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Pieces of gaming equipment from Roman Pannonia

The Collection of the Kuny Domokos Museum in Tata (Hungary)

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Abstract: Archaeological finds connected to gaming and play are seldom published in detail from Roman Pannonia, although these are frequently found during excavations. Therefore, the area of Pannonia along the Danube *limes* represents a blank spot in the research of the ludic culture of the Roman Empire. The paper presents a comprehensive study of the pieces of Roman gaming equipment in the collection of the Kuny Domokos Museum in Tata (Hungary) and discusses sixty hitherto unpublished gaming paraphernalia including six-sided cubic bone dice, bone, glass and ceramic counters, as well as ceramic marbles. As almost all objects were found in the settlement complex of Brigetio (Komárom/Szőny, Hungary), the close examination of the artefacts lets us gain insight into the gaming practices of Roman Brigetio.

Keywords: Roman dice, gaming counters, marbles, game boards

Introduction

Sixty unpublished pieces of Roman gaming equipment have been found in the collection of the Kuny Domokos Museum (KDM) in Tata.[1] Most of these, 57 pieces, were probably found in Brigetio (Komárom/Szőny, Hungary), an important settlement complex along the Danube *limes* in Pannonia which consisted of three parts: the legionary fortress *(castra legionis)*, the military town *(canabae)* and the civil town (*municipium*). The legionary fortress of Brigetio was built at the end of the 1st century AD and the *canabae* and civil town came into being soon after that, during the early 2nd century. While the civil town was already abandoned during the 260s, the *canabae* existed until the late 4th century and the legionary fortress was only given up when Pannonia *provincia* was given over to the Hunnic people in the 430s. As far as we know, pieces of gaming equipment were found in all three parts of the settlement as well as in the cemeteries.[2]

All 57 finds from Brigetio are stray finds and mostly found their way into the museum from private collections. The most substantial of these is the private collection of Ödön Kállay (1879–1960), notary and local historian in Komárom-Szőny who collected artefacts found during construction

1 This publication is based upon work from COST Action CA22145 - Computational Techniques for Tabletop Games Heritage (GameTable) which is supported by COST (European Cooperation in Science and Technology; www.cost.eu).

2 For gaming pieces, dice and toys in Brigetio child graves see Olasz 2025.

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works and lootings between the 1900s and the 1950s.[3] In 1957[4] or 1958,[5] he gave his valuable collection including 42 gaming paraphernalia to the Kuny Domokos Museum.

Nine other finds were discovered in the 1880s during the construction of the Vienna–Budapest railway line. The railway line crossed the territory of the legionary fortress and during the construction works large amounts of Roman stone material and small finds came to light. Some of these were given to the Reformed High School in Hódmezővásárhely (today: Bethlen Gábor Reformed High School) by Béla Matók (1829–1897), a soldier, lawyer and poet[6] from Hódmezővásárhely,[7] who lived in Budapest from 1880.[8] He made a large donation of Roman finds from Brigetio in 1884[9] and was member of the National Archaeological and Anthropological Society in 1885.[10] He was involved in the construction of railway lines from 1869 in Hódmezővásárhely, and perhaps this led him to Komárom in 1884 to the railway construction. The Roman artefacts from Brigetio in the collection of the Reformed High School were given over to the Kuny Domokos Museum in 1955 after the nationalisation of the school system in 1948. The artefacts were inventoried in the KDM in 1956.[11]

Six further pieces were the gift of Károly Fügi (1854–1914) engineer from Győr who collected Roman finds from Brigetio and donated them to the Benedictine Catholic High School in Győr in the 1880s.[12] He was an alumnus of the school where he started his studies in 1864[13] but between 1869-1870 he went to the State Secondary School in Pozsony (today: Bratislava).[14] He studied at the Technical University in Budapest in the 1870s,[15] after which he served in the army.[16] From 1886 he worked as an assistant engineer at the Hungarian Royal State Railways,[17] and he too probably collected the Roman artefacts during the construction of the Vienna–Budapest railway line in Komárom/Szőny. In 1893 he was promoted to railway engineer in Tata[18] but in 1894 we find him again in Győr in the same position[19] where he became head of department from 1901 and lead engineer from 1903,[20] until he died in 1914.[21] He was clearly interested in archaeology, because as

3 Herczeg *et al.* 2007, 6–7; Fehér 2010, 11; Számadó 2020.

4 Számadó 2020, 55.

5 *Magyar Nemzet*, January 28, 1958.

6 As a poet he was not very successful: *Szépirodalmi Közlöny*, 1/12, June 23, 1870, 190–191.

7 Borhy 2010, 49; Banner *et al.* 1937, 106.

8 *Vásárhely és Vidéke*, 15/76, September 16, 1897.

9 *A Hód-Mező-Vásárhelyi Reform. Főgymnasium 1884–85. tanévi értesítője*, Szeged, 1885, 54; *Vásárhely és Vidéke*, 2/33, August 14, 1884.

10 *Az Országos Régészeti és Embertani Társulat Évkönyve*, Budapest, 1879–1885, 90.

11 The ministerial decree and a correspondence concerning the transportation and the inventorying of the finds can be found in the KDM. I thank A. Willand for this information.

12 See for example pages 168–169 and 211 in the *Értesítő a pannonhalmi Sz.-Benedek-rend győri Főgymnasiumáról az 1887–1888. isk. év végén*, Győr, 1888.

13 See pages 12–13 in the *A pannonhegyi Szent Benedek-rend győri főgymnasiuma ifjuságának érdemsorozata az 1864/5-iki tanév második felében.*

14 Pozsonyi Állami Főreáliskola; see *Pozsony Szab. Kir. városa vallásfelekezet nélküli Főreáltanodájának 13. értesítvénye*, Pozsony 1870, 11; *Pozsony Szab. Kir. városa vallásfelekezet nélküli Főreáltanodájának 14. értesítvénye az 1870/1. évről*, Pozsony 1871, 38.

15 He was part of the choir in 1873: *Budapesti Közlöny*, 7/269, November 22, 1873.

16 *Budapesti Közlöny*, 16/290, December 9, 1882; *Budapesti Közlöny*, 19/3, January 4, 1885.

17 Magyarország tiszti cím- és névtára 5, 1886, 278; Magyarország tiszti cím- és névtára 6, 1887, 277.

18 Magyarország tiszti cím- és névtára 12, 1893, 253.

19 Magyarország tiszti cím- és névtára 13, 1894, 260.

20 Magyarország tiszti cím- és névtára 20, 1901, 413.

21 *Hungary, Civil Registration, 1895–1980, FamilySearch* (https://www.familysearch.org/ark:/61903/1:1:684D-YDVC: Wed Mar 06 03:49:33 UTC 2024), Entry for Fügi Károly and Fügi Ágoston, January 20, 1914.

a young engineer, he also helped at an excavation conducted by the Benedictine Catholic High School of Győr in 1878.[22]

Three more possible pieces of gaming equipment were discovered during the excavations of Endre Bíró in the Azaum *ala* fort and *vicus* in 1971. Further pieces were unearthed between 1998–2007 during the archaeological excavations in the *vicus* of Azaum: one six-sided cubic die and bone, glass and ceramic gaming counters. The latter are now in the archaeological exhibition at the Azaum Roman Camp Leisure Park and are published in the catalogue of the exhibition.[23] As they were not available for research, they are not included in this paper. For similar reasons a bone die from a Brigetio grave is also not included here.[24]

This means that from the 60 pieces presented here, only the 3 pieces of gaming equipment from Azaum come from an archaeological excavation, all 57 from Brigetio have uncertain find circumstances. Since the artefacts from Brigetio are all stray finds, we cannot date them precisely between the early 2nd and late 4th centuries AD.

Problems of identification

The identification of objects used for gaming and play is far from straightforward, even from the Roman era where literary and pictorial sources provide some evidence about the kind of objects we should be looking for.[25] Game boards, dice and gaming counters seem to be easily recognizable, however, each object type has its own difficulties when we try to establish if they were indeed used for gaming or for other purposes. One problem is the multifunctional nature of the objects, for example regular six-sided dice could be used for both gaming and divination and it is impossible to distinguish if a die was used for one or the other or both.[26] Similar looking objects were sometimes produced for entirely different purposes: for example circular plano-convex glass pieces of the same form were made for decoration purposes as well as for gaming,[27] and certain flat, circular bone objects could have been both pyxis lids and gaming counters.[28] In the case of fragmentary tiles with grid pattern it is sometimes not possible to determine whether they were fragments of a game board with checkerboard pattern probably used for *ludus latrunculorum*, or wall tiles scored in a grid pattern thereby providing keying for plaster to stick properly.[29] Furthermore, objects originally made for one purpose might have been used as gaming pieces at some point in their life cycle either in an unmodified or in a modified form which usually remains undetected in the archaeological material. The study of object biographies can shed light on some of these processes.[30] Also, natural objects, like unmodified stone pebbles, shells or animal bones *(astragali)* can only be recognized as gaming pieces if they are found as a set, as parts of ludic assemblages, preferably together with other gaming equipment, for example a game board or dice.[31]

22 *Értesítvény a pannonhalmi Sz.-Benedek-rend győri Főgymnasiumáról az 1878/9. tanév végén*, Győr, 1879, 194.

23 Horváth 2021, 75, 94: Cat. 146. KDM 2021.3.34. six-sided die; Cat. 147. KDM 2021.3.2. bone counter; Cat. 192–193. KDM 2021.3.48. and KDM 2021.4.15. ceramic counter; Cat. 194. KDM 2021.1.20. glass counter.

24 Inv. no. KDM 79.24.7. Grave no. 6 (Olasz 2020, Kat. 7).

25 For example: Pace 2023, 19–20.

26 Swift 2017, 125.

27 Cool 2016; Pace 2022.

28 Gostenčnik – Grömer 2019, 41.

29 Courts – Penn 2019, 7; Penn *et al.* 2025. In the case of game boards on tiles, hints to the possible use of the brick or tile could be provided by factors like the depth of the incised lines making up the grid pattern, or if the lines were incised before or after firing, or if the incisions are filled with mortar or not.

30 Crawford 2009; Pace 2022; Penn – Courts 2022.

31 Pace 2023, 22.

Six-sided dice

The eight dice in the museum (Cat. 1–8) are all typical Roman six-sided cubic dice made of one piece of solid bone (Fig. 1).[32] There is a considerable variation in the size of the dice: the length of the edges falls between 6 and 14 mm. As usual for Roman dice, almost all our examples are visibly non-cubic in shape with a variable degree of asymmetry, where the dice are either a bit flattened or elongated, sometimes their faces are trapezoids or parallelograms. From the eight dice there is only one die (Cat. 4) that can be called regular, because the difference in the length of its edges stays under 5% and the faces are almost exact squares.[33] The other seven dice have irregular shapes with faces that are either trapezoids or parallelograms or irregular quadrilaterals, and with edges that are bevelled or rounded to a different degree within the same die. This is at least partly due to constraints caused by the available raw material, the size of the bone, for example.[34] Dice made of more precious materials, in particular rock crystal or amber tend to have a much more precise shape.[35]

The irregular shape of the dice affected roll frequencies, which was further enhanced by the unevenly rounded or bevelled edges within a die.[36] In general, it seems that Romans were not overly disturbed by the biased nature of the dice throws, which could be explained with at least three different reasons. First, if all players used the same dice in a game, the irregularity would affect all gamers in the same way, so this would not necessarily cause a significant problem. Also, compared to *astragali* (knucklebones used as four-sided dice) or Celtic long or domino-shaped dice, the outcome of the throws with roughly cubic six-sided dice were still less uneven. In addition, we have to keep in mind that Romans thought that the outcome of die rolls was controlled by Fortuna or other gods or supernatural forces. This is also the reason why dice could be used for divination purposes: the outcome of a throw showed the will of gods.[37]

It has been observed that on irregular dice the largest face of a die almost always carries the number six.[38] This can be observed on all our dice as well. Placing six on the largest face might be partly due to common sense: the most pips are drawn most easily on the largest surface.[39] This means that the probability of throwing a six or a one (placed on the opposite, equally large face) was somewhat larger than throwing the other four numbers. In cases where dice were used for gambling, the best outcome was to throw sixes with all dice, and the worst to throw ones with all dice. E. Swift argues that when playing with irregular dice where sixes and ones were rolled with higher probability and frequency the game became more exciting because the throws oscillated between the two most extreme outcomes.[40] In other games, for example in *ludus duodecim scriptorum*, which was presumably played with three dice, sixes or ones were not necessarily desired throws.

32 The word bone will be used for dice and counters potentially made of bone, antler or ivory, because no material analysis was made to differentiate between these materials.

33 A length difference exceeding 5% between the shortest and longest edges begins to get conspicuously visible, therefore, 5% difference is considered a threshold in the study of dice. See Swift 2017, 137; Eerkens – de Voogt 2022, 6.

34 Swift 2017, 142.

35 Swift 2017, 133–136.

36 Daniaux 2020, 39–40.

37 David 1962, 24–25; Swift 2017, 123, 127; Eerkens – de Voogt 2022, 9–10.

38 Swift 2017, 139–140; Daniaux 2020, 39; Eerkens – de Voogt 2022, 6–7.

39 Eerkens – de Voogt 2022, 8.

40 Swift 2017, 147. The degree to which the game became in fact more exciting, if at all, is uncertain.

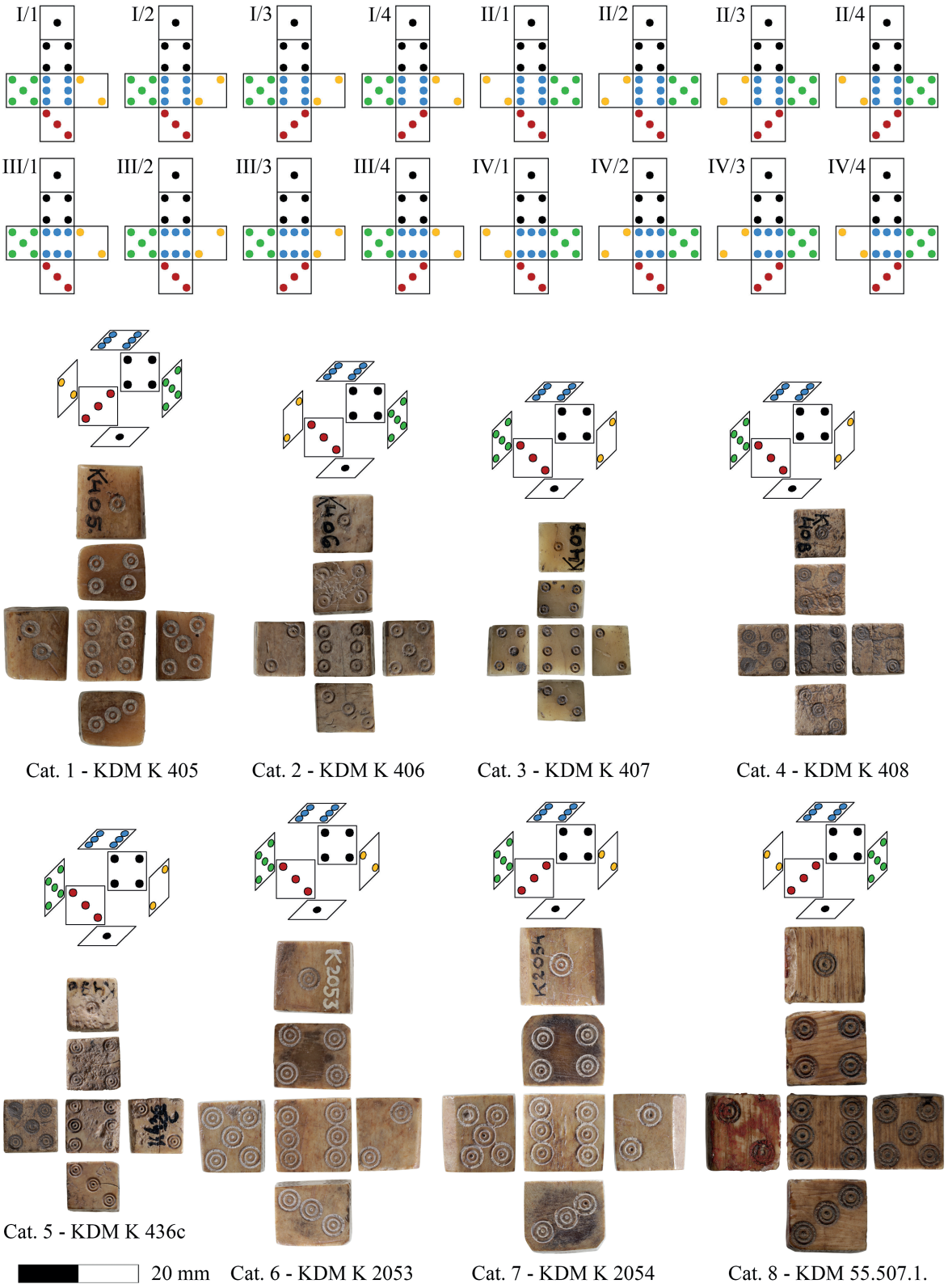

Fig. 1. The 16 different possibilities for placing the pips on the six faces of a die when the Sevens configuration is used for numbering and the six-sided cubic dice in the collection of the KDM (photos and drawings: L. Dobosi).

The numbers on Roman dice were usually indicated by dots, dot-ring or dot-ring-ring motives.[41] In our material two of these pip styles appear: three dice have dot-rings and five dot-ring-rings on their faces. The arrangement of the pips on a face follows a standard pattern, for example one is always in the middle, two and three are placed diagonally, etc. However, the placement of the pips shows a variable level of irregularity and asymmetry, conforming to dice collected from other provinces in the Roman Empire.[42]

When a six-sided die is numbered from one to six, there are thirty different configurations for numbering the six sides.[43] All the dice in this study are numbered regularly: the numbering of the faces goes from one to six with the numbers on the opposite sides adding up to seven. This configuration is called Sevens (1–6, 2–5, 3–4) by J. W. Eerkens and A. de Voogt[44] and this is by far the most frequently used configuration in the numbering of Roman dice, making up more than 90% of the material in the case of bone dice, according to a study of E. Swift.[45] Other numbering configurations also appeared during the Roman era, some of them regularly, like Primes (1–2, 3–4, 5–6) where the numbers on opposite sides add up to prime numbers (3, 7 and 11).[46] Although six-sided cubic dice were used already during the 3rd millennium BC, the numbering configuration of Sevens seems only to have appeared in the 16th c. BC for the first time and became more-or-less standard from the 1st millennium BC in Greek and Roman antiquity (but not in Etruscan and Celtic contexts).[47] During the Middle Ages, the Primes configuration was prevalent in Europe, although in King Alfonso X's *Libro de acedrex, dados e tablas*, also known as Book of Games written in 1283/1284, it is stated that dice should be made so that six is opposite one, five is opposite two and four is opposite three.[48] The Sevens configuration eventually became canonical from the 16th century to the present.[49]

When the Sevens configuration is used for numbering, there are still 16 different possibilities for placing the pips onto the faces of the dice (see Fig. 1).[50] The difference lies between the arrangement of the pips for indicating numbers 2, 3, 5 and 6. From the 16 possibilities, five different arrangements appear on our 8 dice (see Fig. 1).

The production process of bone dice seems to have been standardized across the Roman Empire. In the first stage, a long rod with square or rectangular cross-section was trimmed usually from the metapodial bones of cattle. Then the lengths of the individual dice were marked on the rod with incisions, and the faces would be numbered. Only after this would the rod be cut into cubes. Finally, the last two faces of the cube would be numbered.[51] Such an unfinished row of three dice can be found for example in the collection of the Walters Art Museum in Baltimore (USA): the rod is already numbered but not yet cut into cubes.[52] During the production method, it was customary to place the numbers 1–6 and 2–5 on the uncut rod, and 3–4 onto the cut surface.[53] As a result, the

41 Eerkens – de Voogt 2017, 167–169.

42 Swift 2017, 136.

43 Eerkens – de Voogt 2017, 165; Küchelmann 2018, 119.

44 Eerkens – de Voogt 2017, 165.

45 Swift 2017, 203–204.

46 Poplin 2011, 51; de Voogt *et al.* 2015, 152–153; Eerkens – de Voogt 2017, 165; Küchelmann 2018, 119.

47 David 1962, 10; Eerkens – de Voogt 2017, 165–168; Küchelmann 2018, 117–119.

48 Madrid, Real Biblioteca del Escorial, j.T.6, fol; on *folia* 65. English translation: S. M. Golladay; German translation: U. Schädler.

49 David 1962, 10; Eerkens – de Voogt 2017, 165–168; Küchelmann 2018, 117–119.

50 Poplin 2011, 52; Swift 2017, 204–205.

51 Feugère – Picod 2004, 38; Swift 2017, 205–206; Daniaux 2020, 36–37.

52 https://art.thewalters.org/object/71.636/

53 Swift 2017, 204; Daniaux 2020, 36–37. This method could not only observed on solid bone dice, but also on composite bone dice made of hollow bones, see David 1962, 11; Greep 2022, 103, 106.

faces numbered 1, 2, 5 and 6 were parallel with the direction of the grain in the bone, while faces numbered 3 and 4 were perpendicular to the grain direction.[54] This method of numbering can clearly be observed on six dice in the collection of the KDM (the study of the other two remained inconclusive).

Gaming counters

Gaming counters are common finds both in urban and rural settlements, military installations and in cemeteries, either as lost pieces or deposited as grave goods, ritual offerings or in hoards.[55] They could be made from different materials, such as bone, glass, amber, stone, re-used broken sherds of pottery or glass vessels, etc. The identification of these roughly circular, flat or plano-convex objects as game pieces is normally aided by find context: they are certainly game pieces if found as part of a gaming assemblage. In our case, such find context is missing for all our pieces, so the identification depends solely on the shape of the objects and parallels found elsewhere in the Empire.

Bone counters are the most numerous among purpose-made gaming counters and according to studies they do not tend to be larger than 25 mm in diameter. Bone discs larger than that can mostly be defined as pyxis lids.[56]

Circular, plano-convex glass objects could also have had several different functions besides being gaming counters (see below), but the most problematic object type in this respect is the more-or-less circular ceramic disc made of broken pottery shards. These re-fashioned and re-purposed objects are usually identified as gaming counters in Hungary regardless of size, although recent studies have pointed out that they were also often used as lids, stoppers, and bungs.[57] Regarding the find material from Coria (Corbridge, Britain), F. McIntosh considered circular pottery discs under 35 mm diameter as gaming counters,[58] while for the Wroxeter assemblage, C. Moffett labelled stone discs with less than 25 mm diameter as gaming pieces and anything above 25 mm as stoppers or lids.[59]

The size and type of the gaming counters used must have been in some connection with the size and type of the game board. Grid type boards for example, generally identified as game boards for *ludus latrunculorum*, were often drawn on the surface of roof tiles, and had individual squares of around 20–40 mm large on average.[60] The game did not include the stacking of gaming counters, so both flat and plano-convex, 15–40 mm large counters could be used (depending on the specific board). In contrast, *ludus duodecim scriptorum* could be best played with flat counters, because the gaming pieces could be stacked on the individual squares of the game board. A board drawn on a *tegula* in Intercisa (Dunaújváros, Hungary) had 15 × 20 mm large individual squares 25–30 mm apart from each other,[61] so average flat bone counters of 17–22 mm diameter would have been suitable for this board and this game. However, game boards were also carved in the pavement or drawn in the dirt, and these could have been much larger, making larger counters equally acceptable.[62]

54 Swift 2017, 204; Daniaux 2020, 36–37. More detailed studies established that as a rule, the number six was placed on the periosteal surface of the bone (the outer side, in direct contact with the animal's flesh), the number one on the opposite side, at the medullary cavity in the bone.

55 Penn – Courts 2022.

56 Allason-Jones 2011, 233; McIntosh 2024, 247.

57 Moffett 2018; McIntosh 2024, 248.

58 McIntosh 2024, 247–248.

59 Moffett 2018, 58–59.

60 Penn *et al.* 2025; Dobosi – Szabadváry 2025.

61 Dobosi – Szabadváry 2025.

62 McIntosh 2024, 247.

Considering all the above, 39 objects were identified as gaming counters in the collection of the KDM in Tata, 16 were made of bone, 18 of glass and 5 of ceramics.

Bone counters

Bone gaming counters were either made of flat circular disks or of domed pieces, decorated with groves or dot-circle motives. Both flat and plano-convex counters were lathe-turned, and an indentation can usually be seen where the bone disc was fitted to the lathe.[63] The indentation caused by the lathe should be in central position but is in fact in many cases eccentric, making the whole decoration eccentric as well.

Bone counters are categorized based on their form and decoration (Fig. 2).[64] The simplest form was the completely flat bone disc where both the obverse and reserve sides were undecorated (Type 1). The circumference was either straight, curved, or V-shaped. Somewhat more complex were the ones that had a countersunk upper surface (Type 2). Another frequent decoration involved concentric grooves on the obverse: the number of groves and the space between them could vary from piece to piece (Type 3). Sometimes V-shaped notches were added to the upper edge of the bone disc (Type 4). Plano-convex bone counters also turn up occasionally: they can be undecorated or decorated with concentric groves and/or dot-ring motives.

The reverse side and/or the circumference of flat bone counters are often inscribed with marks, letters or numbers.[65] None of the bone counters in the KDM have such graffiti on their bottom surface.

A common feature on Roman bone counters is that there is a slanting or oblique stripe at the edge of the bottom surface. K. Kenyon interpreted these as "worn patches" caused by a hypothetical game akin to tiddlywinks,[66] however, A. MacGregor argues that these slanting stripes are the result of the manufacturing process: the long bone from which the counters were made did not always have a big enough flat surface. According to his observations, the slanting stripes are always parallel to the grain of the bone and do not always show wear marks.[67]

The 16 bone gaming counters in the material (Cat. 9–24) belong to five different types based on their appearance (Fig. 2). There is not much variation in their size: their diameters range from 16.8 to 21.9 mm but most of them are around 19–20 mm large.

Glass counters

There are 18 glass counters in the material (Cat. 25–42), all more-or-less circular with flat bottom, convex top side and rounded edge, as usual for Roman glass counters (Fig. 3).[68]

Two production methods are known for making glass counters. The first method, described by Pliny the Elder,[69] involved the reheating of glass pieces. When the glass became sufficiently hot and melted, the upper surface became smooth and round, devoid of sharp edges, and the lower surface remained flat.[70] This method can be recognised from the very flat and smooth bottom surface of the

63 Crummy 1983, 91; Harlow 2019, 7.

64 Kenyon 1948, 266; Crummy 1983; 91–92; T. Bíró *et al.* 2012, 76; Harlow 2019, 7–8.

65 Crummy 1983, 91–92; Holliger – Holliger 1984, 9–10; Harlow 2019, 8–11.

66 Kenyon 1948, 266.

67 MacGregor 1976, 4.

68 Crummy 1983, 92–93; Cosyns 2011, 32; Cosyns 2015, 198; Dévai 2024, 84.

69 Plin, *Nat. Hist.* 36.67.199.

70 Cosyns 2011, 33; Cool 2016, 158.

Fig. 2. The 6 types of bone gaming counters in Pannonia and the bone counters in the collection of the KDM (photos and drawings: L. Dobosi).

counter.[71] During the other method, a small amount of hot, molten glass was dropped onto a cold and flat surface. The thermal shock when the hot glass and the cold surface met caused an irregular pitted surface on the basal surface of the counter.[72]

Glass counters were made in a variety of colours and could be both translucent and opaque. In general, black and white counters seem to have been the most widespread.[73] Black counters were in fact made of black appearing very dark coloured glass which is perceived black to the naked eye with light in reflection. The true colour of translucent black appearing glass can be seen when viewed in strong transmitted light: they are most often green, blue, blue-green or purple, red, and occasionally grey or brown.[74] Opaque black glass is achieved by adding iron to the batch,[75] while in the case of opaque white, blue and turquoise glass, opacifiers were added, for example antimony.[76]

There is much debate about the exact function of plano-convex glass objects. Apart from gaming counters, they could have also served as calculating tools, gems, elements of interior decoration, furniture inlays, etc. Their interpretation depends heavily on the context they are found in.[77] An identification of function was attempted by H. Cool on the bases of size. She divided her sample into two groups: one smaller than 15 mm and the other larger than 15 mm in diameter, saying that the larger group can be interpreted as gaming counters. However, in her dataset, there was no real dividing point at 15 mm, the size of the objects was distributed almost evenly across the different sizes between 9–18 mm.[78] The size of the gaming counters certainly depended upon the size of the game board and on the type of game played (see above).

From the 18 glass counters in the museum, 8 are translucent and 10 opaque (Fig. 3). A variety of colours is present among the translucent pieces: three are light green, one brown, one blue, and three black appearing counters, two of which are in fact of dark burgundy colour. All of them have flat bottoms and convex upper sides, and both the bottom and upper sides have pitted surfaces. Some of the pieces have iridescent surfaces: the result of surface corrosion due to the long time spent buried in the ground.[79] There is much less heterogeneity in the colour of the opaque pieces: one dark blue, two white and six black counters. Some of the black pieces have spiral lines on their surfaces, as if the molten glass had been smoothed with a brush. Half of the opaque counters are of very bad quality. The size of the seventeen glass counters varies between 14.5 and 33.4 mm, a much larger range than in the case of bone counters.

Ceramic counters

There are 5 pottery counters in the material and only one is purpose-made (Cat. 43), while the other four are reused shards of pottery vessels (Cat. 44–47, Fig. 4).

Purpose-made ceramic counters seem to be quite rare. The only piece in this collection is a circular flat disc, about the same size as glass counters (diameter c. 25 mm). Its reverse is flat and undecorated, while the obverse has a relief decoration.

71 Cosyns 2011, 33. Archaeometric analysis of glass gaming counters from Pompeii seems to corroborate this hypothesis, see Arletti *et al.* 2006, 184–185.

72 Cosyns 2011, 32–33. According to Crummy *et al.* 2007, the molten glass was dropped onto a bed of sand, which caused a rough bottom surface, see Crummy *et al.* 2007, 186.

73 Cosyns 2015, 198; Pace 2022, Fig. 27; Krzyżanowska *et al.* 2023, 1.

74 Cosyns 2011, 4–11; Krzyżanowska *et al.* 2023, 6.

75 Cosyns 2015, 6.

76 Krzyżanowska *et al.* 2023, 4.

77 Cosyns 2015, 200; Cool 2016, 171; Pace 2022, 463–464.

78 Cool 2016, 164–165; but see Pace 2022.

79 Emami *et al.* 2016; Schalm *et al.* 2021.

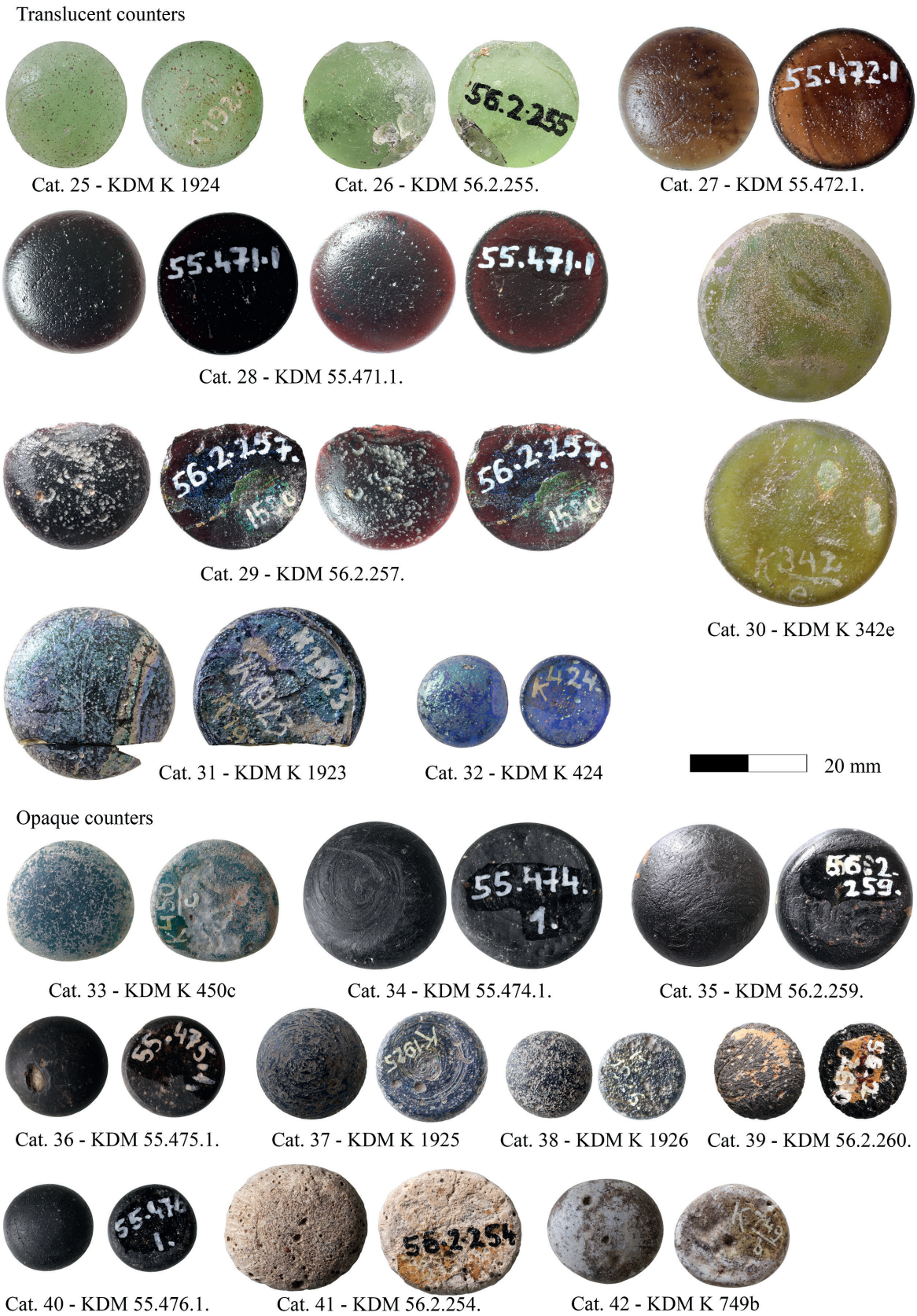

Fig. 3. The glass gaming counters in the collection of the KDM (photos: L. Dobosi).

All counters made of pottery shards were larger in size and their shape, although roughly circular, was irregular. Their diameter ranges between 35–55 mm, so their size is above the 35 mm limit defined by F. McIntosh or the 25 mm limit used by C. Moffett, and according to their definition, these could not be gaming counters, but lids or stoppers.[80] They were included in this paper for two reasons: first, they were identified as gaming counters by the excavator, and secondly, it seemed useful to draw attention to this problem once again.

The edges of the counters at the circumference were chipped to a more-or-less circular form and were occasionally ground as well. One of the ceramic counters was made of a *terra sigillata* bottom with maker's stamp, the others of local pottery. The maker's stamp on the terra sigillata vessel is unfortunately damaged and only partly legible: *[- - -]ianus fe(cit) (?)*. The material and surface of the vessel, along with the fragmentary name stamp point to a product of the Rheinzabern workshop and is to be dated to between 160–235 AD.[81] Terra sigillata vessels from Rheinzabern were extremely frequent in Brigetio.[82] The counters made of local pottery were probably produced in Brigetio, although they were found in Azaum. We have no data on pottery production in Azaum, local pottery vessels were shipped from Brigetio where several pottery workshops operated.[83]

There is one object in the KDM which was made of a Roman tile shard chipped to a circular form (KDM 92.30.1). It looks quite similar to the counters made from pottery shards, however, it is much larger. So much so, that its diameter is almost 90 mm, its thickness 27.8–29.7 mm and its weight 265 g, more than half a pound (as opposed to 1–9 g in the case of bone or glass counters). Because of its size, especially its weight, its use as a gaming counter can almost certainly be excluded, it served much more likely as a weight or a stopper, for example.[84]

Ceramic marbles

There are 13 ceramic marbles that could have been used as game pieces (Cat. 48–60, Fig. 4). All are spherical, their diameter ranges between 25–35 mm, so they are approximately the size of a walnut. Walnuts and marbles were used by children for different games of skill or chance in Graeco-Roman antiquity.[85] Marbles made of fired clay were the most widespread, but they could be made of stone or occasionally of glass as well, as the examples from a second-century AD child grave in Lillebonne.[86] Walnuts made of fired clay also existed.[87]

A more complex game with marbles was played on 'marbles lane'. These rectangular game boards had circular depressions on them between 4–10 cm in diameter. Several types are known from the Roman Empire, usually carved into the pavement in Mediterranean cities, for instance in Rome, Ostia, Athens, or Ephesus, but none have been published at the northwestern *limes*. Despite the dozens of such surviving game boards, the goal of the game and the way it was played is not clear.[88]

80 McIntosh 2024, 247–248.

81 I thank Dénes Gabler for this information and all his help.

82 Gabler 2016.

83 Gátfalvi-Delbó 2020.

84 Stone stoppers from Wroxeter, for example were up to 180 mm large and often made of salvaged stone roof tiles, see Moffett 2018, 58–59.

85 Németh 2002, 19–21; Fuchs 2013, 42; Schädler 2019, 66–67.

86 Schädler 2019, 66–67.

87 Chew – Vespa 2019.

88 Schädler 1994a; Schädler 2013; Schädler 2019; Penn *et al.* 2023. On 'marble lanes' game boards in Athens see Carè 2022, 236–238; in Ephesus see Schädler 2024, 133–134; in Ostia: Dasen 2020, 310.

Fig. 4. The ceramic counters and ceramic marbles (photos: L. Dobosi).

Spherical fired clay objects are sometimes identified as slingshot bullets. Slingers *(funditores)* were used in the Roman army from the early Republic, but it was a widespread weapon for hunting and warfare already in the Iron Age in Greek, Etruscan and Celtic cultures.[89] The bullets *(glandes)* were most often made of lead, stone or fired clay,[90] however, they tended to be larger and heavier than the ceramic marbles in the KDM as well as of different shape: sling bullets were generally almond shaped or oval but spherical ones also existed.[91] The weight of the c. 150 slingshots excavated at the Roman fort of Novae near Čezava ranged between 43–260 g,[92] whereas the weight of our 13 ceramic marbles falls between 16–49 g.

Game boards from Pannonia

The Kuny Domokos Museum of Tata does not have Roman game boards that would get us closer to answering the question, what games were played in Roman Brigetio. Fortunately, there are several fragments of *latrunculi* game boards from Brigetio in the collection of the Klapka György Museum of Komárom.[93] *Ludus latrunculorum* must have been a popular game in Pannonia, because game board fragments with checkerboard pattern turn up regularly at sites along the *limes* and even in the internal parts of the province. Such boards are known from Carnuntum (Bad Deutsch-Altenburg, Austria),[94] Aquincum (Budapest, Hungary),[95] the Roman road station at Gönyű,[96] the Roman road station in Sárvár,[97] late Roman fortlet of Dunakeszi,[98] the auxiliary fortress at Campona (Budapest-Nagytétény, Hungary),[99] the military *castellum* of Gerulata,[100] and the late Roman villa palace in Szabadbattyán.[101] This game was played all over the Empire and game boards with checkerboard pattern were found in Roman age Central and Northern European sites as well, being the most frequent game board find along the northern *limes*. Roman game boards outside the Empire travelled hundreds of kilometres due to commercial and diplomatic connections.[102]

Another type of game board is also known from Roman Pannonia: game boards for *ludus duodecim scriptorum*. Such a game board was found by J. Gömöri during the excavations at the Roman *forum* of Scarbantia (Sopron, Hungary) in the 1970s. The sandstone board was mounted onto a small stone pillar and stood on the *forum* space in the 2nd–3rd centuries AD.[103] *Duodecim scripta* boards drawn onto the surfaces of *tegulae* are known from Intercisa and Aquincum.[104]

89 Keppie 2023, 1–2.

90 Griffith 1989, 258; Völling 1990; Keppie 2023, 4–7.

91 See for example: Völling 1990; Vujović 2009.

92 Vujović 2009, 256.

93 On display in the Brigetio Heritage Visitor Centre in Komárom.

94 Ertl 1986, 28–29 and Fig. 19.

95 On display in the Tegularium exhibition in the BHM Aquincum Museum and Archaeological Park in Budapest.

96 In the Rómer Flóris Museum in Győr, Hungary.

97 Gabler 1991, 67 and Fig. 49.

98 Mráv 2011, 47 and Fig. 52.5.

99 In the Hungarian National Museum; Dobosi – Szabadváry in press.

100 Penn *et al.* 2025.

101 Nádorfi 2007, 176; Nádorfi 2012, 129.

102 About *ludus latrunculorum* and the distribution of game boards see: Schädler 1994b; Richmond 1994; Schädler 2001; Courts – Penn 2021; Crist *et al.* 2024; Schädler – Hall 2024; Penn *et al.* 2025.

103 Gömöri 1982, 64–67, Figs 1–2.

104 Both in the Hungarian National Museum, Budapest (Dobosi – Szabadváry in press). About *ludus XII scriptorum*: Schädler 1995; Schädler 2022.

Brigetio

The settlement complex of Brigetio was one of the most important towns in Roman Pannonia. Situated along the Danube limes, its inhabitants were in close contact with the Roman military on the one hand and with the Germanic tribes on the other side of the Danube on the other hand. The gaming pieces in the collection of the KDM attest to Roman gaming practices as opposed to Germanic ones, since all gaming pieces are typical Roman objects, and no four-sided long or domino-shaped dice are in this collection which would point to Germanic games.

It has already been pointed out in recent research that the Roman military played a decisive role in spreading Roman board games in the provinces to help and speed up processes of acculturation and Romanisation.[105] This must have happened in Brigetio as well, both in the legionary fortress and in the military and civil towns around it. Romanised indigenous (Celtic) people were present in all parts of the settlement, but apparently, they were happy to play with pieces of Roman gaming equipment.

The gaming paraphernalia from Brigetio were most probably made in the settlement, where the remains of glass, bone and pottery workshops have been found. A glass workshop operated in the 3rd century in the civil town where small objects like beads and glass counters were made along with other products.[106] Although the exact location of the bone workshops is still unknown, half-finished and waste products came to light concentrated to a small area both in the civil town and in the legionary fortress.[107] Bone gaming counters and dice could have been produced in both workshops. Large scale pottery production took place from the early 2nd to the late 4th century in the military pottery workshops (so-called Gerhát and Kurucdomb workshops) east of the legionary fortress.[108] Pottery vessels produced here were sometimes reused as gaming counters after they broke.

Conclusions

There are 60 pieces of Roman gaming equipment in the collection of the Kuny Domokos Museum in Tata: 8 six-sided cubic bone dice, 16 bone, 18 glass and 5 ceramic gaming counters, as well as 13 ceramic marbles. Fifty-seven of the objects were from the settlement complex of Brigetio, (legionary fortress, military town, civil town and cemeteries) that were mostly stray finds donated to the KDM by private collectors. The 42 pieces in the Kállay-collection were acquired by Ödön Kállay between the 1900s and the 1950s. The six pieces collected by Károly Fügi and further nine pieces collected by Béla Matók came to light in the 1880s during the construction of the Budapest-Vienna railway line. Only the three artefacts from Almásfüzítő came from modern excavations conducted in the 1970s. None of the gaming pieces in the collection of the KDM can be dated precisely between the early 2nd and late 4th century AD.

The pieces of gaming equipment discussed in the paper conform to Roman gaming paraphernalia known from other provinces of the northwestern part of the Empire. The dice are six-sided, cubic bone dice with an irregular shape characteristic to Roman dice. The numbering of the faces goes from 1 to 6 with the numbers on the opposite sides adding up to 7. The bone gaming counters are mostly flat disks about 20 mm in diameter. Beside the few undecorated pieces, different decorations occur: counters with countersunk upper side, counters decorated with concentric grooves or with V-shaped notches along their upper edge. The only one plano-convex bone counter with a flat

105 Pace 2024.

106 Dévai 2015a; Dévai 2015b.

107 Bartus 2003; Sey 2018.

108 Gátfalvi-Delbó 2020; Gátfalvi-Delbó 2023.

bottom and a domed upper side is undecorated. All bone counters were made on a lathe, and the central indentation caused by the lathe centre is generally visible on either the obverse or reverse side of the counter.

The glass gaming counters are round, plano-convex objects, made of translucent or opaque glass. The translucent counters come in a variety of colours, for example light green, light brown, dark blue or black (their true colour is dark burgundy, visible in strong transmitted light), while the opaque pieces are mostly black along with one dark blue and two white specimens. The size of the glass counters is more varied than that of the bone counters, their diameter ranges between 14.5–33.4 mm.

The pottery counters were mostly made of reused broken pieces of pottery vessels, chipped and ground to a more-or-less round shape. Ceramic marbles were spherical objects 20–30 mm in diameter, made of fired clay.

Unfortunately, no game boards were found in the collection of the KDM, however, several game boards are known from Brigetio in other museums and from elsewhere in Pannonia. *Ludus latrunculorum* seems to have been popular in the province, but *ludus duodecim scriptorum* was also played as attested by the game board finds.

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Catalogue

Cat. 1.	**KDM K 405** (Fig. 1)											
object type	Six-sided cubic bone die											
findspot	Brigetio, Komárom/Szőny											
collection	Ödön Kállay											
length of edges [mm]	**1-2**	**1-3**	**1-4**	**1-5**	**6-2**	**6-3**	**6-4**	**6-5**	**2-3**	**2-4**	**5-3**	**5-4**
	11.4	10.7	11.2	11.2	11.8	11.0	11.5	11.6	9.1	9.5	9.2	9.7
weight [g]	2.4											
numbering	Sevens, II/4											
pip style	dot-ring (diameter of ring: 3.3 mm)											
colour	light brown											
literature	unpublished											
description	Six-sided die made of bone. Irregular, elongated shape with slightly trapezoid faces; length difference between shortest and longest edge is 21.6%. Some of the edges rounded. Numbers are shown with dot-ring motives placed irregularly within the faces of the die. The grain of the bone is parallel to faces 1, 2, 5 and 6 and perpendicular to faces 3 and 4. On face 2 there are four diagonal cuts.											

Cat. 2.	**KDM K 406** (Fig. 1)											
object type	Six-sided cubic bone die											
findspot	Brigetio, Komárom/Szőny											
collection	Ödön Kállay											
length of edges [mm]	**1-2**	**1-3**	**1-4**	**1-5**	**6-2**	**6-3**	**6-4**	**6-5**	**2-3**	**2-4**	**5-3**	**5-4**
	9.3	9.9	9.7	9.3	9.4	9.8	9.6	9.4	8.3	8.1	8.3	8.2
weight [g]	1.5											
numbering	Sevens, II/2											
pip style	dot-ring (diameter of ring: 2.6 mm)											
colour	light brown											
literature	unpublished											
description	Six-sided die made of bone. Irregular, slightly flattened shape; largest faces 1 and 6; faces 3 and 4 are parallelogram shaped; length difference between shortest and longest edge is 18.2%. Edges not rounded. Numbers are shown with dot-ring motives placed irregularly within the faces of the die. The grain of the bone is parallel to faces 1, 2, 5 and 6 and perpendicular to faces 3 and 4. A small piece broke off corner 4–5–6. Root marks on faces 2, 3 and especially 4.											

Cat. 3.	**KDM K 407** (Fig. 1)
object type	Six-sided cubic bone die
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay

length of edges [mm]	**1-2**	**1-3**	**1-4**	**1-5**	**6-2**	**6-3**	**6-4**	**6-5**	**2-3**	**2-4**	**5-3**	**5-4**
	8.3	7.9	7.6	8.2	8.3	7.6	7.4	8.3	6.6	6.1	6.4	6.1
weight [g]	0.8											
numbering	Sevens, I/1											
pip style	dot-ring (diameter of ring: 2.0 mm)											
colour	light brown											
literature	unpublished											
description	Six-sided die made of bone. Irregular, slightly flattened shape; largest faces 1 and 6. Faces 1 and 6 rectangular, 2, 3 and 5 trapezoid, face 4 parallelogram; length difference between shortest and longest edge is 26.5%. Edges not rounded. Numbers are shown with dot-ring motives placed irregularly within the faces of the die. Moderately worn, scratched faces.											

Cat. 4.	**KDM K 408** (Fig. 1)

object type	Six-sided cubic bone die											
findspot	Brigetio, Komárom/Szőny											
collection	Ödön Kállay											
length of edges [mm]	**1-2**	**1-3**	**1-4**	**1-5**	**6-2**	**6-3**	**6-4**	**6-5**	**2-3**	**2-4**	**5-3**	**5-4**
	8.6	9.0	9.1	8.6	8.7	8.8	8.9	8.7	9.0	8.9	8.7	8.7
weight [g]	1.3											
numbering	Sevens, I/1											
pip style	dot-ring-ring (diameter of outer ring: 2.8 mm)											
colour	light brown											
literature	unpublished											
description	Six-sided die made of bone. Almost regular cubic shape; length difference between shortest and longest edge is 5.5%. Edges not rounded. Numbers are shown with dot-ring-ring motives placed irregularly within the faces of the die. The grain of the bone is parallel to faces 1, 2, 5 and 6 and perpendicular to faces 3 and 4. Cracks on faces 2, 3, 4 and 6. Root marks and scratches on all faces.											

Cat. 5.	**KDM K 436c** (Fig. 1)

object type	Six-sided cubic bone die											
findspot	Brigetio, Komárom/Szőny, parcel of József Járóka											
collection	Ödön Kállay											
length of edges [mm]	**1-2**	**1-3**	**1-4**	**1-5**	**6-2**	**6-3**	**6-4**	**6-5**	**2-3**	**2-4**	**5-3**	**5-4**
	9.1	9.4	9.3	9.5	9.2	9.3	9.5	9.1	8.8	9.2	8.7	8.9
weight [g]	1.5											
numbering	Sevens, I/1											
pip style	dot-ring-ring (diameter of outer ring: 3.1 mm)											
colour	light brown											
literature	unpublished											
description	Six-sided die made of bone. Almost regular cubic shape but face 1, 2, 6 trapezoids; length difference between shortest and longest edge is 8.4%. Edges not rounded. Numbers are shown with dot-ring-ring motives placed irregularly within the faces of the die. Cracks on faces 2, 3 and 4. Root marks and scratches on all faces, especially pronounced on faces 1 and 4, as well as edge 2–6.											

Cat. 6.	**KDM K 2053** (Fig. 1)

object type	Six-sided cubic bone die
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay

length of edges [mm]	**1-2**	**1-3**	**1-4**	**1-5**	**6-2**	**6-3**	**6-4**	**6-5**	**2-3**	**2-4**	**5-3**	**5-4**
	12.3	12.9	13.1	11.9	12.5	12.7	13.1	12.3	10.8	11.3	10.2	11.0
weight [g]	3.6											
numbering	Sevens, I/2											
pip style	dot-ring-ring (diameter of outer ring: 4.4 mm)											
colour	light brown											
literature	unpublished											
description	Six-sided die made of bone. Irregular, slightly flattened shape; largest faces 1 and 6; faces 2 and 5 are trapezoids, 3 and 4 rectangular; length difference between shortest and longest edge is 22.1%. Edges 1–2 and 1–5 rounded. Numbers are shown with dot-ring-ring motives placed irregularly within the faces of the die. The grain of the bone is parallel to faces 1, 2, 5 and 6 and perpendicular to faces 3 and 4. A small piece broke off corner 4–5–6. Scratches on faces 3 and 4.											

Cat. 7. **KDM K 2054** (Fig. 1)

object type	Six-sided cubic bone die											
findspot	Brigetio, Komárom/Szőny											
collection	Ödön Kállay											
length of edges [mm]	**1-2**	**1-3**	**1-4**	**1-5**	**6-2**	**6-3**	**6-4**	**6-5**	**2-3**	**2-4**	**5-3**	**5-4**
	12.7	13.7 (11.2)	13.9 (10.5)	12.7	12.8	13.3	13.7	12.8	11.7 (9.9)	12.1 (9.8)	11.9 (8.7)	12.2 (10.1)
weight [g]	4.2											
numbering	Sevens, I/3											
pip style	dot-ring-ring (diameter of outer ring: 4.5 mm)											
colour	brown											
literature	unpublished											
description	Six-sided die made of bone. Irregular, slightly flattened shape; largest faces 1 and 6; length difference between shortest and longest edge is 15.8%. Edges 1–2 and 1–5 markedly bevelled. Numbers are shown with dot-ring-ring motives placed irregularly within the faces of the die. The grain of the bone is parallel to faces 1, 2, 5 and 6 and perpendicular to faces 3 and 4. Scratches on faces 3 and 4.											

Cat. 8. **KDM 55.507.1.** (Fig. 1)

object type	Six-sided cubic bone die											
findspot	Brigetio, Komárom/Szőny											
collection	gift of Károly Fügi											
length of edges [mm]	**1-2**	**1-3**	**1-4**	**1-5**	**6-2**	**6-3**	**6-4**	**6-5**	**2-3**	**2-4**	**5-3**	**5-4**
	12.6	13.1	13.3	12.6	12.3	12.9	13.2	12.2	11.9	12.1	12.0	12.1
weight [g]	4.1											
numbering	Sevens, II/4											
pip style	dot-ring-ring (diameter of outer ring: 4.7 mm)											
colour	light brown											
literature	unpublished											
description	Six-sided die made of bone. Irregular, slightly flattened shape; largest faces 1 and 6; length difference between shortest and longest edge is 10.5%. Edge 1–2 bevelled. Numbers are shown with dot-ring-ring motives placed irregularly within the faces of the die. The grain of the bone is parallel to faces 1, 2, 5 and 6 and perpendicular to faces 3 and 4. Red paint (?) on face 2.											

Cat. 9.	**KDM K 2062** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	19.2 19.3
thickness [mm]	2.3
weight [g]	1.1
colour	brown
literature	unpublished
description	Circular bone gaming counter. Both obverse and reverse are flat, undecorated, circumference rounded. Small indentation in the centre of reverse (lathe centre). Slanting patch on reserve, 5 mm wide, almost parallel to grain of bone. Large crack in middle. Both upper and bottom surface worn and show root marks.

Cat. 10.	**KDM K 2173** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny, civil town
collection	Ödön Kállay
diameter [mm]	19.8 19.0
thickness [mm]	4.0
weight [g]	2.1
colour	brown
literature	unpublished
description	Circular bone gaming counter. Both obverse and reverse are flat, undecorated, circumference rounded. Small indentation in the centre of obverse (lathe centre). Slanting patch on reserve, 7 mm wide, parallel to grain of bone. Nicely polished.

Cat. 11.	**KDM K 2018** (Fig. 2)
object type	bone (?) counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	17.5 16.7
thickness [mm]	5.1
weight [g]	2.7
colour	light brown
literature	unpublished
description	Circular bone gaming counter. Irregular, but more or less circular. Both obverse and reverse are a bit convex, undecorated, circumference rounded. There is a small chance that this counter was in fact a small pebble and not made of bone.

Cat. 12.	**KDM K 409** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	20.2 20.2
thickness [mm]	3.5
weight [g]	1.9
colour	light brown
literature	unpublished

description	Circular bone gaming counter. Obverse is countersunk, reverse is flat, undecorated, circumference slightly bevelled, edges rounded. Small indentation near the centre of obverse (lathe centre). Slanting patch on reverse 7 mm wide, almost parallel to the grain of the bone. Root marks on both upper and bottom surfaces.

Cat. 13.	**KDM K 2057** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	20.3 20.4
thickness [mm]	3.8 4.6
weight [g]	2.4
colour	light brown
literature	unpublished
description	Circular bone gaming counter. Obverse is countersunk, reverse is flat, undecorated, circumference slightly bevelled, edges rounded. Small indentation near the centre of obverse (lathe centre). Slanting patch on reverse 3 mm wide, parallel to the grain of the bone. Slightly scratched upper and bottom surfaces.

Cat. 14.	**KDM K 2060** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	21.6 21.9
thickness [mm]	3.9 4.5
weight [g]	2.7
colour	light brown
literature	unpublished
description	Circular bone gaming counter. Obverse is countersunk, reverse is flat, undecorated, circumference slightly bevelled, edges rounded. Small indentation near the centre of obverse (lathe centre). Lower edge a bit chipped. Root marks on both upper and bottom surfaces.

Cat. 15.	**KDM 56.2.216.** (old number 1529) (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Reformed High School, Hódmezővásárhely
diameter [mm]	20.2 20.4
thickness [mm]	3.2 3.4
weight [g]	1.8
colour	light brown
literature	unpublished
description	Circular bone gaming counter. Obverse is countersunk, reverse is flat, undecorated, circumference bevelled. Small indentation near the centre of obverse (lathe centre). Lower edge a bit chipped. Two slanting patches on reverse 3–4 mm wide, parallel to each other and to the grain of the bone.

Cat. 16.	**KDM K 2061** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	20.0 20.1

thickness [mm]	2.4 3.4
weight [g]	1.7
colour	brown
literature	unpublished
description	Circular bone gaming counter. Obverse is countersunk, reverse is flat, undecorated, circumference rounded. Small indentation near the centre of obverse (lathe centre) with a protruding ring around it. Slanting patch on reverse 4 mm wide, almost parallel to the grain of the bone. Two other slanting patches on lower edge, 1 mm wide. Upper surface worn.

Cat. 17.	**KDM K 2058** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	20.4 20.6
thickness [mm]	2.3 3.1
weight [g]	1.7
colour	dark brown
literature	unpublished
description	Circular bone gaming counter. Obverse is countersunk, reverse is flat, undecorated, circumference rounded. Small indentation near the centre of obverse (lathe centre) with a protruding ring around it. Cracked.

Cat. 18.	**KDM K 73** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	19.9 20.1
thickness [mm]	2.0 2.4
weight [g]	1.2
colour	light brown
literature	unpublished
description	Circular bone gaming counter. Obverse is decorated with four concentric groves, reverse is flat, undecorated, circumference bevelled. Lower edge a bit chipped on one side.

Cat. 19.	**KDM K 2056** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	20.1 20.2
thickness [mm]	3.2 3.2
weight [g]	1.7
colour	light brown
literature	unpublished
description	Circular bone gaming counter. Obverse is decorated with four concentric groves, reverse is a bit curved instead of being completely flat, undecorated, circumference rounded.

Cat. 20.	**KDM K 2059** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	17.9 18.8

thickness [mm]	2.4 2.9
weight [g]	1.3
colour	light brown
literature	unpublished
description	Circular bone gaming counter. Obverse is decorated with four concentric groves, reverse is flat, undecorated, circumference rounded. Both upper and lower surfaces covered heavily with root marks.

Cat. 21.	**KDM K 2055** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	16.8 16.9
thickness [mm]	3.5
weight [g]	1.1
colour	light brown
literature	unpublished
description	Circular bone gaming counter. Obverse is decorated with three concentric groves with a prominent ring in the middle, reverse is flat, undecorated, circumference bevelled. Small indentation near the centre of reverse (lathe centre). Both upper and lower surfaces scratched.

Cat. 22.	**KDM K 843c** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny, Bélapuszta
collection	Ödön Kállay
diameter [mm]	20.7 20.8
thickness [mm]	2.8 3.4
weight [g]	1.9
colour	light brown
literature	unpublished
description	Circular bone gaming counter. Obverse is decorated with three concentric groves and a protruding ring in the middle and, as well as V-shaped notches along the upper edge; reverse is flat, undecorated, circumference straight. Slanting patch on reverse 3 mm wide. Lower edge chipped. Root marks on both upper and lower surfaces.

Cat. 23.	**KDM 56.2.217.** (old number: 1535) (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Reformed High School, Hódmezővásárhely
diameter [mm]	18.3 18.7
thickness [mm]	2.9
weight [g]	1.3
colour	light blue
literature	unpublished
description	Circular bone gaming counter. Obverse is decorated with four concentric groves and a protruding ring in the middle and, as well as V-shaped notches along the upper edge; reverse is flat, undecorated, circumference rounded. Minor scratches.

Cat. 24.	**KDM 56.2.256.** (Fig. 2)
object type	bone counter
findspot	Brigetio, Komárom/Szőny
collection	Reformed High School, Hódmezővásárhely
diameter [mm]	18.9 19.3
thickness [mm]	8.6
weight [g]	3.7
colour	light brown
literature	unpublished
description	Circular bone gaming counter. Irregular but more or less round. Obverse convex, reverse is flat, undecorated. Small indentation near the centre of obverse (lathe centre). Bottom is cracked and chipped.

Cat. 25.	**KDM K 1924** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	20.7 22.2
thickness [mm]	8.8
weight [g]	6.0
colour	translucent light green
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Translucent light green colour. Both upper and lower surfaces heavily pitted. A faint spiral line on upper surface.

Cat. 26.	**KDM 56.2.255.** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Reformed High School, Hódmezővásárhely
diameter [mm]	21.7 22.4
thickness [mm]	9.1
weight [g]	6.0
colour	translucent light green
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Translucent light green colour. Both upper and lower surfaces pitted. Small parts broke off the object (conchoidal fractures).

Cat. 27.	**KDM 55.472.1.** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	gift of Károly Fügi
diameter [mm]	24.1 24.5
thickness [mm]	6.5
weight [g]	5.9
colour	translucent light brown
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Translucent light brown colour. Both upper and lower surfaces pitted.

Cat. 28.	**KDM 55.471.1.** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	gift of Károly Fügi
diameter [mm]	24.3 24.8
thickness [mm]	6.0
weight [g]	5.5
colour	translucent black appearing, true colour in transmitted light: burgundy
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Translucent black appearing glass, in strong transmitted light its colour is dark burgundy. Both upper and lower surfaces pitted.

Cat. 29.	**KDM 56.2.257.** (old number 1530) (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Reformed High School, Hódmezővásárhely
diameter [mm]	22.1 25.4
thickness [mm]	5.5
weight [g]	4.8
colour	translucent black appearing, true colour in transmitted light: burgundy
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Translucent black appearing glass, in strong transmitted light its colour is dark burgundy. Both upper and lower surfaces pitted, lower surface also corroded (iridescent patches). A large piece broke off the object (conchoidal fracture).

Cat. 30.	**KDM K 342e** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny, parcel of József Járóka
collection	Ödön Kállay
diameter [mm]	33.4 32.7
thickness [mm]	8.1
weight [g]	13.4
colour	translucent light green
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Translucent light green colour. Both upper and lower surfaces pitted and corroded (iridescent patches). Found in a child's grave in the Járóka cemetery, at the feet of the skeleton with 16 other glass objects (K 342c).

Cat. 31.	**KDM K 1923** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	29.6 29.6
thickness [mm]	6.4
weight [g]	8.9
colour	translucent black
literature	unpublished

description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Translucent black appearing glass. Both upper and lower surfaces pitted and heavily corroded (iridescent patches). Broken in two with small part missing. The broken surface is black, looking like obsidian.

Cat. 32.	**KDM K 424** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	15.4 15.6
thickness [mm]	5.8
weight [g]	2.0
colour	translucent dark blue
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Translucent dark blue glass with light blue patches. Both upper and lower surfaces heavily pitted and corroded (iridescent patches). Upper surface chipped.

Cat. 33.	**KDM K 450c** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	23.1 24.3
thickness [mm]	7.0
weight [g]	5.9
colour	opaque dark blue
literature	unpublished
description	Plano-convex glass gaming counter. Rounded triangular shape, with flat but rough bottom, domed upper surface and rounded edge. Opaque dark blue colour. Both upper and lower surfaces corroded, worn and scratched.

Cat. 34.	**KDM 55.474.1.** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	gift of Károly Fügi
diameter [mm]	24.9 25.8
thickness [mm]	7.0
weight [g]	7.2
colour	opaque black
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Opaque black colour. Spiral line on both upper and lower surfaces.

Cat. 35.	**KDM 56.2.259.** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Reformed High School, Hódmezővásárhely
diameter [mm]	23.9 24.9
thickness [mm]	9.4
weight [g]	8.6
colour	opaque black

literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Opaque black colour. Spiral line on both upper and lower surfaces.

Cat. 36.	**KDM 55.475.1.** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	gift of Károly Fügi
diameter [mm]	17.3 17.5
thickness [mm]	6.9
weight [g]	2.9
colour	opaque black
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Opaque black colour. Both upper and lower surfaces smooth. A small piece broke off the upper surface.

Cat. 37.	**KDM K 1925** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	18.9 18.9
thickness [mm]	9.0
weight [g]	4.3
colour	opaque black
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Opaque black colour. Spiral line on both upper and lower surfaces. Both surfaces are heavily pitted.

Cat. 38.	**KDM K 1926** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	14.5 14.8
thickness [mm]	6.2
weight [g]	1.8
colour	opaque black
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Opaque black colour. Both upper and lower surfaces are heavily pitted.

Cat. 39.	**KDM 56.2.260.** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Reformed High School, Hódmezővásárhely
diameter [mm]	15.8 17.3
thickness [mm]	6.4
weight [g]	2.2
colour	opaque black
literature	unpublished

description	Plano-convex glass gaming counter. Oval, with flat bottom, domed upper surface and rounded edge. Opaque black colour. Both upper and lower surfaces are extremely rough.

Cat. 40.	**KDM 55.476.1.** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	gift of Károly Fügi
diameter [mm]	15.8 15.9
thickness [mm]	6.7
weight [g]	2.6
colour	opaque black
literature	unpublished
description	Plano-convex glass gaming counter. Circular, with flat bottom, domed upper surface and rounded edge. Opaque black colour. Both upper and lower surfaces slightly pitted.

Cat. 41.	**KDM 56.2.254.** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Reformed High School, Hódmezővásárhely
diameter [mm]	21.5 24.3
thickness [mm]	8.2
weight [g]	3.2
colour	opaque white
literature	unpublished
description	Plano-convex glass gaming counter. Oval, with flat bottom, domed upper surface and rounded edge. Opaque white colour. Both upper and lower surfaces are pitted.

Cat. 42.	**KDM K 749b** (Fig. 3)
object type	glass counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	18.6 20.3
thickness [mm]	7.0
weight [g]	2.4
colour	opaque white
literature	unpublished
description	Plano-convex glass gaming counter. Irregular, roundish shape, with flat bottom, domed upper surface and rounded edge. Opaque white colour with light brown patches. Both upper and lower surfaces are smooth with a few indentations. Originally there were 17 glass counters under this number: two green, one blue, one black, five brown and eight white pieces.

Cat. 43.	**KDM K 2037** (Fig. 4)
object type	ceramic counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	25.1 25.5
thickness [mm]	5.0 5.7
weight [g]	4.8
colour	light orange
literature	unpublished

description	Ceramic purpose-made gaming counter. Circular, flat shape with relief decoration on obverse and undecorated, plain reverse. Rounded edges. The relief decoration looks like a rough imitation of a coin.

Cat. 44.	**KDM K 1197** (Fig. 4)
object type	ceramic counter
findspot	Brigetio, Komárom/Szőny
collection	Ödön Kállay
diameter [mm]	35.0 37.2
thickness [mm]	8.7 10.6
weight [g]	17.5
colour	red
literature	unpublished
description	Ceramic gaming counter made of a reused terra sigillata bottom shard. Chipped and ground to an almost exactly circular shape. Bottom of a wheel-thrown terra sigillata vessel with maker's stamp. The stamp is fragmentary and damaged. According to Dénes Gabler the vessel was made in Rheinzabern between c. 160-235.

Cat. 45.	**KDM 80.1.492.** (Fig. 4)
object type	ceramic counter
findspot	Almásfüzítő-Foktorok, 1971
collection	excavation of Endre Bíró
diameter [mm]	42.7 46.6
thickness [mm]	12.1 13.0
weight [g]	32.0
colour	light orange
literature	unpublished
description	Ceramic gaming counter made of a reused pottery shard. Chipped and ground to a roundish form. The object is not flat but slightly curved, it was made of a wall fragment of a locally made pottery vessel.

Cat. 46.	**KDM 80.221.300.** (Fig. 4)
object type	ceramic counter
findspot	Almásfüzítő-Foktorok, 1971
collection	excavation of Endre Bíró
diameter [mm]	54.7 51.5
thickness [mm]	10.1 11.2
weight [g]	31.1
colour	light orange
literature	unpublished
description	Ceramic gaming counter made of a reused pottery shard. Chipped and ground to a roundish form. Flat upper surface, concave lower surface, it was made of the bottom of a locally made pottery vessel.

Cat. 47.	**KDM 80.1.862.** (Fig. 4)
object type	ceramic counter
findspot	Almásfüzítő-Foktorok, 1971
collection	excavation of Endre Bíró
diameter [mm]	48.0 51.7
thickness [mm]	9.8 10.3
weight [g]	27.5

colour	light orange surfaces, dark grey
literature	unpublished
description	Ceramic gaming counter made of a reused pottery shard. Chipped to a roundish form. The object is not flat but slightly curved, it was made of a wall fragment of a locally made pottery vessel.

Cat. 48.	**KDM 56.1.25.** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny
collection	Reformed High School, Hódmezővásárhely
diameter [mm]	33.5 35.2
weight [g]	49.0
colour	dark brown
literature	unpublished
description	Ceramic marble. Spherical shape.

Cat. 49.	**KDM K 907 a** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay
diameter [mm]	27.1 34.0
weight [g]	24.8
colour	light grey
literature	unpublished
description	Ceramic marble. Spherical shape. Perforated. As it is perforated, it might not have been a marble but a loom weight originally (maybe later reused as a marble).

Cat. 50.	**KDM K 907 b** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay
diameter [mm]	29.3 29.7
weight [g]	27.3
colour	light grey
literature	unpublished
description	Ceramic marble. Spherical shape. Greyish colour with dark grey patches.

Cat. 51.	**KDM K 907 c** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay
diameter [mm]	29.3 29.5
weight [g]	26.7
colour	grey
literature	unpublished
description	Ceramic marble. Spherical shape. Greyish colour, chipped surface.

Cat. 52.	**KDM K 907 d** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay

diameter [mm]	25.0 25.9
weight [g]	15.8
colour	orange
literature	unpublished
description	Ceramic marble. Spherical shape. Orange colour.

Cat. 53.	**KDM K 907 e** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay
diameter [mm]	29.3 29.4
weight [g]	25.8
colour	orange
literature	unpublished
description	Ceramic marble. Spherical shape. Orange colour. Partly chipped, damaged surface.

Cat. 54.	**KDM K 907 f** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay
diameter [mm]	29.4 35.8
weight [g]	38.7
colour	light orange
literature	unpublished
description	Ceramic marble. Spherical shape. Light orange colour. Heavily chipped surface.

Cat. 55.	**KDM K 907 g** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay
diameter [mm]	32.7 33.3
weight [g]	36.1
colour	yellowish
literature	unpublished
description	Ceramic marble. Spherical shape. Yellowish colour, smooth surface.

Cat. 56.	**KDM K 907 h** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay
diameter [mm]	28.8 30.9
weight [g]	27.1
colour	orange
literature	unpublished
description	Ceramic marble. Spherical shape. Orange colour. One side chipped and there is a cut on the other side.

Cat. 57.	**KDM K 907 i** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay

diameter [mm]	30.7 31.2
weight [g]	30.5
colour	greyish
literature	unpublished
description	Ceramic marble. Spherical shape. Yellowish-greyish colour. Chipped.

Cat. 58.	**KDM K 907 j** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay
diameter [mm]	27.5 27.8
weight [g]	21.1
colour	orange
literature	unpublished
description	Ceramic marble. Spherical shape. Orange colour.

Cat. 59.	**KDM K 907 k** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay
diameter [mm]	31.6 34.0
weight [g]	34.1
colour	yellow
literature	unpublished
description	Ceramic marble. Spherical shape. Yellowish colour and smooth surface.

Cat. 60.	**KDM K 907 l** (Fig. 4)
object type	ceramic marble
findspot	Brigetio, Komárom/Szőny, Kurucdomb
collection	Ödön Kállay
diameter [mm]	33.4 34.1
weight [g]	39.8
colour	light orange
literature	unpublished
description	Ceramic marble. Spherical shape. Large hole on one side (but not perforated), chipped surface.