europe to the Near East and beyond. His fascinating way of describing the past to undergraduate students or academia, common public or visiting heads of state, has won him many admirers and friends. His latest excavation projects, at the Early Neolithic site of Slatina-Sofia (where in 2016 he revealed an extraordinarily large house of the early sixth millennium BC) and the Salt-Producing Center of Provadia-Solnitsata (where the last decade has witnessed the uncovering of an amazingly well preserved stone fort and salt-production facilities of the fifth millennium BC), continue to excite the archaeological establishment and the public alike with a wealth of spectacular discoveries that immensely influence current archaeological knowledge and interpretation.

It is with great pleasure that we offer this Festschrift to Vassil Nikolov as a mark of our appreciation to his many contributions to the prehistoric archaeology of Southeast Europe, congratulating him most warmly for his sixty-fifth birthday, and wishing him many more years of good health and productive scholarship!

Ad multos annos, Magister carissime!

Krum Bacvarov and Ralf Gleser
Sofia and Münster, October 2016

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THE ARCHAEOLOGY OF GAMES. PLAYING WITH KNUCKLEBONES IN THE EARLY CHALCOLITHIC OF THE BALKANS

Isabelle Sidéra and Andreea Vornicu

Abstract

We will address here the subject of prehistoric games by looking with fresh eyes at knucklebone collections from Chalcolithic sites located in modern-day Bulgaria and Romania, with special attention to Drama-Merdžumekia – Karanovo V/Maritsa [1] – Târgu Frumos-Baza Pătule and Isaiia-Balta Popii – Precucuteni culture [2]. Gaming activities did not always leave identifiable traces in the archaeological record. Children's toys appear occasionally among very old remains, as it is the case of the bone anthropomorphic figurines of the late Linear Pottery culture (5100 BC), for which a function as dolls for girls can be firmly supported [3]. But these are only isolated cases. The great importance of the Drama Merdžumekia assemblage and of other assemblages from neighboring contemporary cultures, resides in the fact that they contain hundreds of game pieces, which provide the means to understand the issue of games in their social aspects, since it is observable. On these sites, games appear with frequency and intensity, as a common practice. Thereby, we push back the prehistory of games to the moment it becomes systematic, at the beginning of the 5th millennium BC, with Karanovo V/Maritsa [4], and Precucuteni in the Eastern part of Romania [5].

In honor of Vassil Nikolov, we choose to debate a topic that integrates a part of the significant collection of almost 2000 animal hard tissue objects from the site of Drama, which was partly published in previous studies[6]. The reason for this choice lies in the almost legendary nature of the site, which brought together researchers from all of Europe and beyond, for a period of over thirty years during the archaeological investigations in the micro-region of Drama. It is during the campaigns of excavations carried out between 1994 and 2001 that we have often rubbed shoulders with Vassil Nikolov. In remembrance of those campaigns, we dedicate this text to him.

BRIEF SNAPSHOT OF KNUCKLEBONES IN ANTIQUITY

The knucklebones are components of the tarsal bones. They form a compact bone roughly rectangular, with morphologically differentiated sides (fig. 1). In Greco-Roman Antiquity, knucklebones were used mainly as game pieces, bringing together various players without age or gender limit. "*The popularity of the game of knucklebones in ancient Greece and the importance of the role it played in the everyday life of Greeks are attested by texts, paintings, and plastic art of all types and standards*" [7].

During play, these game pieces were thrown and different names and values were attributed to each side of the bone. The combination of sides facing up when they fell formed different figures to which names were given. Most of the game pieces are natural knucklebones from various sized species and are more or less modified. They display diverse volumes, forms and materials. If we accept the assemblage of 10,000 pieces identified by F. Poplin within the 24,000 knucklebones found in the Corycian Cave (Greece), most of them came from sheep and goat and to a smaller extent from cattle, pig, red deer, fallow deer, and roe deer[8]. Some of them are drilled, or are flattened on their sides. Others are inscribed, covered or filled with gilding metal or lead, as showed by the overabundant collection of Coycian Cave, remarkably studied by Pierre

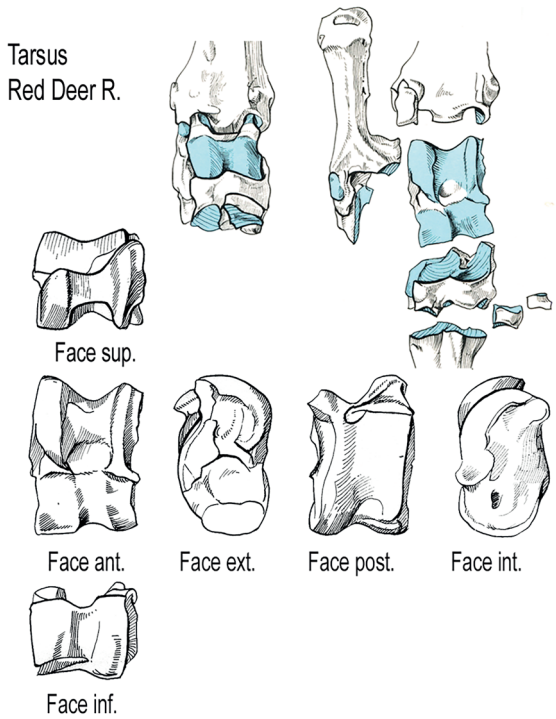


Fig. 1: Anatomical aspects of knucklebones.

1 Sidéra 1998.
2 Vornicu 2013.
3 De Maret / Sidéra 2015.
4 Sidéra 1998.
5 Vornicu 2013.
6 Sidéra 1998; 2012.
7 Armandry 1984, 376.
8 Poplin 1984, 383.

Amandry[9]. There are also imitations of knucklebones, of which some are faithful replicas made of marble, limestone or even bronze[10]. The use of knucklebones as game pieces or dices goes beyond the Greco-Roman world. Thus, the Tutankhamun sepulcher from Egypt contains eight imitations of knucklebones, many of which are made of resin[11].

It should be added that in Antiquity knucklebones are present in all environments: private houses, public buildings, sanctuaries and graves[12].

In Southeast Europe and Asia, the game of Knucklebone has survived until today. It is called *aşık* in Turkey [13] and *Mōzōn Šagaj* in Mongolia[14].

In Roman and Greek Antiquity, but also in Mongolia, knucklebones were also used in divination[15], showing the shift from gaming towards magic, which commonly occurs in traditional societies. The same object thus serves several simultaneous or successive functions[16]. In his work, *Lives of the Twelve Caesars*, Suetonius reports that Emperor Tiberius, wanting to know the future, threw several golden knucklebones into a spring and interpreted the combination of knucklebones in the water to his advantage[17].

The divinatory function of knucklebones is well attested by the *astragaloi* oracle tradition, which was fashionable during the 2nd and 3rd centuries[18]. People turned to oracles in order to consult the gods in the pertinence of their future actions. The answers came from the numerical combination obtained by throwing five or seven knucklebones (the sides of the bone were numbered 1, 3, 4, 6) to which corresponded oracular answers[19].

KNUCKLEBONES IN PREHISTORY

Knucklebones and knucklebone imitations are present in the material culture of Neolithic and Chalcolithic sites from the Near East to Central Europe. In the current state of research, it appears that they were not used within the Neolithic cultures of Central and West Europe. The earliest knucklebones date to the middle of the 7th millennium and were found in the site of Çatal Höyük, in Anatolia[20]. In the 6th millennium BC, in the Starčevo Criş, Dudeşti and Vinča cultures from the western part of Balkans and Romania, this type of objects appears rarely and in isolation. Their presence seems to increase from the 5th millennium in Precucuteni and Gumelniţa contexts in Romania, and Karanovo V-Maritza, Karanovo VI-Gumelniţa in Bulgaria.

Recent studies have shown that the functions of knucklebones in prehistory were not equivalent. But, in order to reveal this variability, they must become the subject of detailed studies carried out with analytical tools specific to the functional analysis: the study of wear and its distribution on objects and experimentation[21].

Three hypotheses regarding the use of knucklebones in prehistory have previously been proposed. The first, based exclusively on ethnographic or historical analogy, supports the use of knucklebones in divination or as game pieces[22]. The other two, based on use-wear analysis and experimentation, propose a material function for Caprid knucklebones, as tools associated with activities such as pottery shaping[23] or hide working[24].

We believe that only a holistic perspective, encompassing the cultural and archaeological context, the morphological and technological variations, as well as the wear traces for each individual object can shed light on the use of knucklebones. More precisely, the study of technological transformations combined with use-wear analysis enables the gathering of objective and reliable data on the physical manner in which the knucklebones performed their function. As for the analysis of the archaeological context, it offers an understanding of the environment in which knucklebones functioned: domestic, funeral, technical, etc. The ethnographic and historical data provide interpretative models able to reveal the meaning and symbolic content associated with this type of object. Finally, we insist on the importance of studying each individual object, since it is possible that objects of the same type perform different functions.

RAW MATERIAL AND MORPHOLOGY

Objects made of osseous materials are often obtained by the transformation of raw material through a technical process that comprises blank production (*débitage*) and shaping (*façonnage*).

Sometimes, the raw material is little or not at all transformed. In this case, the product is the result of a direct transfer from the anatomy to the object, as François Poplin has beautifully described: "[...] starting from the animal, in front of the preoccupations of those who have in mind Civilization" [25]. These "natural items" occur in all Neo-

9 Armandry 1984.
10 Armandry 1984.
11 Tait 1982, 38; Bellessort 2016.
12 Armandry 1984; Carè 2009; De Grossi Mazzorin / Minniti 2009; De Grossi Mazzorin 2014.
13 Mellaart 1964, 103.
14 Tatár 1972.
15 Armandry 1984.
16 Lusardy 2006; De Maret / Sidéra 2015.
17 Nikulina / Schmolcke 2008.
18 Cuvigny 2010, 267.
19 Cuvigny 2010, 267.
20 Russell / Griffitts 2013, 295–296.
21 Legrand / Sidéra 2007.
22 Gilmour 1997; Bejenaru et al. 2010; McCarty 2013; Kogălniceanu et al. 2014.
23 Choyke / Bartosiewicz 2009; Meier 2013; Mărgărit 2015.
24 Cavaleriu / Bejenaru, 2009.
25 Poplin 1984, 381.

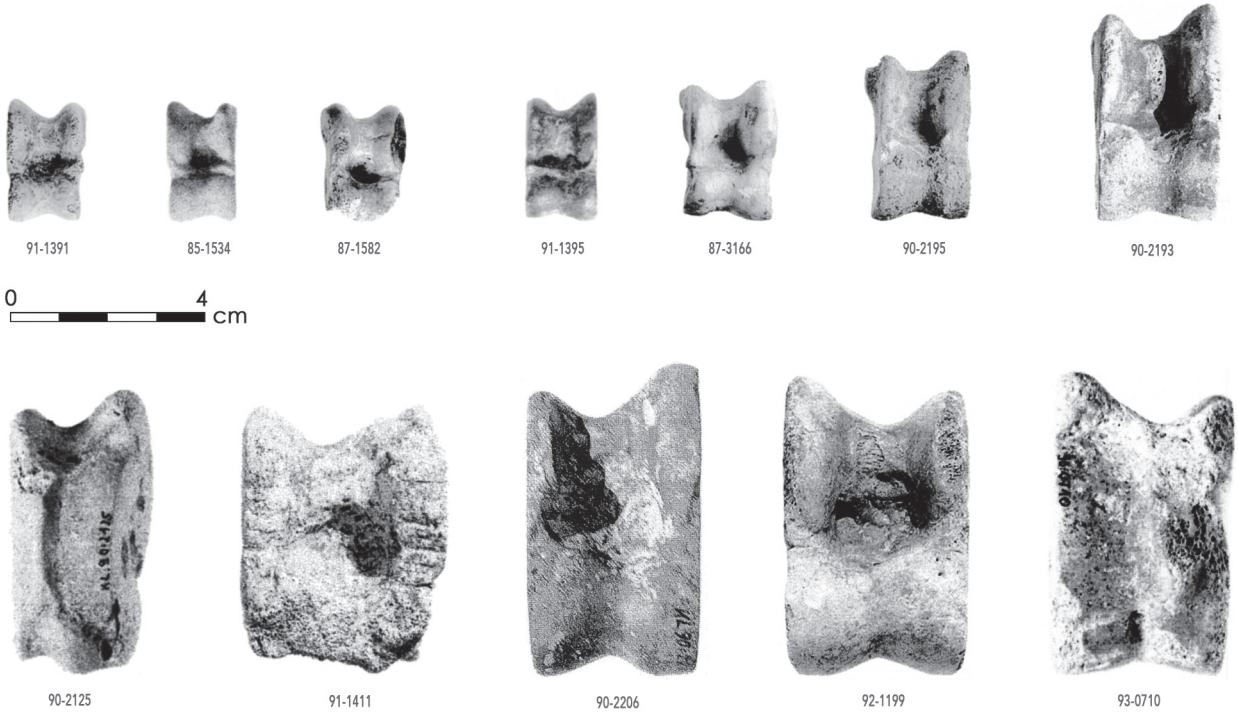


Fig. 2: View of the anterior face of Drama's knucklebones. Num. 91-1391, 85-1534, 87-1582, 91-1395, 87-3166 sheep or goat. Num. 90-2195 roe deer. Num. 90-2193 red deer. Num. 91-1411, 90-2206, 92-1199, 93-0710 cattle. Num. 90-2125 boar.

lithic and Chalcolithic industries, but they are represented in small proportions.

However, the assemblages we are discussing here are of great importance within the cultural context to which they belong. Their number is extraordinary: 291 of 1897 objects made of osseous materials at Drama-*Merdžumekia* (Bulgaria), 45 of 318 at Târgu Frumos and six of 34 at Isaiia (Romania).

As regards the raw material, three categories were identified within the knucklebone collections. The heavy and massive specimens, weighting between 42 to 121 grams, come from large ruminants like the domestic cattle and aurochs (fig. 2 num. 91-1411, 90-2206, 92-1199, 93-0710). Smaller specimens, of average size and lower weight, come from red deer (fig. 2 num. 90-2193), fallow deer (fig. 3 num. 87-3156), boar, and domestic pig (fig. 2 num. 90-2125). These species are rare. The swine bones weigh between nine to eleven grams, while those of fallow deer weigh 26 grams (the specimens from red deer were much deteriorated, thus they were not weighed). Finally, there are the small, very lightweight knucklebones, weighing between three to nine grams – which come from small ruminants i.e., sheep, goat, and rarely roe deer (fig. 2 num. 91-1391, 85-1534, 87-1582, 91-1395, 87-3166).

The sites of Drama, Târgu Frumos and Isaiia share a common preference in terms of raw material exploitation. The heavy, massive knucklebones from large ruminants are favored over the small specimens of sheep and goat (tab. 1). Finally, at the two sites from Romania, the presence of small ruminant knucklebones is insignificant. This pattern seems to be specific for the early Chalcolithic of the East Carpathian region – Precucuteni and is quite unusual considering the high use of small ruminant knucklebones in the previous and later periods.

Excluding the unworked knucklebones, there are three main categories of modifications on knucklebones that occur generally in Neolithic and Chalcolithic sites:

1) Flattening is the most common modification found on knucklebones. It may be located on the anterior side (1A), the flanks of the bone – medial and/or lateral side (1B), the flanks and the front side (1C) or on all four sides (1D). The flanks are not always flattened symmetrically, one of them being flatter than the other. Sometimes even a single side is flattened. Similarly, the extent of the flattened area varies. It may affect the entire face or it may be located in a defined area (fig. 3–4).
2) Drilling – which may be either simple or multiple. Several situations are possible, such as drilling of the proximal part (2A), opposite drillings, one on the proximal and the other on the distal part (2B), and drilling on the proximal or distal part (2C). This technique is always associated with flattening. Drilled knucklebones are quite common and were found from Middle Neolithic to Chalcolithic sites from Serbia and Romania[26].

26 Vitezović 2011; 2013; Mărgărit et al. 2014; Kogălniceanu et al. 2014.

3) Incising is very rare and always associated with flattening. Incisions appear like short lines made with a flint blade, arranged in parallel and following the bone's contour. The incisions are located on the lateral or medial face of the knucklebones. They occur in several knucklebone assemblages from Romania[27].

At Drama, the transformations of knucklebones are mainly of type 1B: flattening on the flanks, regardless of the species (231 from 291 objects) (fig. 3–4). Unworked knucklebones are rare (21 pieces). The drilled Type 1C (13 objects) and 2A are marginal (four objects). The flattening of the anterior side is rare. Among the curiosities, the swine knucklebones, and sometimes also goat and bovine, are strongly abraded obliquely (fig. 2 num. 90-2125).

The large knucklebones from Precucuteni collections are always flattened on the anterior side (type 1A). Other types of transformation, such as perforation or incision, are lacking. This seems to be a pattern specific to Precucuteni collections, which will be maintained until the beginning of the Cucuteni culture, when the patterns of transformation will diversify, and a shift to caprid knucklebone as the main raw material type will occur.

Finally, we note that a surface treatment in order to color or perhaps dry the material [28] was applied on most of the Drama objects (239 of 291). The colors range from dark brown to a set of mixed hues of yellowish and brown. All have a shiny appearance. Some of the knucklebones from the site of Isaiia display colors varying from dark brown to grey or black, as a result of burning along with the dwelling in which they were deposited.

Species	Qty. Drama	Qty. Târgu Frumos	Qty. Isaiia
Cattle	144	43	6
Red deer	7	1	-
Fallow deer	18	-	-
Caprids	80	1	-
Roe deer	14	-	-
Swine	21	-	-
Undetermined ruminants	3	-	-
Undetermined large ruminants	2	-	-
Undetermined small ruminants	2	-	-
Undetermined	1	-	-
Total	292	45	6

Tab. 1: Distribution by species of the knucklebones from Drama, Târgu Frumos and Isaiia.

MODUS OPERANDI

The type 1 modification, namely flattening, is the most problematic, since its formation may be the result of three possible actions: 1) shaping, by which was intended to obtain various types of objects; 2) use processes or 3) a combination of shaping and use.

Studies that rely on naked eye observations consider the flattened aspect of the bone surface as an indicator of shaping by abrasion[29]. We do not contest this interpretation, as in Drama, the lateral sides of many knucklebones display very clear traces of fashioning by abrasion (fig. 4 num. 89-1628). However, naked eye observations are not enough to understand the function of these surfaces. It takes a detailed examination using optical instruments to uncover the otherwise invisible traces. This ultimately leads to a better understanding of the manner in which knucklebones were used.

Observations made by means of stereomicroscopy have previously related the flattening of sides to use: knucklebones are tools for ceramic smoothing[30]. Yet, before use, the objects may have undergone shaping, [31] the flattening being in several cases the result of surface preparation by abrasion, which aimed to erase the naturally irregular aspect of the bone[32].

As regards the modifications on the anterior surfaces of knucklebones, the study of Drama, Târgu Frumos and Isaiia assemblages showed that the flattened aspect formed as a result of use[33]. The wear appears as bright polished areas, that vary in extend and degree restricted to four areas on the knucklebone's anterior side (fig. 3; 5). These correspond to the contact points of a knucklebone standing on a flat surface with the anterior side downwards. Despite the flattened aspect of the surface, no striations similar to those caused by shaping were observed. The collections contain knucklebones in different stages of use, providing enough data for the reconstruction of the wear sequences (*chaîne d'usure*). Thus, we observed that the wear evolves differently on the four mentioned areas. Firstly, the high points of the anterior face (1–2 in fig. 6) develop a polished aspect on a small area, which will gradually enlarge and begin to flatten. At this point, a rarely visible polished aspect will appear on the lower areas of the anterior surface (3–4 in fig. 6).

27 Berciu 1956; Cucoş 1999; Beldiman et al. 2012.
28 Sidéra 2000.
29 Vitezović 2011.
30 Meier 2013; Mărgărit 2015.
31 Mărgărit 2015.
32 Sidéra 2012; Vornicu 2015, 201–203.
33 Vornicu 2013, 56–57.

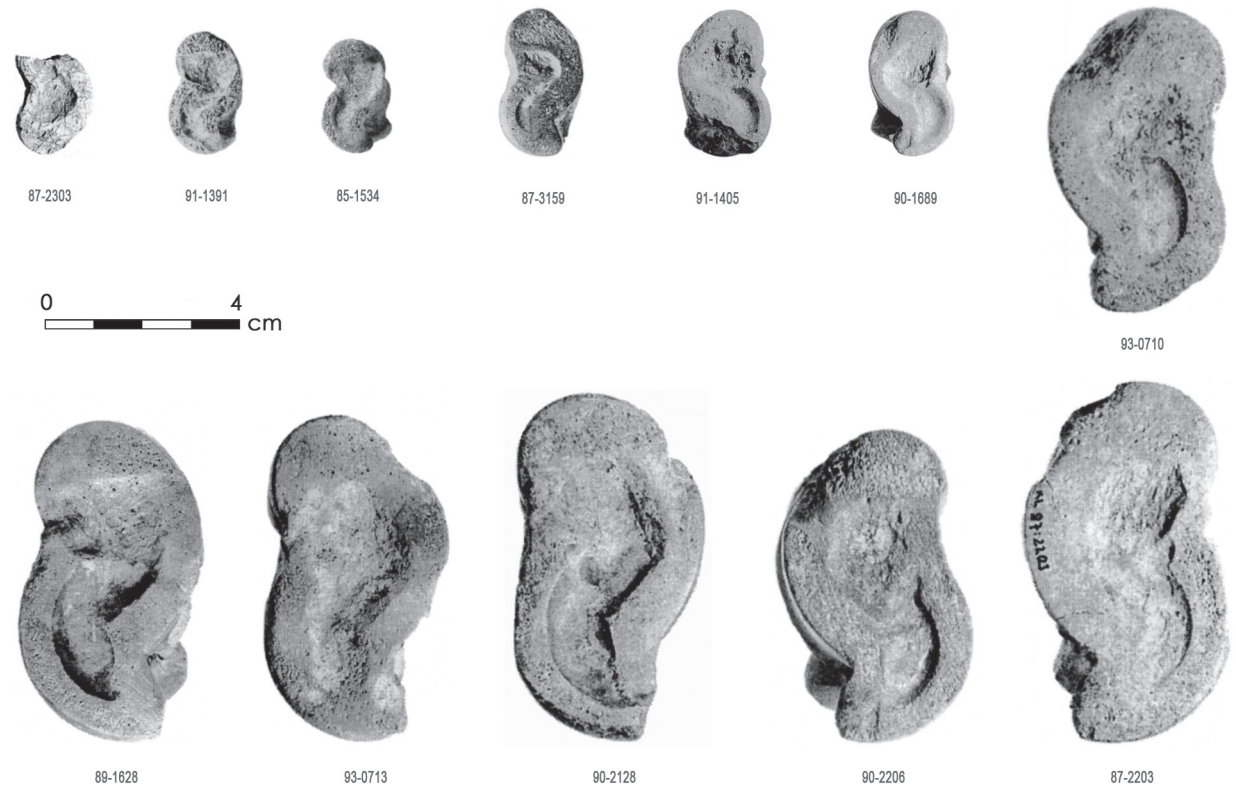


Fig. 3: Modifications of the internal side of Drama's knucklebones. 91-1391, 91-1395, 88-1031 sheep or goat, 87-3156 fallow deer, 90-2193 red deer, 91-1396, 89-1628, 90-2206, 90-2128 cattle.

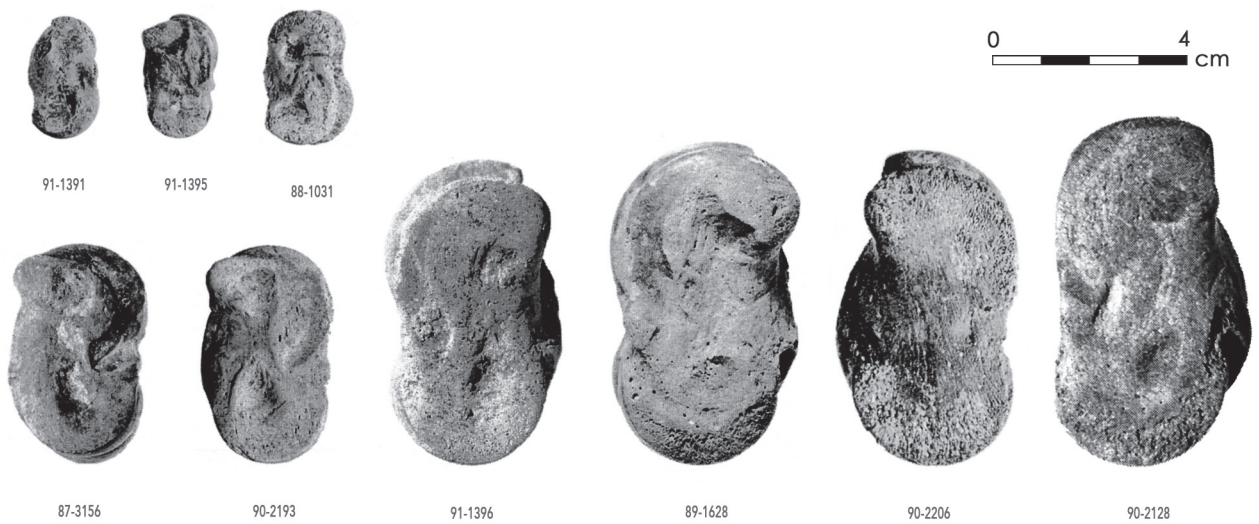


Fig. 4: Modifications of the external side of Drama's knucklebones 87-2303 sheep, goat, roe deer, 91-1391, 85-1534, 91-1405 sheep or goat, 87-3159, 90-1689 roe deer, 93-0710, 90-2206, 87-2203, 89-1628, 93-0713, 90-2128 cattle.

As the wear on areas 1 and 2 increases in size and become more flattened, the other two regions will also begin to develop a flattened aspect. This type of wear development is encountered only when the knucklebone is used as a passive object. This was shown by an experiment that we carried out, in which a small knucklebone was launched on the surface of a dry clay floor, always with the anterior side facing down. The bone's movement was controlled only at the launching point. It took ten minutes for the areas 1 and 2 to gain a flatten appearance, while the areas 3 and 4 had developed only a shiny appearance (fig. 7). This contrasts the pattern resulting when a knucklebone was used as an active object. In this case, when continuous and organized gestures replicated a controlled friction against the same floor, the wear developed uniformly on the four areas from the very first movements. Moreover, after five minutes, not only these four areas were flattened, but the wear extended in other adjacent points (fig. 7).

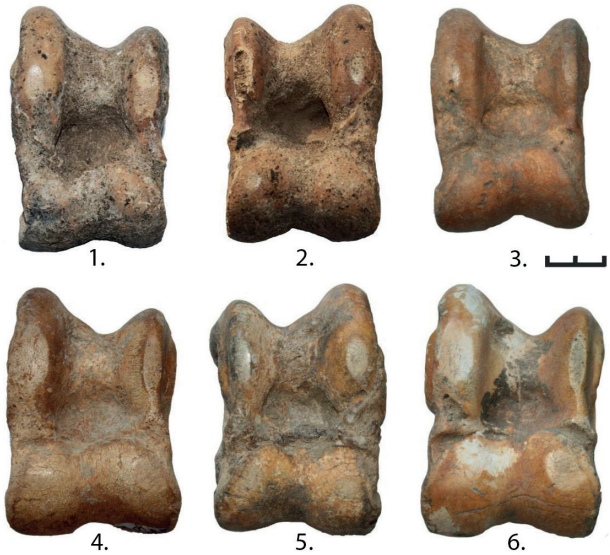
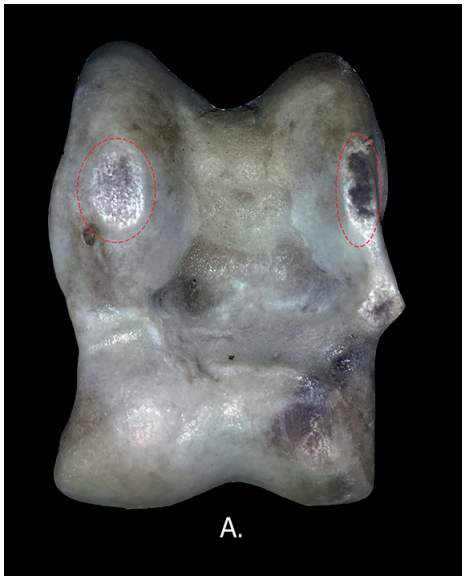


Fig. 5: Knucklebones from the Precuceteni sites of Isaiia-Balta Popii (1-2) and Târgu Frumos-Baza Pătule (3-6) showing different degrees of wear- incipient (2, 3), intermediary (1, 4), and advanced (5, 6).

Fig. 6: The use–wear's distribution and order of appearance (with numbers from 1 to 4) on the anterior side of the knucklebones from Precuceteni culture.



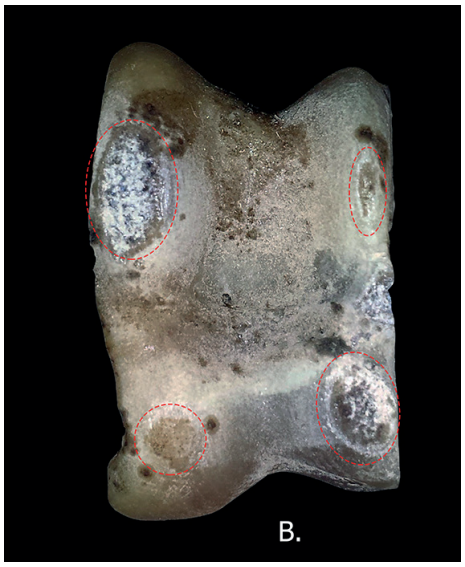


Fig. 7: The use-wear's distribution on two experimental knucklebones- A. used as a passive object on a dry clay floor for ten minutes, B. used as an active object on a dry clay floor for five minutes.

Besides this type of wear, the archaeological specimens display on their posterior, lateral and medial sides patchy bright areas of a varnished aspect and which color differs, with no visible striations (fig. 8). These are obvious traces from handling. Also, there are no clear traces of impact or accidental friction on the edges or surface of knucklebones.

One can infer that in the case of the knucklebones, their use did not involve a gesture of throwing/tossing, but rather by launching or pushing the bone with the anterior side facing down. The great majority of knucklebones from the three sites show an incipient or intermediary wear, indicating that the objects were abandoned after a short or occasional use. From what we can judge from the 37 out 291 Drama's objects with a well-defined wear, other types of wear traces identified on the knucklebones also reflect a passive use. These are traces of impact and accidental friction (e.g., material removal and pitting, sinking and compression, wide and deep striations isolated or organized in small groups) on the edges and on the prominences of the anterior and posterior sides' joints (fig. 2). There are no wear traces that could suggest an active use of the surfaces. Thus, the large majority of knucklebones were not tools. This applies both to objects dated from Karanovo V, VI

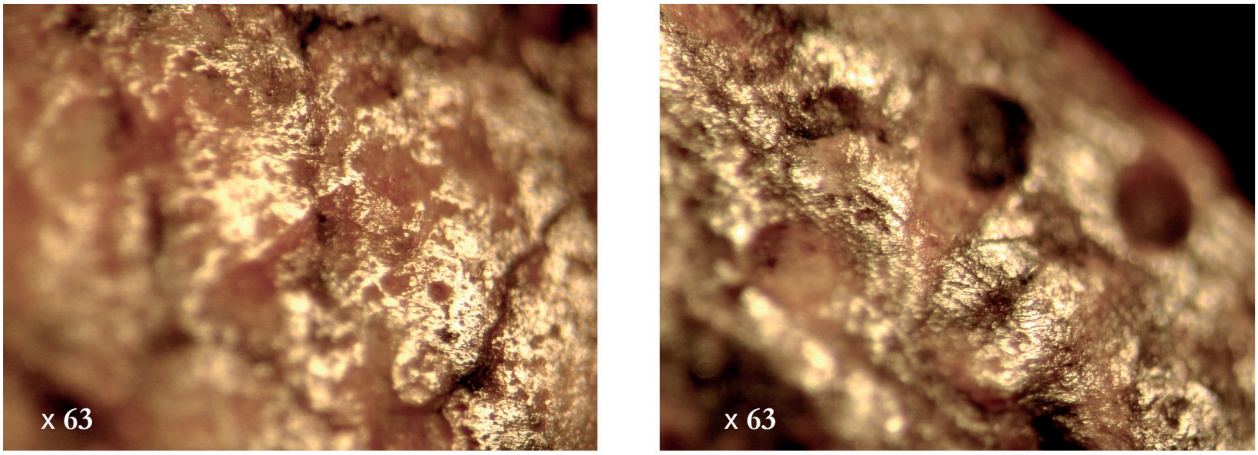


Fig. 8: Microscopic view of the flat sides showing traces of fabrication and wear, with the typical handling polish.

and Precututeni, as well to objects of the Cernavoda III culture[34]. Some objects, but rare, with more organized and systematic striations could, however, may have functioned as occasional tools.

Overall, the low frequency of well-developed wear is striking – the wear traces consist mostly in surface and edge rounding. This means that many knucklebones were disposed when they were slightly deformed. Some of them are burnt (42 pieces in Drama). Also, it is worth noting that the most visible wear is present on the heavy and massive objects. As in the case of the Precucuteni assemblage, the traces of use on the small caprid knucklebones are almost imperceptible, at least at the mesoscopic scale.

The detailed observation of the flattened lateral areas shows abrasion at different degrees of intensity in most of the cases. It can be combined occasionally with scraping. These are technical actions which purpose is to flatten the faces. Sometimes, the technical traces are superposed by traces of use. The most common use wear consists of dull surface and volume blunting, which leads to the erasure of shaping traces and the rounding and polishing of the edges. The areas with wear display an irregular, superficial, and very bright polish interspersed with multiple multidirectional, short, superficial, and unorganized striations, which are specific to handling[35].

Given that 1) knucklebones at the three sites were not active tools, 2) most of them do not show highly developed wear traces, but rather rounding with traits associated with handling, and 3) the traces of material removal indicate accidental impact and friction; we deduce that we are dealing with game pieces hand-held and thrown on more or less hard surfaces of various types, upon which they were rolled and pushed. The variability of the soil types could explain the very irregular traces of wear.

An experiment was conducted with large knucklebones that consisted in recreating the playing conditions, by sitting on the floor and throwing the pieces against a well graded soil so that they roll. The experimental pieces show very similar wear to those on archaeological specimens, but with a much more developed wear, this being due to the well graded type of soil. One should imagine at Drama game areas on more or less fine-grained soils, with or without grass, or even hard soil or, possibly, a floor.

Perhaps different units of knucklebones served as various types of games, as it happened in Antiquity. Thus, the game of tossing up the knucklebones and catching them on the back of the hand, called *pentelitha,* was played with five pieces. The Greek and Roman authors mention that it was played rather by women and girls[36]. The *astragaloi* was a game of chance in which were counted the values of the sides on which the knucklebone fell. In this game, four bones were thrown simultaneously, or one after another. They rolled just until they stabilized on one side[37].

ARCHAEOLOGICAL CONTEXT

By studying the archaeological context of knucklebone discoveries from the end of the Neolithic and the Chalcolithic of Balkans and even of the Near East, one could easily recognize very similar patterns in their distribution within the sites.

As a distinguishable element, very often, knucklebones are found grouped together in hoards. Sometimes, used knucklebones are found alongside unused specimens. In the sites of Drama, Isaiia and Târgu Frumos such hoards comprise from five to 20 pieces. Only in one pit at Târgu Frumos, four used knucklebones were found in association with 16 unmodified specimens[38], while at Isaiia, six used and eight unused knucklebones were recovered from

34 Sidéra 2012, 269–270; Vornicu 2015.
35 Sidéra 2012, fig. 8.
36 Nikulina / Schmölcke 2008.
37 Nikulina / Schmölcke 2008.
38 Ursulescu / Boghian 1996.

dwelling no. 7 [39]. At Drama, groups of five, seven, nine till 16 knucklebones were identified inside several houses. This behavior is not restricted to the Neolithic and the Chalcolithic, but extends into the Bronze Age and Iron Age[40]. Among the most impressive assemblages by the sheer number of knucklebones found together, are the 497 pieces that form the hoard discovered at the Chalcolithic site of Ghelăieşti – Cucuteni culture[41] – or the 684 specimens from the Iron Age site of Meggido[42], both of them deposited in ceramic pots.

Most of the times, knucklebones are found inside houses – e.g., the Neolithic and Chalcolithic sites of Çatalhöyük[43], Kazane Höyük[44], Pietrele[45], Iepureşti[46], Costeşti[47], – or placed in clay layers within house foundations – at Poduri – *Dealul Ghindaru* [48], Borduşani [49] – fireplaces or rebuilt ovens – in the Chalcolithic sites of Hârşova [50] and Bucşani-*La Pod* [51].

At Târgu Frumos, there are three houses that contain in their inventories a small number of knucklebones (one and two per house), while at Isaiia and Drama the hoards are larger, as mentioned above. Hoards of knucklebones occur in refuse pits or in pits for which a cultic destination was assumed, such at Târgu Frumos[52].

Certainly, knucklebones are also found in the archaeological strata, but in this case, they are no mentions of them being found grouped or scattered.

Therefore, it seems that the value of knucklebones resides in their use together, destined to a large public.

CONCLUSION

The study of traces associated to volume modifications on abraded or unworked and used knucklebones from the sites of Drama (Bulgaria), Târgu Frumos and Isaiia (Romania) provide sufficient data to formulate a solid hypothesis for the use of knucklebones as game pieces, at least for a significant part of them.

A ludic activity occurred on these sites, indicated by hundreds of objects. For the first time in the history of the Balkans this activity is now very visible. Let us add that the large number of clay tokens discovered at these sites could also refer to another sphere of game play and increase the visibility of gaming activity.

So, games were being played with knucklebones at Drama, Târgu Frumos, and Isaiia with certain intensity. Probably, on these sites, the practice of playing was a part of everyday life of the groups. The presence of knucklebones of different sizes, as well as the variations in the wear traces could speak for the existence of various types of games. Thus, the large knucklebones may have been launched on the ground, while the lightweight pieces were perhaps used differently, like in the Antique games of *astragaloi* and *pentelitha*. A larger experimentation should be carried out in this aspect in order to document all types of use wear.

In any case, such games are collective actions, which involved various actors and various locations – knucklebones and clay tokens are found both inside houses and outdoors, in the spaces between buildings, among domestic wastes.

For a long time, the domain of game was considered anodyne. But theoreticians see it as an integral part of culture and, much more, a source of dynamism within societies[53], since its presence is active and fruitful in the major forms of community life: cult, poetry, music and war[54]. Indeed, the sphere of game does not refer so much to the child's universe and bagatelle, but rather to the social relationships between adults[55]. Thus, the game is a "serious task"[56]. Considering the degree of systematization in the practice of games on these sites, new in the history, we ask here whether the strong manifestation of game play in the chronological horizon of the late Neolithic and early Chalcolithic constitutes a new indicator of the changing social relationships that accompanied the emergence of metallurgy.

39 Vornicu 2013.
40 Affanni 2008; Gilmour 1997.
41 Cucoş 1999.
42 Minniti / Peyronel 2005, 16.
43 Russell / Griffitts 2013.
44 McCarty 2013.
45 Berciu 1956.
46 Kogălniceanu et al. 2014.
47 Vornicu 2015.
48 Bejenaru et al. 2010.
49 Voinea 1997.
50 Popovici et al. 1998-2000.
51 Bem 2001.
52 Urulescu et al. 2005.
53 Caillois 1958.
54 Huizinga 1951.
55 Hamayon 2012.
56 Huizinga 1951.

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